

THE ECONOMICS OF
THE STOCK EXCHANGE

T H E E C O N O M I C S O F
T H E S T O C K E X C H A N G E

by

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TO ETTA

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CHAPTER VII

SOME ASPECTS OF VALUATION OF SECURITIES
FOR INVESTMENT PURPOSES

A. Introduction

The purpose of this chapter is to give a very brief outline of some of the more important factors which an individual will consider before committing his funds (or savings) to a particular share or shares. The discussion can be divided into two major parts, namely security analysis and market analysis. Risk and portfolio selection will be dealt with in the next chapter. In the previous chapter we were concerned mainly with some of the broader aspects of share price economics, for example, the 'temporary equilibrium' nature of security prices. In this chapter, the processes or methods by which an individual will try to measure or ascertain the investment merits of a security will be discussed.

The remarks in the present chapter will be mainly applicable to industrial and commercial companies, and not to gold mines already producing or in the developing stages. Mines are a wasting asset and certain problems arise in the valuation of gold mining shares. Some of these problems will be discussed at the end of this chapter.

We must again point out that we must distinguish between the valuation of a given share or group of shares and the theory on share price economics in general. The price of a share ruling at a given point of time implies subjective valuation by a large body of individuals. It must again be stressed that valuation and the value placed on a given share by an individual is purely a subjective matter. The stock exchange is a market where the current market price reflects the balance of expectations, and the individual will compare his own subjective valuation with the objective valuation placed on the security by the market, that is, the current market price. The market price, or the value placed on the security by the market is the social objectification of an otherwise subjective phenomenon.

The individual's subjective valuation may, however, differ from the current market price, in which case the individual will consider the security to be overvalued or undervalued, which will then determine his strategy. The fact that we do talk about an undervalued or overvalued security implies that we have some standard 'measure' of

value. We may take this measure to be the current market price, but we must still be very careful. Roughly we may say that, from the individual's point of view, a security is undervalued if the individual's subjective valuation of the company's worth in terms of asset values and expected earning power (or income stream) is higher than that reflected by the market, that is, the market price is below the subjective valuation. The opposite will hold for an overvalued security. The stock exchange is a market where the potential earning power of a heterogeneous capital stock is valued in terms of expected future income streams.

An individual will attempt to appraise a certain security in an effort to place some subjective valuation on the security before any funds are committed to the purchase of such a security, or before he may decide to sell such a security. As we have indicated in chapters IV and VI, the stock exchange is an intertemporal market, where expectations are brought into consistency, and where the 'temporary equilibrium' prices of listed securities reflect the balance of expectations at a point of time. These prices are part of the market and other knowledge transmitted to all corners of the market, which affect expectations, multiperiod plans, and decisions. The individual can calculate important ratios and relationships, which will of course change over time, from the ruling market prices of securities. The ruling market price of the security, and the suitability or feasibility of the security for investment purposes, at that price, is a significant consideration. A sound issue is not necessarily a good investment at the current price, as this price may already be too high and may reflect over-optimistic expectations. A given security may be an attractive proposition at one price, but vulnerable and a poor proposition at another price. In investment analysis the element of time, and the timing of either a purchase or a sale is given some prominence.

Valuation is one of the tools used by an individual to forecast¹ the prospects of a given security. Valuation is also an important ingredient in formulating an investment programme or plan, and in portfolio management. The individual must, however, always bear in mind that estimating future dividend growth and dividend streams, earnings and earnings growth, and the future price of any security

1. To forecast is to express a more or less definite view of the future.

with any high degree of confidence is impossible. Some margin of error must always be expected. This should, however, not deter the individual from carefully considering all known facts or evidence at his disposal about a given security, and then formulating his own subjective expectations and forecasts. He will, of course, be proved right or wrong only at some future date, that is, say, the date of his investment horizon, or his next decision-date.

An individual analysing and investigating the future prospects of a given security will, before he adopts a certain strategy, investigate some qualitative and quantitative factors related to the security. The qualitative factors are the nature of the enterprise and its future prospects within the industry, as well as the current position and future prospects of the industry as a whole. Whether proper industry selection is an important factor in analysis and investment strategy is still a controversial matter. We feel that it is an important factor, because in a dynamic world we will find declining industries, for example, the gold mining industry in South Africa. Proper industry selection is thus an important ingredient in investment analysis and portfolio management.

The second qualitative factor is the character, composition, and ability of the existing management. Some weight may also be attached to recent and/or pending changes in management. There are no objective tests of the management's ability or any tangible information available on the qualities of management. The ability and quality of management may be reflected in earnings and net profits and thus be reflected in the market performance of the security. To give extra weight to management ability and quality may then amount to 'double-counting'.

The quantitative factors will involve a full investigation into the available statistics of the company over a representative period of time. The information will be obtained from published statements and accounts, newspaper reports and so forth, and will comprise mainly the following:- (1) sales figures where available, (2) operating costs, (3) operating profits, (4) net profits, (5) dividends, (6) reserves and ploughback, (7) working capital, (8) liquidity, (9) capital structure, (10) assets and liabilities, (11) different yields, and (12) price-earnings relationships and price-value relationships.

The financial relationships in the income accounts and balance sheet can be investigated by computing numerous ratios, and the trends in these ratios. A trend will show the relationship of individual ratios in a time series. The ratios and trends themselves must, however, be treated with caution, as some distortion may be present in the statistical data used. The trends may then be extrapolated into the future, and the individual can make subjective estimates as to the future trends of the various variables and ratios. The qualitative and quantitative factors must always be considered in conjunction with each other. Some quantitative and qualitative information or knowledge is needed for careful judgment, decision-making and prudent portfolio management. With reference to the quantitative factors, the statistical and other data will be the individual's raw material. The manner in which he utilises the statistical data will be largely influenced by his own objectives, aims and temperament.

The purchaser of a stock exchange security is interested in either income or capital appreciation, but normally both, and as we have indicated before, there is no need to distinguish between income and capital when dealing with the stock exchange and portfolio equilibrium. He may, of course, also adopt a certain strategy for tax purposes. Whether he can satisfy the above, that is, some satisfactory income and capital appreciation, will to a large extent depend on how the assets of the company are managed, the dividend and reserve policies of management, general economic and market conditions, and the behaviour (as influenced or determined by expectations) of other stock exchange participants. To achieve some success, valuation and investigation, and broad economic thinking are prerequisites. Valuation is only more or less empirical, and the best the individual can hope to achieve is to arrive at some subjective, apparent value, or expected value, which may or may not differ from the current market price at that time.

Any individual will have a certain objective or objectives in mind in following a particular investment programme or in holding a portfolio with a certain composition, which is not a once-for-all composition, but is subject, or should be subject, to constant revision and change in a dynamic world. The frequency with which an individual will buy and sell will be influenced by the actual course of events, his objectives, investment horizon, wealth, transaction costs, and so forth.

The function of investment analysis is then to establish certain principles which can be used as analytical tools by the individual for comparing the past performance of various security issues, in an attempt to rationalise, as far as is realistically possible, the selections of issues incorporated in the investment portfolio. Most investment analysts and economists, however, seem to agree that investment analysis has some definite limitations. The elements of subjectivity, uncertainty and risk are always present. Dowrie, Fuller and Calkins recognised the limitations and contended that since the individual is really "Dealing with some factors which can be measured and others which cannot, with some which depend on future events and others which reflect the past and present, investment analysis can only be effective within rather wide tolerance limits, since the data used and conclusions reached are subject to human interpretation."² We are in complete agreement with this view. In general investment analysts agree that mechanical or technical approaches to analysis do not really prove to be very successful. This is mainly because the stock exchange is a 'flexprice' market where history, like anywhere else, does not repeat itself, even if some factors appear to be the same as previously. The above statements refer particularly to charting and analysis of market performance, which do not normally form part of investment or security analysis, but part of market analysis. (At a later stage in the present chapter we shall indicate the difference between the 'fundamentalists' and the 'technicians'.) The result is that, in forecasting even short-term price-fluctuations, some considerable margin of error may be present, since the magnitude of price changes is of a random character, as we shall also argue later.

Although the risks attached to a given security cannot be easily, (or at all), cardinally measured, the function of investment analysis is still an attempt to analyse and stress some of the internal and external risks inherent in a certain company, and to enable the individual to formulate some subjective estimate as to the risks inherent in security A, which may be present to a lesser or greater degree in securities B, C, D, and so forth. The advantages of proper analysis and investigation are really twofold; first, it helps in the process of appraising risks, and second, more data and knowledge

2. Dowrie, G.W., Fuller, D.R. and Calkins, F.J., Investments, 3rd edition, p.293.

will, to some extent, decrease the degree of uncertainty.

Dowrie, Fuller and Calkins divided the functions of investment analysis into two steps, namely, first, that of classification, and second, that of valuation. Classification is a descriptive function, and involves the determination of the true nature of a security.³ Classification as such will actually involve two main steps. First, all relevant facts relating to a particular security will be compiled and presented in a manner intelligible to the individual, or he may make use of specialist services by broking firms or investment analysts to supply the information wanted. All facts will be carefully scrutinised, and all favourable and unfavourable aspects of the given security will be listed. The second step in classification will be to compare the facts compiled with other issues in an effort to focus attention on certain strengths and weaknesses and the relative risk position. Classification is again a subjective matter, as the individual, in his classification, will always bear in mind his own objectives, based on multiperiod plans, and the means at his disposal to attain the objectives.

The manner in which the securities will be classified will be largely governed by the individual's taste for risk and his risk-aversion, and the type of risk which is subject to examination. This is normally called risk classification, to use Dowrie, Fuller and Calkins' terminology. Risk classification will thus already have some influence on the composition of the portfolio. Subjective uncertainty, subjective taste for risk and subjective risk-aversion will affect the composition of a given portfolio and subsequent changes in the portfolio. By comparing risks the individual will also try to ascertain the affect of the various risks involved on price and income variability or stability, as the case may be. If the individual classifies securities or groups of securities according to the degree of price volatility, which is really part of market analysis, the classification is referred to as stability classification. The third classification, given by Dowrie, Fuller and Calkins, is temporal classification. Here the individual is interested in the time period within which the price variability is

3. Dowrie, G.W., Fuller, D.R. and Calkins, F.J., Investments, 3rd edition, pp.295-296.

exhibited or expected.⁴ Whether his horizon will be relatively short or long will again be determined by the individual's objectives and multi-period investment plans. The classification function serves the purpose of answering three important questions, namely the type of risk which is considered, the degree of price volatility which can be expected and which is associated with the type and degree of risk, and the time period involved, where the latter will be a function of the individual's multiperiod plans. The various kinds or types of risk external to a particular company as well as some of the internal risks, will be discussed in chapter VIII.

The individual may also be interested in the long-term price fluctuations or price trends exhibited by the security in the past, and formulate his subjective opinion of how stable (or variable) the price may be in the future, always bearing in mind that the past performance of the management and economic conditions need not be repeated in the future. However, the trends in the past may show a given pattern, either of a sustained and above average increase, or decrease, or some remarkable degree of constancy. By observing these trends in the prices of given issues, the individual may be able to isolate the issues which are more suited to his own objectives, multi-period plans and temperament. The individual may then consider the potential investment merits of given issues by classifying the issues into three groups, namely those showing a growth potential, a non-growth potential, and a declining potential.

The individual will also carefully consider the period of time over which he will endeavour to attain his objectives, and careful investment planning will be of great significance. The individual's policy and behaviour (strategy) will be influenced by the time period for which he is prepared to lock his funds up in securities to achieve his objectives, that is, whether he is a day-to-day trader (speculating from day-to-day on daily price fluctuation), or whether he is trading on medium-term swings, or whether he is a long-term investor, the latter being institutions, intermediaries, and private individuals. His forecasts will also tend to be for the short, medium, or long-term.

4. See Dowrie, G.W., Fuller, D.R., and Calkins, F.J., Investments, 3rd edition, p.297.

The long-term investor will, by the nature of his objectives, be particularly interested in the growth possibilities and income stability offered by a given security issue. This certainly does not imply that his decision to invest in a given security, which does promise growth in terms of his subjective forecast, is a once-and-for-all commitment or decision. If the past performance of the management is not repeated and earnings, dividends, output, and so forth, show a tendency to grow at a slower rate, or some other internal factor, such as a bad financial decision, or a change in management, adversely affect the investment potential of the security as a long-term prospect, the individual can always sell and substitute, if and when necessary.

The individual investing in stock exchange securities, either in equities or fixed-interest securities, or both, cannot afford to go about investment in a haphazard manner and he will from time to time be faced with complex situations. He must make his choice between various differentiated securities, where the future prospects of all of them are uncertain. Proper classification will answer some of his questions, but not all.

The second function of analysis, that of valuation, covers an extremely wide field, where different approaches are possible, and some complex issues present themselves. Valuation is a particularly subjective element in investment analysis. According to Dowrie, Fuller and Calkins, valuation is "...a more positive step, going further than classification, trying to arrive at a judgment of value, of the desirability of a security at a specific price. It answers the question: 'At what price is it good for me?' It undertakes to determine what price is reasonable for a given security especially in comparison with other suitable opportunities."⁵ This obviously involves a process of careful comparison and selection. The selective process or function is an important one, and involves quite a few steps and principles.

First, with reference to stocks and debentures the principles pertaining to selection may be considered as being well-established and fairly standardised. The individual must, of course, try to judge the credit standing of the issuer, that is, whether interest payments will be met, and whether it is the right time to invest in

5. Dowrie, G.W., Fuller, D.R. and Calkins, F.J., Investments, 3rd edition, p.296.

a particular stock, that is, whether the price and the yield would justify some commitment. Here again the issue will be compared with comparable issues as to safety of principle, interest cover, prices and yields.

With reference to ordinary shares, a number of approaches are open to the individual. In the first place he can merely select issues on the basis of expected future market performance. This will involve market analysis, and the individual will probably commit his funds to those shares which he expects will give him the best capital gains over a certain period of time, say two to twelve months. He will thus look for issues which he subjectively feels will outperform other issues in the market over his own investment horizon. He may be a short-swing trader, hoping to make capital gains which would give him reasonable average profits over, say, a year, or any other relatively short-period. His guesses must be more often right than those of the market.

A second approach would be to make an attempt to arrive at some subjective worth or value of the share, independently of its current market price. The subjective valuation placed on the share may be quite different from the current market price. In terms of the subjective valuation the individual may consider the share to be overvalued or undervalued by the market. If the share is overvalued by the market, the individual will probably sell if he already owns the security. On the other hand, he may be tempted to buy if the security is undervalued by the market. This subjective, independent value arrived at by the individual is usually referred to as the intrinsic value, indicated value, normal value, fair value, appraised value, reasonable value, investment value and so forth.⁶ It is then assumed that the intrinsic value or whatever one may wish to call it, will be independent of the current market price of the security. The word intrinsic is used simply to distinguish between value and current market price.

The third approach advocated by investment analysts is that the value or worth of a share is not independent of its current market price. The individual will, of course, ask himself whether the current

6. See Graham, B., Dodd, D.L. and Cottle, S., Security Analysis, 4th edition, p.27.

market price is a reflection of investment value. He does not accept the complete independence of intrinsic value from the current market price. Here the individual is interested in the relative value of the share. The share is valued in terms of its current market price, which is considered to reflect the balance of expectations and other people's valuations at that time. The market price is accepted as such. The rates at which earnings and dividends are capitalised for the security and other comparable securities are derived from the current level of prices. The subjective value of an ordinary share is not the equivalent of its current price. Neither current price, nor an average price over a representative period of time is a measure of value, or of future price expectancy. The real issue is not so much the value of the share versus the price of the share, but the future price versus the present price.⁷

The second approach probably needs a bit more clarification. A clear distinction is drawn between subjective value and market price, where value is considered to be a variable and liable to changes. (The same, of course, applies to market price.) It is normally said that the intrinsic value is less volatile or does not change as frequently as the market price. It is said that the intrinsic value is that minimum value which is "...justified by the facts, e.g. assets, earnings, dividends, definite prospects, including the factor of management."⁸ For example, if it is accepted that a security's value is mainly a function of future earning power, then the intrinsic value can be determined by multiplying an estimate or forecast of the earning power by some capitalisation factor. For example, the estimated earning power of ABC Ltd., over the next couple of years would be say R1 per share. Say a multiplier (price-earnings ratio) of 10 is assumed, then the intrinsic value is R10. This may be well above or below the current market price, which is not taken into account. It is claimed that a sound valuation basis can provide the individual with a profitable buying and selling policy or programme. The individual may find that his valuation of the security conforms very closely to the ruling market price, that is, there may be a tendency

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7. In chapter VI, we have pointed out that transactions will take place between those whose expectations of future prices diverge from the current market price, and that the future will affect the present via expectations.
 8. Graham, B, Dodd, D.L. and Cottle, S., Security Analysis, 4th edition, p.28.

for the current market price and the subjective value placed on a security by an individual to converge, and this will also influence his expectations and strategy. However, the use of the word intrinsic is not a very fortunate one when it comes to valuation, because it implies that some objective valuation can be placed on a given share by an individual, given the necessary data and facts. This, of course, cannot be done, since the future will always remain uncertain.

The real difficulty arises when one has to estimate future earning power or rate of return, as earnings and the rate of growth of earnings cannot be forecast with any high degree of accuracy or confidence. Secondly, the capitalisation rate, or as it is sometimes called, the multiplier, is another factor which is difficult to ascertain or determine. We thus have two uncertain variables, and this is a limitation inherent in the value approach, particularly with reference to the valuation of ordinary shares, where conditions can change very rapidly. The risks inherent in stock exchange investment thus remain, however sound the basis and methods of valuation used.

The various approaches to, and the actual process of valuation, will be given some attention in the present chapter. At this stage, all we want to point out is that classification and valuation will enable an individual to plan his strategy in respect of stock exchange investments, rather than going about it in a haphazard way. True uncertainty and risk will, however, remain. Wrong investments in securities, which are sometimes due to bad investment planning, the lack of a well-defined investment policy and programme, and lack of proper supervision and scrutiny, may become a very costly business for any individual.

To formulate his expectations and to assist him in making his decisions and forecasts, the individual has only past and current data at his disposal, constituting his knowledge up to a given point of time, and the element of risk and uncertainty cannot be eliminated, as unexpected legal, economic and political changes, as well as changes in management and other internal factors, will result in unexpected changes in the investment merits of a given security or a given industry.

Investment analysis, as applied to equities in particular, is really only a device which can be used in an effort to measure, where

possible, and if possible at all, the growth potential or long-range investment merits of a given security in terms of a number of variables, namely, output-growth, earnings-growth, dividend rates and expected growth thereof, asset values, net worth, the risk-premium required, and so forth, by which the past performance of management may be judged. Supplementary information regarding technology, general economic conditions, the political climate, the integrity of existing management, the true nature and extent of the company's business, (concentration or diversification of interests), competitive position in the industry, and future domestic and international demand for the product or service of the company in the future must also be obtained and analysed. Other factors which must be duly considered are the overall financial structure such as factors related to the gearing and leverage of the company, liquidity, state of solvency, the marketability of the shares and, therefore, whether the current market price of the security, if analysed in terms of all above mentioned variables, is worth paying, that is, whether the security is overvalued or undervalued by the market.

The current market price can be compared with the nominal value of the share, as well as the past high and low quotations, which may reflect the current market confidence or lack thereof in the given security. This is where the complex problem of valuation really comes in, namely to establish the desirability of a given security at a specific market price at a given point of time, which is said to reflect the balance of expectations at that point of time. We cannot escape from the fact that the same data will be differently interpreted by different individuals resulting in divergent expectations. One individual may feel that the market valuation of a given issue, however sound, is too high (overvalued or overpriced) so that a purchase at that price must be considered as irrational, whereas an issue of lesser merit in all respects, allowing for risk, is so undervalued by the market that a small commitment may in the long-run prove to have been rational or feasible or wise.

It must also be borne in mind that securities will be rated according to the subjective multiperiod plans and policy of the individual, and weight will be given to such factors as safety of principal, stability of income, marketability, dividend yield, earnings yield, and possibilities of capital appreciation. The weights given to these factors will differ from one individual to another. To

bring out the above factors clearly, the individual will again divide the different securities (or investment media) into different classes, as already suggested in chapter V. After having done this the individual will study the behaviour of the security after he has purchased it, and substitute at the margin to accommodate any changes in conditions.

In the case of fixed-interest stock, safety of principal and stability of income are more assured than in the case of ordinary shares, as pointed out in Chapter V. It is in the case of equities that more heavy emphasis must be placed on expectations of the future. The individual investing in ordinary shares cannot afford to commit his funds without analysis and forecasting. In the real world uncertainty and risk cannot be divided, and in the same sense, the formation of expectations, forecasting and decision-making (when it comes to security investment) cannot be divorced. At some stage the individual must make a definite choice (or express a definite preference) between certain securities or a combination of securities and other financial assets, such as money and near-money balances. Security prices, due to a large number of factors, are inherently restless, and the future prices are unpredictable, and this, of course, complicates the work of the analyst.

Any forecast of future earnings, dividends, the influence of plough-back on earnings and general economic conditions are equally complex and impossible. The rapidity with which unexpected change can occur in the investment merits of an ordinary share, makes forecasting difficult, and the assessment of risk complex. The individual must, however, clearly formulate his policy towards risk, and this will influence his subjective judgment, expectations, and his forecasting. The accuracy or the correctness of the forecast will, of course, also depend on such factors as the adequacy, and authenticity of the available data, errors in interpretation and assessment, personal bias, changing economic, political and legal conditions and stock exchange psychology, all of which render past experience invalid, and the future uncertain and unpredictable. Whether a purchase was sound or not will only be determined by the future developments, which may bear no relationship to past history, or experience, or statistics. The past is, however, important in the sense that past averages and trends may have some bearing on our expectations which we formulate at

a point of time.

In a volatile, dynamic market situation the facts compiled and forecasts made of a given share may be out-of-date by the time the investigation is finalised. However, such fluctuations in price may only be temporary, and the true merits of the share not impaired. Whether a change in price is temporary, or whether the change in price reflects a more permanent change in quality, cannot easily be judged.

An individual setting himself the task of evaluating the investment merits of securities must have some understanding of the legal and economic aspects of investment media, of accounting principles and practices, and knowledge of the economic and other factors affecting the economy as a whole, or certain sectors in the economy, and certain industries in particular.

Before considering some of the aspects which may give the individual better understanding of the accounts of a company, which in turn will tend to give him some understanding of business procedure and operations, and enable him to formulate his judgment of investment merit, some general aspects will first be considered.

B. Variations in the Type and Nature of the Company

In the introduction to this chapter we have expressed the view that industry selection is an important ingredient in valuation. Furthermore, in the process of classification, it was stated that the relative position of given companies within an industry will be given some weight. Some general remarks with reference to the above will be made in this section.

One of the very first steps which an individual will take is to classify the issues in which he is interested into various industries or groups of industries, that is, mining, financial, industrial, banks and loans, preference shares, debentures, and stocks of various kinds. Mining can again be subdivided into coal, diamonds, gold producers and developers, metals and minerals; financial into mining finance, industrial and general finance, investment trust companies, mutual funds, lands and estates, insurance; industrials into breweries, wines, mineral waters, hotels; building and allied industries; chemicals; clothing and textiles; fisheries, produce, food; iron, steel and engineering, and so forth.

Of prime importance to an individual is the fact that each and every industry will have its own characteristics, risks, and hazards, legally, economically and politically. The methods of analysis and forecasting must be adapted to accommodate the risk differentials and all other problems inherently related to a particular industry. Before an individual can devote his energies to the analysis and investigation of various companies within an industry on a comparative basis, he must have some knowledge and understanding of the basic characteristic differences between the various industry groups, which will enable him to highlight the different risks involved within each industry, and to appraise these risks realistically after careful comparison with other industries. The individual should acquire knowledge of the past development of the industry, the competitive situation of the industry as compared to other industries, and knowledge of other economic trends which may affect the industry advantageously or adversely, such as the stability of demand for the product of the industry, the cost structure, stability of the price of the product, taxation position, the supply of raw materials, labour relations, government policy and monopoly regulations, the extent to which the industry may be able to diversify activities, and so forth.

The individual will find that, after careful investigation, the risks associated with investment in say, breweries, will be completely different from the risks associated with investment in the shares of an unproved mining venture, or an investment trust, or mining finance company. For example, a decline in security prices in general on the stock exchange, or any change in dividend rates, will affect the latter two groups adversely. Rates of growth in earnings and profits in industries will differ (or diverge) as long as changes in economic conditions exist, and such changing conditions will always exist. Changes in the rate of growth of the economy will affect earnings, and the growth rate of earnings more in certain sectors than others. The individual will, of course, find it impossible to assess the amplitude of these changes and the future impact of such changes. A stop-go policy, for example, may materially affect output and output-growth, and thus turnover, profits and dividends of certain industries. Such changes will be reflected in relative price movements on the stock exchange as between various industries. Not all sectors of the economy share equally in economic growth. A comparison of share price indices, say golds and industrials, will clearly indicate this.

Furthermore, inflation may affect various industries (or groups of securities) differently, for example during a 'go-period', particularly if accompanied by inflation, one would expect ordinary shares as a group or class to do better than fixed-interest securities. One may say that prosperity and depression have their victims and favourites in the financial world. During boom and inflation some companies will still incur losses, and the growth rates of earnings between various companies will still diverge completely.

It is thus not only important to classify securities into industry groups, but also according to type of security, emphasising the points mentioned in chapter V on investment media. Again, the individual's own subjective aversion or taste for risk will have some bearing on the bias against or preference for certain industries and for certain securities. Some industries may be completely avoided by some individuals. For this reason, no two individuals will value the same security identically, even if there were no other reasons.

After the individual has considered and compared various industries, he will focus attention on the individual companies within the industry, and make a detailed comparative study of the individual companies within an industry or industry group. It must always be borne in mind that not every company within an industry will be equally favourably or unfavourably placed within a particular industry or equally affected by adverse or favourable trends and developments within the industry. Comparative studies of and investigation into the quality, integrity, progressiveness and policies of management, financial and capital structures, locality, turnover, operating costs, gross and net profits, rate of return on capital employed, and so forth, may reveal certain points of strength or weakness in a particular company, which may place such a company in an inferior or superior competitive position relative to other companies in the same industry. Furthermore, a comparative analysis may have the further advantage of showing up the vulnerability of a particular company to other internal and external risks. A comparative analysis and investigation of the various companies within the industry is a necessary step in the process of judging the investment merits of a given security.

Constant revision of the relative positions of companies is, of course, a prerequisite in portfolio management. In a dynamic

world each company will be subject to considerable change over time. The earnings of industrial and commercial companies are subject to considerable fluctuations, and earnings-per-share, dividend rates, and prices on the stock exchange are volatile. The growth rate of earnings and growth rate of dividends are variable and influenced by numerous internal and external factors. The earnings of companies in some industries may be more stable than in others, or less sensitive to changing economic conditions. To assess the impact of these external and internal forces on the relative position of a given company in an industry, the individual will need, apart from financial statements, other supplementary information and data.

The external factors are a growing demand for the product, changes in technology,⁹ new inventions, and better markets. Obstacles which may inhibit the growth are lack of finance, patents, competition, entry, and the supply of factors of production.

In the same manner as expectations determine the behaviour of the individual so will expectations determine a company's behaviour. The ambitions, judgment, visions, and multiperiod plans of management will have some influence on the growth rate of the company. Expectations about the future will have an influence on, or determine, the plan structure of the company. Expectations are again held with varying degrees of confidence, but are also variable, and the fact that expectations do change will, of course, lead to changing plans. Risks will always be present, that is, the actions taken by management may result in losses to the company. Risk and uncertainty may even lead to the cancellation of certain projects, which may then become a limiting factor on growth. For example, to undertake certain capital projects, the company may have to borrow. To borrow, however, may place the company in an unbalanced and unhealthy financial position, with the result that certain capital projects are shelved, because of the increasing risk factor involved in borrowing.

To maintain a certain competitive position and some growth in earnings in expanding markets, continued investment must be undertaken. Companies with a well-entrenched position in a given industry have

9. See section C on depreciation for a discussion of embodied and disembodied technical progress. Technical progress can work in both directions.

normally established and maintained a basic position in the industry with reference to sources of supply of productive factors, technology and markets for their products. Such companies may also find diversification of activities useful in maintaining the growth rate in earnings. To maintain a certain position in the industry, a given company will have to keep pace with new techniques and other innovations introduced by its competitors. Proper diversification of products and activities may result in some stability of earnings at later stages, after a rapid initial increase in the rate of growth. Diversification need not impair the efficiency of a company, and may well increase the rate of growth in earnings. However, the management must have knowledge of opportunities for diversification. The extent to which a company can diversify is limited by the supplementarity of existing activities and the extent to which other activities can be fitted into the plan structure of the company. With any increase in size of the company, the absolute amount to be invested must be larger to maintain at least a minimum rate of growth. Small companies face the same problem, and opportunities for expansion through mergers and take-overs and from internal resources may be limited as well by, for example, finance. Companies cannot be expected to grow indefinitely at a compound rate. However, as larger companies expand, new opportunities may present themselves, and growth, to some extent, may be maintained.

In a growing economy one will expect companies to grow, but sectors will grow at different rates and not all companies will share equally in the actual and/or potential growth. Some external bottlenecks, such as availability of labour and other resources may have a considerable influence on the growth rate of companies and a definite limit may be encountered in the profitable use of resources. The rate of growth is also a function of capacity. A company within an industry may show a tendency to grow faster than the average by better capacity-utilisation and other technological factors, as well as the capacity of its existing management. External expansion and growth may come about through mergers and take-overs, which will be discussed in chapter XI. It is not our purpose to deal with Marshall's internal economies and economies of scale in detail. These views are well-known. However, one may again state that proper utilisation of all internal and external economies by a company must be to the advantage of the shareholders of such a company. There are limits to internal

and external expansion and the duration of growth. From the individual's point of view any changes in the composition and earning power of the real and financial assets are of great importance, because this will influence the future dividend rate and the market price of the share.

The earning power, dividend rates, rate of plough-back, and other factors must be analysed over a sufficiently long period, to include years when adverse economic or political conditions prevailed, in order to demonstrate the ability of the management (and the company) to resist or overcome adverse conditions. Ordinary shareholders assume the risks inherent in any productive activity, and it is essential that the company chosen whether or not it is widely known, should be well established in its industry, and that its earnings growth has been at least as favourable as that of the industry as a whole. If a company shows growth potential within the industry, whereas another company shows a declining or contracting trend within the industry, the issue of the latter company should be avoided, even if the price and yield pattern of the latter on the stock exchange is more attractive. The individual may, however, expect the former company to stage a comeback, in which case a purchase may be feasible at a time when the share is undervalued by the market.

A fact which must be accepted by a stock exchange investor is that some companies show very slow growth rates, due to inefficient management, poor co-ordination and direction of activities, lack of working capital and inability to raise long-term capital to finance capital stock growth and expansion, product and factor market limitations, and other rigidities. A necessary condition for growth is, of course, profitable investment opportunities, and the latter is a function of numerous factors, some of which were discussed in chapter II. Productive opportunities will have considerable influence on the growth rate, and if such opportunities are lacking or limited, the growth rate may well slow down. Furthermore, the attitude of management toward risk may become a limiting factor.

Views on so-called growth-equities are still very much in vogue.¹⁰ The theory is that one should select equities with growth

10. A more detailed discussion of the valuation of growth shares will be given later in this chapter.

potential, as this would ultimately lead to enhanced dividend rates and capital appreciation. However, the individual should still tread carefully, particularly after we have again been warned by Rayner and Little that earnings tend to grow in a higgledy-piggledy manner,¹¹ and that projection of past earnings growth and profit trends into the future may be a costly and futile pastime. In any event, the price of the share on the stock exchange may be standing at such a level, reflecting such a low apparent dividend yield, that the share is clearly overvalued by the market, the price not only discounting the foreseeable future growth potential, but also the 'hereafter'. Unrealised growth in earnings in this case may only lead to capital losses at a later stage. Since expectations will tend to converge, and growth shares are highly prized, willing buyers meet unwilling sellers and the so-called growth shares may well be overvalued. The supporters of the growth cult maintain that individuals primarily interested in capital gains will profit more by investing in growth shares than by investing in more mature and slow-growth concerns, where rapid advances in earnings (and share prices) are not likely. The more mature concerns would be steady dividend-payers, and the investors looking for stability of income would prefer them.

As part of the comparative analysis, the individual will also analyse the market performance of the security, which will give some indication of how investors as a body valued this security in the past. The market analysis will deal with the trends in security prices over a certain period of time; the longer the period the better. In analysing the price trend, the individual will make use of charts and/or statistical tabulations with which he will try to project past trends into the future, and so forecast possible price changes in the future, possibly selecting short, medium, and long-term periods of time. The individual will also study past share prices indices carefully, and also take account of factors such as past and present stock exchange turnover.

By fully accounting for the differences in the nature and so forth of the different industries, and then subjecting the companies in the industry to a comparative study in the forms of security analysis and market analysis, the individual may narrow down his choice to only

11. Rayner, A.C. and Little, I.M.D., Higgledy Piggledy Growth Again.

a few securities to be incorporated in a diversified portfolio. Once he has decided on what to buy he must still decide on the size of the commitment in any particular case, and this will also to some extent be influenced by the degree of uncertainty and risk inherent in the industry and individual companies in the industry. We must then again be careful to distinguish between the risks inherent in a given company and the element of risk such a share imparts into a portfolio. In chapter V we have pointed out that the shareholders assume market risks of volatile prices, which the company (the issuer of the shares) do not assume. The shareholder thus assumes the market risks and the investment risks inherent in the company.

We must restate that an individual interested in equities must give some weight to the degree of maturity and stability in a given industry, and the growth potential in the industry. A well-established company, with a stable dividend record, but with little growth potential, may still appeal to a conservative investor concerned with income and not necessarily with capital gains. (It should be pointed out that the purchase of a preference share at a time of high rates of interest will also satisfy this requirement.) In investor interested in capital gains will tend to concentrate on issues of companies with a faster prospective rate of growth in earnings and dividends, after allowance for risk.

The following issues related to an industry and/or individual company are of some significance:-

- (1) New and untried industries or companies, representing a high degree of risk, or well-established and mature industries and companies.
- (2) Future demands for product or service - necessity or luxury.
- (3) Capacity-utilisation and excess capacity in the industry as a whole, or in individual companies within the industry.
- (4) Liquidity.
- (5) Stability of earnings per share, that is, the earnings history.
- (6) Stability of dividends, that is, the dividend history.
- (7) Labour problems and supply of other productive factors.
- (8) Government attitude.
- (9) Competition, product differentiation, concentration and diversification of activities.

- (10) Foreign trade position.
- (11) Capital structure, leverage and other financial ratios.
- (12) Management.
- (13) Market performance of share.
- (14) The tax position of the industry or company.
- (15) Growth potential.

Some of the above factors will be discussed in more detail in sections to follow in the present chapter.

C. Position of the Stock Exchange

In our view the conditions prevailing on the stock exchange are important. In chapter VI, we pointed out that the stock exchange can actually be divided into the equity market on the one hand, and fixed-interest securities on the other. From our analysis in chapter VI it was clear that the emphasis in the market can shift and that this will have an influence on the yield patterns. The shifts in the emphasis in the market will influence the individual's strategy. Furthermore, with regard to the equity market as such, the emphasis in the market can shift from gold shares to industrial and commercial shares, and vice versa. The individual's strategies will also be influenced by these shifts of emphasis in the market. In this section a few factors the individual must take into account, regarding the conditions prevailing on the stock exchange will be indicated.

There are times when the market prices of a certain group of equities are depressed in relation to the market as a whole, that is, the industrial and commercial share prices may be relatively depressed in relation to the gold market due to say persistent speculation on the possibilities of a sterling or dollar devaluation, or in the period of a boom and persistent inflation, the gold share prices may be relatively depressed. There are times when the market as a whole may be depressed. Sound buying conditions for certain issues may prevail when the market is generally depressed due to adverse psychological factors and pessimism. Careful analysis and caution are, however, still of utmost importance in such conditions. An old stock exchange maxim is that it is not automatic that all equities suddenly become sound investments just because prices are generally depressed or that 'blue-chips' are sound investments regardless of how high the prices. There may be temporary exogenous factors which

may be excessively discounted on the decline or on the incline of the market. In the former case the individual will endeavour to buy just after the trough and to sell just after an upper turning point. A decision as to when to buy and when to sell may perhaps not be as difficult as deciding on what to buy and what to sell.

Real uncertainty actually enters the picture if the individual has to decide what to buy when and what to sell when. The question of timing is important in equity transactions, as we have to deal with a 'flexprice' market. The chartist or technician feels that charting can assist him in deciding on when to buy and when to sell. It is then argued that a study of market psychological conditions and market analysis will enable the individual to judge the investment merits of an equity on the basis of prevailing market price only. We will later on show that this is a fallacy, since the magnitude of price change cannot be forecast with any high degree of confidence.

The market conditions for a given equity may be such that expectations tend to converge, with the result that willing buyers meet reluctant sellers, or willing sellers meet reluctant buyers, resulting in volatile prices. This makes timing of purchases and sales a hazardous business and wrong timing may result in capital losses. The turnover or activity volatility may also influence marketability, and an individual may find that selling (or buying) a given equity in a narrow market may be detrimental, that is, selling at the bottom just before a rally, and buying at the top, that is, just before a decline.

The most important single factor which an individual must decide upon before purchasing a given equity is the appropriateness of the price prevailing at the time, that is, he must subjectively decide whether the equity is overvalued or undervalued by the market at that point of time and whether the 'market' is likely to adjust itself in the future to conform with the individual's own subjective valuation. If an equity is undervalued in terms of his subjective estimate, and he expects the consensus of opinion to conform to his some time in the future, with the result that the price is likely to rise, he would buy. Conversely, if, in terms of his own subjective estimate, the equity is overvalued, he will refrain from buying, or if he is already holding the equity, he may decide to sell. His timing will, however, have to be correct.

We have also indicated in the previous chapter that the stock exchange can really be divided into more or less distinct markets, between which investors can and will move with relative ease. There may be times when certain groups or classes of securities will be in strong demand and others not. We have explained that the relative movements of indices may be used as a rough index of these shifts in the market emphasis. The individual will then try to ascertain the merits of a purchase or sale of a given class of security during certain periods. There may be times when equities, in general, are overvalued, with the result that heavy investment in equities may not be feasible at all. The individual will, however, from time to time shift his funds from one sector of the market to another according to changing economic conditions, changes in risk differentials, and changes in his own preferences and risk-aversions and expectations of future economic developments.

The individual investing in stock exchange securities will be faced with the risks inherent in a dynamic economy. In such an economy the risks will thus also change over time, for example, the purchasing power risk, changes in money rates of interest, political risks, changes in taxation and so forth.¹² This means that the prospects of certain issues will be changing according to changing economic conditions.

Cyclical changes in the economy may affect the investor if these cyclical fluctuations in the economy are reflected and exaggerated in the stock exchange in price fluctuations of various securities. General optimism and pessimism about general economic conditions will then be reflected in the market. Yield patterns will tend to change as the emphasis in the market shifts and prices may even become distorted, for example, a complete shift from fixed-interest securities to equities, particularly towards the end of a boom period. It should be borne in mind that equities normally carry the full impact of an adverse change in economic growth and the change from boom to recession conditions. The price volatility of equities due to changing expectations has been discussed in the previous chapter. Changing cyclical conditions will have an impact on the market, via changing expectations. It is thus quite possible that equity prices

12. See chapter VIII, pp. 526-534.

may be too high during certain periods and that a downward revision of prices may be imminent, for example, when the inflationary expectations under President Kennedy did not materialise, prices on Wall Street in May, 1962, were marked down considerably, resulting in capital losses to many individuals. We are all familiar with bull and bear markets in equities and fixed-interest securities. Those individuals who purchased preference shares a few years ago, when interest rates were relatively low, and prices of fixed-interest securities relatively high, will, under present conditions, still show large book losses. Economic conditions may, however, again change and the emphasis may again shift to fixed-interest securities and the pressure on equities may be removed. This will again have an influence on the pattern of market yields.

In a modern 'fixprice' world, where most prices, particularly the prices of manufactured goods and wage rates, are rigid downwards, one should not, in actual fact avoid discussions of the business cycle, and therefore, also cyclical equity price trends. It may happen that individuals will substantially change their portfolios according to the phases of the business cycle, for example, if a recession or depression is imminent, they will be inclined to sell equities and to increase their money and near-money balances, or they may purchase short-dated fixed-interest securities. In the recovery period an individual will again substitute and prefer to hold equities instead of money and near-money balances and other short-dated securities to enable him to participate in yield and capital appreciation.

An individual investing in securities will thus also take account of prevailing monetary and fiscal policy and expected changes in these. Due consideration will also be given to other economic trends which may affect given sectors in the economy more or less than other sectors. Investment policies will then to some large extent be influenced by cyclical fluctuations, or rather, expected changes in economic conditions. The individual will again find it difficult to forecast cyclical fluctuations in business, and thus cyclical fluctuations in security prices.

D. The Investigation of Financial Statements

We may now turn to the factors which the individual will consider in an effort to appraise the merits of securities for

investment purposes. In this section we shall describe the classification of balance sheet and the income statement items and in the next section we shall consider some important financial ratios. This will be followed by a discussion of comparative balance sheet analysis. The role of earnings and dividends in valuation will then be discussed.

The individual will, as part of the process of security analysis (as distinct from market analysis), investigate the financial statements of listed companies. The analysis of the financial statements over a long enough period, on a comparative basis, may reveal some unsound financial relationships in the statements, which may not only affect the competitive position of the company in the industry, but also its solvency. Furthermore, unsound relationships may impair the investment merits of the given equity if compared, not only with comparable equities in the same industry, but also with equities of other industries. Analysis of the financial statements and market analysis is complementary, and unsound financial relationships in the statements will, to some degree, be reflected in the price trends of the share over a period of time, if such price trends do exist.

In South Africa, as in some other countries, analysis is complicated by the lack of information contained in the financial statements of companies, the directors' reports and chairmen's statements. The data on which an individual must base his investigations and forecasts will be imperfect from the outset, but this does not mean that he should not carefully analyse the relationships between the various figures and try to arrive at some conclusions.

However, it is maintained that the past performance and current policy or policies of the management will be reflected in the sound and unsound financial relationships in the financial statements. The individual must also, where possible, try to ascertain and establish the causes of such relationships, and also, where possible, try to supplement his existing knowledge of the company's affairs with some knowledge of the management's expected or anticipated multiperiod plans or future course of action.

The individual may be able to analyse and interpret the information (figures) contained in the financial statements, and establish certain trends with the aid of numerous ratios which can be

computed, but this knowledge may only be of limited value, unless it can be supplemented with additional information regarding the policies of the company, and on a wider front, general economic and political trends, or expected trends.] The individual must also acquaint himself with the structure of the company, that is, whether the company is a holding company or not. In the case of a holding company the individual should also acquire information and knowledge of the nature of the subsidiary or other affiliated companies, and all important contracts and other arrangements between all these companies. The individual will be interested in the financial strength and earnings capacity of the group as such, as reflected in the consolidated statements.

The individual will, of course, also formulate a subjective opinion of his own of the existing management, and their capabilities, limitations, reputation and potentialities. According to Foulke, this subjective opinion formulated of the management will have some influence on the confidence with which the individual studies and analyses the financial statements. In his view "The confidence with which figures are studied and analyzed depends, in the first place, upon the confidence with which the active management of a business enterprise is generally regarded."¹³

The balance sheet shows the position of the company at a point of time; and is thus considered as a statement showing stock magnitudes and relationships at a given point of time. The balance sheet is a statement which shows the asset portfolio of the company and the claims of the creditors and owners against the asset portfolio at a point of time.] The balance sheet again can be compared with a 'kaleidoscope' giving different pictures at different points of time. A study of past balance sheets will reflect the past financial activities of the company and its asset and financial policy. The balance sheets over a period of years may be compared, and certain trends may be established from such a comparison.

The operating performance of the company can be judged from the income statements. The income statement is considered to show the flow magnitudes over a certain fiscal period, and certain changes in

13. Foulke, R.A., Practical Financial Statement Analysis, 5th edition, McGraw-Hill Book Co., Inc., New York, 1961, p.51.

the stock magnitudes in the balance sheet will be explained in the income statement. It is really an attempt to distinguish between capital and income, but the balance sheet and income statements must be analysed in conjunction with each other.

Both the balance sheet and income statements are important, not only for potential equity holders, but also for the potential holders of fixed-interest securities, for the latter lenders will be concerned with the protection of their principal and safety of their income over a long period of time. The long-term creditors and equity holders will both be vitally concerned with the solvency and profitability of the company, and thus, in the financial relationship which will show these two conditions. Section 90 ter of the Companies Act, 1926, as amended, makes provision for the form and contents of the balance sheet and income statements, and the fact that these published accounts must give a 'true and fair' view of the company's profit and loss for the past fiscal year. This section in the Act is aimed at giving reasonable protection to shareholders and a better understanding of the financial position of the company.

The Eighth Schedule to the Companies Act sets out the general provisions as to the information and contents to be contained in the balance sheet and income statements. With reference to the balance sheet, the authorised and issued capital, the assets and liabilities are to be presented or summarised, giving adequate particulars, in such a manner that the nature of these assets and liabilities is fairly clear, and the headings to all items must be appropriate so that the nature of the company's business is clear, and contain sufficient information to enable an individual to get a true and fair view of the financial position of the company. The individual would, however, most probably divide the balance sheet into more parts to enable him to establish more carefully the ratio-relationships which he considers to be of prime importance.

The individual may for simplicity divide the assets into three parts, for example, current assets, fixed assets, and intangible assets. Likewise, the liabilities may be divided into three groups, for example, current liabilities, deferred liabilities, and most important, net worth. Proper classification will precede the analysis. Consistency in classification is, of course, necessary. If we account for accounting convention in valuation of balance sheet items, then the

balance sheet does not reflect the valuation of the company as a going concern since there is a discrepancy between book values and replacement cost, and economic value. It is not, however, the purpose of the balance sheet to show these discrepancies and the valuation of the company as a going concern.

The information contained in the balance sheet, after careful comparative analysis over a period of time, will reveal some information to the individual regarding the capital structure and gearing, the total capital employed, net worth, the working capital position, liquidity, the amount earned on total capital employed and on net worth, the sources of income, the book value of the asset portfolio, and so forth.

The balance sheet and income statements are the minimum requirements for the protection of shareholders, and risk is limited by the fact that these are published. The balance sheet, however, does not provide a measure of capital. A balance sheet, reflecting only past history, does not mean that it will provide the answers to future questions. The balance sheet values do not reflect future income streams which the assets can produce. The latter remains an uncertain, expectational magnitude. There need not be any positive correlation between the economic value and the historical costs reflected in the balance sheet, or any relationship between historical cost and future earning capacity. In this sense balance sheet values do not provide a forward-looking measure of capital, which is the discounted value of the expected income streams which the assets can produce.¹⁴

It should be borne in mind that past balance sheets and income statements can tell us what has happened in the past - a past which will not be repeated in the future. A study of balance sheet and income statement figures and ratios also has limited value in the sense that past statistical performance may turn out to be a poor guide to future performance. Balance sheets and income statements cannot answer all the questions the individual is confronted with. There are a great number of factors which influence the growth of a company or an industry which cannot be statistically analysed or treated. If we analyse the past we obtain facts which cannot tell us much about the future. Security investment involves value judgments which cannot be derived

14. See chapter IV, pp.139-147.

from purely mechanical formulas or past statistical data. Intangibles are involved, such as management's philosophy, policy, attitude towards the company, as well as other factors which do not lend themselves to mechanical and statistical analysis.

The individual, before he considers certain important financial ratios, will first classify the balance sheet and income statement items as suggested below.

1. Classification of Balance Sheet Items

(a) Assets

(i) Current Assets

The current assets will constitute the more liquid side of the balance sheet, and will to some extent reflect the current solvency of the enterprise if taken in conjunction with the current liabilities.¹⁵

The number and the nature of the items included under current assets will, of course, differ from one company to another. Generally, current assets consist of those items which, in the ordinary course of the company's business, are convertible into cash, and temporary investments in readily realisable securities, which may be converted into cash without any material delay or loss. Readily marketable securities (temporary investments) should, however, not be treated as equivalent to cash.

The following assets, or combination thereof, could be classified as current: (1) Cash on hand, in the bank on current account or savings deposit, deposits at call, (2) short-term fixed-deposits with financial institutions and intermediaries, (3) marketable securities, (4) trade debtors, (5) bills and notes receivable (accounts receivable), (6) trade acceptances, (7) inventory (Stock-in-trade), (8) finished goods, goods in process, and raw materials, and (9) prepaid tax.

The cash and other deposit items should be adequate to cover all current expenses and/or operating expenses, such as rents, wages, salaries, taxation, dividends declared but not yet paid and maintenance.

15. Also see the current ratio in section E of the present chapter, where the distinction between liquidity and solvency will be discussed.

(ii) Fixed Assets

Fixed assets will vary with the type and size of the company, and are those assets which are held by a company for the purpose of earning an income or revenue by their use over time. Fixed assets include those items which are not readily convertible into cash in the ordinary course of business and which are not subject to frequent purchase or sale. In this sense fixed assets do not 'turn over' like current assets. The fixed assets, therefore, constitute the less liquid part of the balance sheet. The fixed assets, if properly maintained intact, are shown as a stock carried forward from year to year, and they contribute to the earnings of the company over time.

The following items are normally considered as fixed assets, and the amount of each item will depend on the nature and size of the company:-

- (1) Land and freehold property.
- (2) Buildings.
- (3) Machinery, tools, plant, equipment.
- (4) Furniture and fixtures.
- (5) Motor vehicles, and so forth.

Of the above items, land is the only item not subject to depreciation. The fixed assets normally appear in a balance sheet at cost less accumulated depreciation. The assets (except land) are continuously replaced, and the value of the assets, although probably lagging behind, is brought more in line with higher replacement costs and even economic value. This is known as the process of stock adjustment.

Fixed asset values do not represent replacement cost, economic value, or the value on winding-up. There is not necessarily any positive correlation between stated balance sheet or historical values, and the productivity or earning power of the fixed assets.

(iii) Miscellaneous Assets

Miscellaneous assets would include prepaid expenses such as insurance, deferred charges, and advances to subsidiaries.

(iv) Investments

Investments must be carefully analysed, and a distinction drawn between listed and unlisted investments. In terms of the Eighth Schedule to the Companies Act, 1926, as amended, the market valuation of the investments must be stated in the balance sheet, by way of a note. This does not, however, refer to trade investments. In the case of banking institutions (registered under the Banking Act), and insurance companies (registered under the Insurance Act), the market value of listed investments need not be stated. (See paragraphs 22 and 23 of the Eighth Schedule.)

The listed securities, it is assumed, will have a ready market, and the market valuation of the listed investments may be taken to represent a fair valuation. The degree of diversification is also an important consideration.

The conservative investor will hardly place any value on unlisted investments, unless he is certain about the nature of these investments, in which case he may accept the book value.

The individual must also ascertain whether the investments represent investments in a subsidiary or subsidiaries, and how the investments are valued, that is, at cost, at book value, or directors' valuation.

(v) Intangible Assets

Intangible assets consist of a large variety of items depending on the nature of the company, and must be shown separately from fixed assets or current assets, for normally intangible assets do not render a 'service' like fixed assets, or 'turn over' like current assets, so that they do not earn an income over time, and are not available in the ordinary course of business, for conversion into cash. In the case of winding-up, the intangible assets normally depreciate considerably in value, and in most cases may be written-off completely.

The following items will normally be considered as intangible assets, namely goodwill, franchises, trademarks, trade names, patents, leaseholds, development expenses, processes and formulae, contracts, brands, and so forth.

In calculating break-up value, goodwill must always be excluded. The goodwill figure in the balance sheet does not

necessarily represent the difference between market value of the share and break-up value. Goodwill does not, after a time, represent earning capacity, as the latter may change over time, whereas the balance sheet value of goodwill is normally fixed. In any event, goodwill may be considered as a fictitious figure.

(vi) Net Assets

The net assets is usually defined as the difference between total assets and external liabilities (including preference shares) that is, net assets = total assets minus external liabilities.

The net assets, represented by the interests of ordinary shareholders only, are usually calculated as follows:-

Total assets minus debentures and preference shares outstanding minus other long-term loans minus current liabilities minus taxation provisions = net assets attributable to equity.

The net assets will be represented by issued ordinary share capital, plus revenue and capital reserves. In calculating the net assets of an investment company, or a mining or industrial finance company, the individual will, of course, take account of the difference between the book value and the market value of listed securities at the balance sheet date.

Net assets minus all intangible assets will be the net tangible assets. The asset value per ordinary share will be the net tangible assets divided by the number of ordinary shares issued, and this represents the net worth per ordinary share, or the break-up value per ordinary share.¹⁶ From the point of view of the investor in ordinary shares, the net worth is an important magnitude.

(b) Liabilities

As stated previously, the liabilities can be divided mainly into three groups, that is, current liabilities, deferred liabilities, and net worth. The total liabilities (actual financial debts) will consist of all current liabilities plus all long-term loan or debt contracts payable at some future date.

16. See the next section of the present chapter for a discussion of net worth.

(i) Current Liabilities

Current liabilities will normally include some of the following items:-

- (1) Trade creditors.
- (2) Short-term loans payable.
- (3) Bills and notes payable.
- (4) Dividends declared but not yet paid.
- (5) Any other accruals.
- (6) Any long-term loans (for example, funded debt) currently maturing.
- (7) Provisions for current taxation, and so forth.

The current liabilities are the short-term obligations of the company, and payable within one year. The dates and amounts payable are normally fairly fixed and definite, and payable in the normal course of business.

(ii) Deferred Liabilities

The deferred liabilities are the long-term liabilities, such as mortgage bonds, debenture stock, secured and unsecured notes, and also other items such as unearned income, general reserves for contingencies, and valuation reserves. The long-term liabilities such as debenture issues are important, since they show the gearing and leverage, which will be discussed below in the present chapter.

(iii) Net Worth

Foulke defined net worth as "...the amount of funds invested at the risk of a business enterprise. More formally, it is a liability of a business enterprise to those interested in it after all debts of every description have been paid." ¹⁷

The net worth is sometimes simply described as the excess of assets over liabilities, that is, $\text{assets} - \text{liabilities} = \text{net worth}$ or $\text{assets} = \text{liabilities} + \text{net worth}$. The net worth will vary thus with variations in asset values and liabilities.

The assets will reflect the form (or composition) of the funds employed; the liabilities the method of how the funds (as represented by the assets) are financed, that is, net worth plus outside

17. Foulke, R.A., Practical Financial Statement Analysis, 5th edition, p.113.

liabilities. The net worth will represent the claim of the owners, that is, the claim of the ordinary shareholders, and this claim is actually represented by the excess of assets over liabilities (debts).

The net worth would then normally include some or all of the following items:-

- (1) Ordinary shares.
- (2) Capital reserves, such as share premium.
- (3) Revenue reserves and undistributed profits.

The individual will normally distinguish between net worth and tangible net worth. The latter magnitude is arrived at by deducting the book (balance sheet) values of the intangible assets from the net worth. Although preference shares are really ownership capital in the eyes of the law, we exclude preference shares from net assets and net worth and treat them as an ordinary creditor claim when we are concerned with financial relationships affecting the position of ordinary shareholders. The reason for doing so is that the dividend rate on preference shares is fixed, and the earnings accruing to ordinary shareholders may be levered upwards or downwards as a result. However, a number of financial analysts do include preference shares in net worth.

The following calculation would serve as an elementary example, (excluding preference shares),

Issued - Ordinary share capital	
1,000,000 shares at R1 each	R1,000,000
Share premium (capital reserve)	250,000
Revenue reserves and undistributed profits	750,000
Net Worth	R2,000,000
less intangible assets (balance sheet value)	100,000
Tangible Net Worth	<u>R1,900,000</u>

If no additional funds were raised by new issues or from creditors any changes in net worth in two consecutive balance sheets are explained in the income statements for the current (intervening) period.

Another concept which is closely related, but which may pose some problems, is capital employed. The latter is normally calculated as follows:-

Gross assets	R2,000,000
less depreciation	<u>300,000</u>
	R1,700,000
less intangibles	<u>20,000</u>
	R1,680,000
less current liabilities	<u>80,000</u>
Capital Employed	<u><u>R1,600,000</u></u>

The capital employed will then show the assets represented by nominal issued ordinary share capital, capital reserves, revenue reserves, preference shares, debentures, and other long-term loans, say, from a Building Society.

The capital employed is an arbitrary figure in the sense that assets show the historical cost and do not reflect replacement cost or economic value. Some companies may, however, as a matter of policy, use replacement cost in their calculations. However, the concept is frequently used in ratio analysis, and also in a rather restricted sense, namely on taking account of ordinary shares, preference shares, debentures, and revenue and capital reserves.

2. Income Statements (or Profit and Loss Accounts)

The income statements are of interest to the security holders (equity and prior charge) as this statement shows the income (and sources of income if sales figures are published), and expenses of a company over a fiscal period, and the final net profit or loss is recorded.

The individual is interested in the income and appropriation statements for various reasons, mainly:-

- (1) Size and nature of income.
- (2) Size and nature of expenditure.
- (3) Trends in 1 and 2 above.
- (4) Trends in profits and stability of profits.
- (5) Appropriation or distribution of net profits.

The Eighth Schedule to the Companies Act, 1926, as amended.

clearly states the items which should appear separately in the income statements (Profit and Loss Accounts) of a public limited liability company, and it is not our purpose to discuss these items in this section in detail.

The income statements throw light on a number of changes in the balance sheet, and is in a sense a dynamic statement. The individual must eliminate all non-recurring items, or else a distorted view of actual earning capacity may be conceived. For example, a refund of taxation, such as a loan levy previously paid, or a profit or loss accruing through the sale of some of the company's assets, and other non-recurring claims should be excluded.

As a result of the Companies Act, 1926, as amended, the Stock Exchange Requirements for already listed companies, and standardisation of accounting practice in South Africa, some degree of uniformity in presentation of and detail contained in published account has been achieved. However, it appears that the Eighth Schedule of the Companies Act still leaves too many loopholes concerning the classification of certain revenue and expenditure items.

For his own analysis, the individual may re-classify the income statements into four broad sections, namely

- (1) gross profit section
- (2) operating profit section
- (3) net profit or loss section, and
- (4) the appropriation account, which is normally shown separately.

The income statement, read in conjunction with the appropriation account, will reflect some of the financial policies, skills, and competency of the existing management, and trends in income, expenditure, gross profit, operating profit, and net profit (or loss). The individual is well advised to pay considerable attention to income and appropriation accounts. Comparisons should also be made over a number of successive years to establish certain trends or show certain points of weakness or strength. The income statements, like the balance sheet, if investigated over a representative period of time, will furnish the individual with comparative data at given fiscal intervals.

(a) Gross Profit Section

Under this heading the individual will take the net sales

figure,¹⁸ and deduct the cost of sales, the latter being the inventory at the beginning of the fiscal year, plus purchases of inventory, less inventory at the end of the year. In the case of manufacturing, the costs of raw materials, direct labour costs, and so forth, may be included.

The gross profit figure is then the difference between net sales and cost of sales. From this can be calculated the gross-profit-margin, that is, gross profit divided by net sales.

When overheads, labour charges, and so forth, are relatively fixed, a small increase in gross profits will increase net earnings by a large percentage, particularly if excess plant and labour capacity existed.

(b) Net Profit

The net profit (after tax) accruing to the majority shareholders is normally obtained as follows:- operating profits + profits on security transactions + dividends received on investments (including subsidiaries) + interest received - losses on security transactions - interest paid - taxes - minority interests (where applicable).

Although Rayner and Little conclusively showed that the growth-rate in profits tends to be higgledy-piggledy,¹⁹ one may expect money profits, in general, to show an upward trend. One may expect money profits to rise with the money value of gross national product, or with a given rate of growth in real gross national product, real profits would also grow at more or less the same rate. Graham, Dodd, and Cottle showed that the share of profits in gross national product in the United States of America between 1909 - 1960 averaged 5.3 per cent.²⁰ For the economy as a whole the relationship may be found to be reasonably constant or stable, but in the case of individual companies there may be considerable divergences, and, in the end, the individual is interested in only one, or at most a relatively few companies. Furthermore, in a dynamic, growing economy, one must be careful not to generalise about factor shares in gross national product. If the individual is acquainted with the tax

18. In most cases the sales figures are not published.

19. Rayner, A.C. and Little, I.M.D., Higgledy-Piggledy Growth Again.

20. Graham, B., Dodd, D.L., and Cottle, S., Security Analysis, 4th edition, p.7.

formula applicable, he can check the reported earnings by looking at the tax deduction or provision.

Apart from the above classification, the individual may be interested in individual items in the income statements.

(c) Revenue and Other Reserves

Provisions have been created for a multitude of reasons and purposes. The main purposes are threefold, namely to reduce the book value of certain assets, or to show certain contingencies, the outcome of which is still uncertain, or to provide for expected losses which may accrue at some future date. We may distinguish between the following important provisions, namely valuation provisions, for example, to reduce assets, such as debtor balances (bad debts), and assets (amortisation and depreciation) or to write down listed securities to current market price, should the latter be below cost price. Secondly, liability provisions, which reflect certain liabilities arising from past actions or events, such as pensions, workmen's compensation, claims in litigation, for non-recurrent taxes, injuries and damages, mortgage loans, and so forth. Thirdly, provisions against future liabilities, that is, to provide for future losses, for example, plant replacement costs and changes, and various other contingencies.

We must, however, distinguish between a provision and a reserve. The term provision means any amount provided to cover depreciation, renewals, or diminution in the value of assets, or to provide for a known liability, the amount of which is not known for certain, but may be reasonably accurately estimated. A reserve is defined as not including any amount which can be classified or grouped as a provision, that is, an amount which does not fall under the definition of a provision.²¹

Reserves as such are classified into two kinds, namely revenue reserves and capital reserves. The latter reserves are not free for distribution through the profit and loss account, whereas revenue reserves are. Capital reserves, such as share premium, cannot be

21. See Henochsberg, E.S. and Fairbairn, W.J.G., Henochsberg on the Companies Act, p.558.

utilised for dividend payments, whereas revenue reserves can be used for this purpose. Share premium may, however, be utilised for capitalisation or bonus issues. If a company does not provide a reserve specifically for the purpose of dividend stabilisation, then the general reserve may be utilised for this purpose. At the end of the financial year, the revenue reserves, (undistributed profits, etc.) plus earned net profit for the fiscal year, plus any withdrawals from provisions, will be available for distribution to the ordinary shareholders. The revenue reserves will only be distributed in the form of dividends if the board of directors deems such a policy feasible. Normally, the directors would, of course, prefer to increase revenue reserves from year to year to provide for internal finance for new investment, working capital, and the acquisition of financial assets.

Transfers from one revenue reserve to another are not unusual. It is sometimes claimed that directors transfer undistributed profits to certain reserves simply with the object of resisting shareholders' pressure for higher dividends.

Very few companies in South Africa provide a specific reserve for dividend equalisation, and the undistributed profit figure and the general reserve are the fluctuating variables. In practice in South Africa there is no difference between the general reserve which is not a specific reserve, and the balance of the undistributed profits, as shown on the balance sheet and the appropriation account.

The undistributed profit figure will vary from year to year if profits fluctuate and the management utilises undistributed profits to maintain some degree of stability in the dividend rate. On the other hand existing equity shareholders would expect some reasonable plough-back over time, as this would, to some extent, protect them against capital-watering, which may result from later new issues. A reasonable plough-back may, of course, be reflected in earnings (or profits) growth, although this need not be so. Other things being equal, the company that earns 12 per cent and pays out 6 per cent may be a better investment than one that earns 7 per cent and pays out 6 per cent. The first company ploughs back the balance of 6 per cent, and if it employs this additional money profitably, shareholders will ultimately benefit in higher dividends and in capital appreciation. The individual must nevertheless guard against the company that consistently retains a large percentage of its earnings without any

apparent benefit to the shareholders, because what may appear to be sound reinvestment of undistributed profits may actually turn out to be expenditure necessary to maintain the productive capacity of existing, obsolete assets on which inadequate depreciation allowances were made in the past. No new investment is taking place which may improve the competitive position. It is a matter of maintaining the existing position in the industry with heavy plough-backs. Some proportion of the retentions may thus be malinvested, and the rate of return thereon may be negligible or even negative.

Rayner and Little also found no close correlation between the rate of retention and the future earnings growth rate,²² and during temporary recessions dividends may not even be paid. Adequate retained earnings, accompanied by a lack of working capital and liquid cash resources, may not necessarily result in dividend distributions. Liquid resources may also be earmarked for meeting prior charge claims, even if reserves and profits are adequate. One of the gravest errors a management can make is to overpay dividends for a year or two, and then, due to some small fluctuation in profits, find that it is forced to pass the dividend in the third year. Overpayment of dividend can also impair the liquid and working capital position. Even if adequate net profits accrue, a niggardly dividend policy may be necessary in order to protect the liquid and working capital position.

Hidden and secret reserves are not common. A hidden reserve may occur when transfers from profit and loss account are not disclosed in amount, and may appear in the balance sheet under the heading of 'creditors, including provision for contingencies'. A secret reserve arises through the under-valuation of assets, or the overstatement of liabilities. Capital expenditure items may be charged to current revenue, thus understating current profit. The same result is obtained by excessive provision for depreciation or excessive provision for bad debts. It is, however, not the policy of the Companies Act, 1926, as amended, to allow hidden and secret reserves. The fact that the accounts must reflect a 'true and fair view' of the state of affairs does not allow for excessive depreciation and bad debt provisions. Reserves must also be clearly disclosed. The creation of hidden and secret reserves, except in the case of banks

22. See Rayner, A.C. and Little, I.M.D., Higgledy Piggledy Growth Again, pp.54-58.

and insurance companies, is a situation the Companies Act desires to avoid. Say, for example, a company has made provision for a known liability of R5,000, which appeared at the time as a reasonable estimate of the claim, but the claim is ultimately met for R2,000 then the excess provision of R3,000 must be treated as a revenue reserve. The existence of such a reserve must then be disclosed. It is the duty of the auditors of a company, if they differ from the directors in opinion as to whether an amount is a provision or a reserve, to report on this to the shareholders.

(d) Depreciation

Depreciation is a cost item in the same fashion as cost of materials and wages. Fixed assets possess a limited economic life. Underprovision for depreciation of fixed assets is tantamount to the understating of costs, and thus inflating the net profit earned for distribution. In any event, if inadequate provision is made for depreciation, resulting in an excess distribution of profits, the company may lack the liquid resources to replace the fixed assets when the time comes.

It is common practice today for companies rather to overprovide for depreciation to keep real capital intact in an inflationary world. There may be a considerable price differential between historic cost and the cost of eventual replacement. The real problem is that the economic life of a real asset can only be estimated, and is therefore an expectational magnitude. Depreciable life is thus different from economic life. The introduction of new techniques of production may substantially alter the economic life of a specific capital asset. The company may, of course, decrease maintenance expenditure which will then tend to reduce the useful life of the asset. Accounting depreciation charges are fairly rigid and well-defined. However, the value of a company's assets, particularly the value of the as yet undepreciated assets, will diverge from the accounting values to be found in the balance sheet. The value of the assets of a company cannot be derived by simply adding the individual values together. Assets have different values in different combinations, and the assets will also be of different vintages.

We must actually distinguish between embodied and disembodied

technical progress.²³ Technical progress will tend to increase the productivity of capital assets (machines) built in any given period compared with capital assets (machines) built in a previous or earlier period. Such technical progress will not increase the productivity of the capital assets (machines) already in existence. In this case we say that the technical progress is embodied in the new capital assets (machines). This means that capital assets (machines) constructed at different dates are not qualitatively the same, and capital assets (machines) cannot be added or aggregated to give a measure of capital. The capital assets of different vintages produce a given output if used in a particular combination. The fact that technical progress may be embodied also means that the assumption of capital homogeneity must be dropped. Embodied technical progress also implies that the capital assets (machines) already in existence do not benefit from later technical progress. The economic lives of machines are limited by obsolescence due to embodied technical progress, and not necessarily due to physical collapse. In a fast growing, progressive company capital assets would be abandoned more rapidly. Old machines will probably then be written down at a faster rate. The expected economic lives of capital assets (machines) will have an influence on the techniques used and on the value of capital, and the value will, of course, be different from the balance sheet valuations. Disembodied technical progress means that the old machines can also be adjusted to the changes, and the notion of capital homogeneity can be retained.

Depreciation allowances may be related to revenue by the following ratio:- maintenance expenditure + depreciation divided by operating revenue. However, it does not follow automatically that high expenditure for maintenance may reduce the depreciation allowance, for example, plant may be relatively obsolete, and so forth.

Depreciation may also be related to the assets subject to depreciation, by calculating the ratio:- Depreciation divided by gross assets (excluding land). This ratio gives the rate of depreciation, and the rate or extent to which assets were depreciated in the past can be measured by the ratio:- Depreciation provision divided by gross assets.

23. For a more detailed discussion see Hahn, F.H. and Matthews, R.C.O., "The Theory of Economic Growth: A Survey", The Economic Journal, Vol. 74, December, 1964, pp.825-844.

Amortisation simply means that, in the case of a wasting asset, the return over the life of the asset should be sufficient to repay the cost of the asset to the owner. After the amortisation has been fully accounted for the return above or in excess of the full amortisation may be considered as a profit or a return on the investments. The above applies to South African gold mining shares in particular. The investor in such shares should consider part of his dividend cheque as a capital repayment or amortisation allowance before he calculates his dividend yield or rate of return on his investment. A yield of 7 per cent on the share of a gold mine with a long life may in actual fact only amount to a 5 per cent dividend yield after allowing for amortisation of the cost of the share. In the case of a mine with a short-life the difference is more substantial.

E. Ratio Analysis

1. General

After the individual has classified the balance sheet and income statement items, and perhaps placed his own subjective values on certain items, he may then proceed to analyse certain financial relationships which he may consider important.

Ratio analysis can aid the individual in the sense that it provides him with some data in organised form, showing the past financial trends (and changes in such trends) in the published accounts. Such ratios may be considered as a rough measure of the past financial and other performances of the management of a company. It must again be emphasized that ratio analysis provides evidence of past trends and performance, and cannot provide any knowledge of future trends. Ratio analysis is another device used in security analysis, and is used for judging certain financial conditions. The only real advantage of ratio analysis is that it may show some deterioration in the financial affairs of the company which is not apparent in comparable other companies and which may then serve as a warning to the individual, either not to buy the security, or to sell the security if already held. Ratio analysis may highlight some factors materially affecting the quality (value and future price prospects) of a given security of which the individual may be a potential owner.

Graham, Dodd and Cottle²⁴ actually divided the various ratios into six main groups. These groups of ratios are (1) profitability ratios, (2) growth ratios or progress ratios, (3) stability ratios, (4) payout ratios, reflecting dividend policy, (5) credit ratios and (6) price ratios. The first five ratios will be classified under the process of security analysis, showing financial strengths and weaknesses in the company and will be calculated from the published accounts. The sixth group of ratios, that is, the price ratios, will be part of the market analysis, where the market performance of the share is taken into account. The first five groups of ratios will form part of the subjective valuation process, that is, independently of the market price, whereas the sixth group, where the market price, reflecting the balance of expectations and the subjective valuations of a multitude of individuals, are taken into account, may be considered part of a more objectified valuation process. However, the interpretation of the market data and the expectations formulated on the basis of such data by an individual will still be subjective. Ratio analysis is really only useful for comparative purposes, that is, for comparing trends in a given company, for comparing companies within the same industry, and companies in different industries. The individual will concentrate on those ratios which will solve his particular problem. The individual must, however, realise that in a dynamic world, the business and economic environment can be subject to sudden and unexpected change, the performance and ability of managements are ever changing, and to judge management or formulate any expectations or forecasts with any high degree of confidence, regarding future managerial performance, is in fact impossible.

It should, at the outset, also be realised that the accounting values stated in the accounts and break-up value in the event of liquidation will tend to differ radically; the value on liquidation sale may well be below stated book or accounting values, except for buildings and property, which may be higher than historical book value. The economic value, as a going concern, may be well above accounting values, as stated in the balance sheet. The break-up value of a share computed on balance sheet asset values merely represents the asset content in a share. The real value as a going concern is the discounted value of expected future net earnings. The value of a given asset is represented by the present discounted value of the net

24. Graham, B., Dodd, D.L. and Cottle, S., Security Analysis, 4th edition, p. 231.

return expected from it over its remaining life, or its entire life.

The economic value in the market for assets of individual balance sheet items, is not always very important. The productivity or earning capacity of the assets, of different vintage and book values, is of importance to the prospective investor. Assets can be under-utilised or fully utilised, and this will have an influence on the income the assets produce. When the assets are under-utilised the future income stream accruing to shareholders may tend to be low.

In the event of a take-over, the assets of a company may change hands at prices (usually influenced by market valuation of shares), well above accounting valuation or replacement cost, and the difference is normally considered as goodwill. There is a difference in the value of assets as elements of different capital combinations, and this will have an influence on the expected yield stream which the assets can produce in the future. In the case of a take-over, the change in ownership is normally accompanied by changes in the production process and capital re-grouping.²⁵

The practical advantage of ratio analysis is that the ratios are the symptoms reflecting certain financial illnesses or weaknesses, but whether the management will possess the ability, insight, and foresight to overcome the problems and to improve the position, is a question no one can answer. One of the major limitations of ratio analysis is, of course, that a series of financial ratios as such cannot show the underlying causes of any changes in the ratios, or whether any such changes are due to some internal factors or external economic factors, the latter, such as excess capacity due to general economic stagnation, being outside the control of the management. Ratio analysis thus fails to show the causes of certain changes and the remedies which can be applied to reverse any adverse changes particularly if the change is caused by some external economic factor. It merely acts as a thermometer. A definite limitation is that every ratio only shows the relationship between two variables. By listing the various ratios the individual may, however, attempt to formulate some overall subjective opinion.

25. See chapter XI for a discussion of take-overs.

2. Different Ratios

(a) Current Ratio

The current ratio is one of the credit ratios, and is computed by dividing the current assets by current liabilities, for example,

$$\frac{\text{current assets}}{\text{current liabilities}} = \frac{\text{R50,000}}{\text{25,000}} = 2.$$

This implies that, in the case of liquidation, the current assets need only realise 50 per cent of the balance sheet value to pay the short-term creditors in full, provided that there are no other prior claims, that is, long-term creditors. The current ratio will show whether the company is technically solvent at a point of time, and is in a sense a rather crude ratio.

The current ratio will, of course, differ from one company to another, depending on the nature of the business conducted and the maturity of the business. What may be considered as a safe or satisfactory ratio for one company may still be dangerously low for another. The creditworthiness of a company, at a time when funds are needed for short-term finance, may become impaired if the current ratio is too low, which may threaten the solvency of the company. A conservative valuation of the current assets, particularly the inventory, is called for. The current ratio actually reflects a condition at the date of the balance sheet, and will in the course of a fiscal year be subject to violent changes. However, the individual may try to establish a current ratio trend by computing this ratio for a number of consecutive years, and to compare this trend with trends in comparable companies.

COMPANY A

	<u>1960</u>	<u>1961</u>	<u>1962</u>	<u>1963</u>	<u>1964</u>
Current assets	R400,000	R350,000	R450,000	R400,000	R420,000
Current liabilities	<u>100,000</u>	<u>100,000</u>	<u>150,000</u>	<u>160,000</u>	<u>280,000</u>
Net working capital	300,000	250,000	300,000	240,000	140,000
Current ratio	4.00	3.50	3.00	2.50	1.50

COMPANY B

Current assets	R420,000	R400,000	R450,000	R350,000	R400,000
Current liabilities	<u>280,000</u>	<u>160,000</u>	<u>150,000</u>	<u>100,000</u>	<u>100,000</u>

Net working capital	140,000	240,000	300,000	250,000	300,000
Current ratio	1.50	2.50	3.00	3.50	4.00

In the case of company A the net working capital position deteriorated over time, and so did the current ratio. In the case of company B, the working capital position improved with an improvement in the ratio. It is clear that the position in company B is much healthier than in company A during 1964.

The individual must, however, bear in mind that the current ratio is but one of many ratios, and a sound current ratio, accompanied by other poor ratios, should be considered as a poor or questionable financial condition overall. Even if the current ratio is high, the company may still lack the cash resources to pay a dividend or reasonable dividend.

The liquid assets are only cash and realisable investments, excluding debtors and inventory. The liquid asset position is normally calculated as follows:-

Liquid assets minus tax liability	
" bank overdraft	
" fixed interest	
" dividends declared but not paid	
" current trade creditors	
= net liquid assets.	

Liquid assets can be expressed as ratios, showing certain trends.

Net Quick Cash

The net quick cash is the cash balances less total quick claims, that is, the ratio of cash and readily marketable securities to total current liabilities. This ratio, for which 1 : 1 ratio is often used as a norm, measures liquidity, or the ability of the business to liquidate all current demands on it, particularly liabilities for tax due and to shareholders for dividends declared but unpaid at the end of the year.

The liquid position of the company is important to maintain technical solvency, that is, to meet its obligations when they are due. The alternative is legal failure. The object of the company must be to generate sufficient cash with which to meet all maturing legal

obligations, such as the repayment of the principal of a debenture issue currently maturing, or interest on the debentures, since failure to do so is a default on a legal obligation. Failure to pay preference dividends, although this does not constitute a legal default on the part of the company, may seriously impair the company's credit rating, and render future finance more difficult and expensive. As long as the company can meet all the legal claims on it when due, technical solvency can be maintained. The company may, however, be technically insolvent, but still have assets of considerable value. The company can liquidate short-term assets to raise the funds to pay its legal obligations. Legal insolvency will set in when the company's recorded assets amount to less than its recorded liabilities. This may be due to losses earned over a period of time. The company may possess sufficient cash to pay short-term liabilities, but it may still be legally insolvent. This normally leads to technical insolvency.

The maintenance of a sound liquid position may then be considered as one of the objectives of the company. The company will keep adequate cash under the transactions motive, including liquid resources to meet known legal claims which are due in the foreseeable future. Furthermore, some liquid resources will be kept under the precautionary motive to meet any contingencies or uncertainties which may arise, or for any payments should the expected inflow of cash lag behind the expected outflow of cash. To maintain technical solvency proper cash-budgeting is thus necessary.

On the other hand the company may not keep unduly high precautionary motive balances, since the return on money and near-money balances will be normally lower than the return earned by locking the money up in revenue-producing productive activity. The involuntary balances which the company must keep to satisfy the transactions motive may be fairly high, depending on a number of factors, such as size of the company, volume of turnover, and so forth. The voluntary balances held under the precautionary motive will be mainly determined by expected future developments and management's policy.

Cash Flow

The cash flow is the annual net profits retained in the business, plus the depreciation provision. It is also referred to as earnings

after tax before depreciation or amortisation. It will be appreciated that the provision for depreciation is accumulated annually, being reflected in the current assets and not utilised until replacement of plant and machinery or any other fixed assets is called for. The long-run liquidity position will then be reflected by the sum of net earnings after tax plus all non-cash charges. In the interim the company has the use of the cash which, more often than not, will be absorbed in the working capital of the business or for expansion, an increase in dividends, reductions of debts, and so forth. Not only does the cash flow concept come in useful when considering problems of liquidity, but it also has its uses when balancing the claims of authorised capital expenditure programmes against the liquid resources available to meet them. Thus, for instance, if cash balances at the end of the year are low or inadequate in relation to quick claims and the calculated annual cash flow over the period during which the capital expansion plan is contemplated is less than the cost of the project, plus an allowance for an increase in working capital, one can be relatively sure that the company must either borrow money or raise fresh capital by way of an issue to shareholders. The ability of the company to meet long-run fixed cash payments is thus also important from the ordinary shareholder's point of view.

In checking current assets, cash is valued as reported, and marketable securities are valued at cost or market price, whichever is the lowest. If marketable securities form a large item, knowledge of their nature and the basis of their valuation is, of course, essential. The problems of receivables depend on the degree to which the company finds it necessary to finance its customers. The most uncertain of major current assets ordinarily is the inventory. It is usually also the largest current asset. Where an arbitrary liquidating value of perhaps two-thirds may generally be accorded to customers' receivables, however, inventory would likely be given a value of no more than one-half. Instead of a claim for cash, inventory represents merchandise which must still be sold.

Graham, Dodd and Cottle,²⁶ however, criticised the use of cash-flow on the grounds that it does not supply any better guide to the

26. Graham, B., Dodd, D.L. and Cottle, S. Security Analysis, 4th edition, p.176.

company's profitability than say calculations of earnings-per-share, and so forth. The re-investment of depreciation and/or amortisation allowances do not necessarily create or increase the cash-flow earnings, and do not necessarily contribute to the growth of earnings.

(b) Total Liabilities to Tangible Net Worth

This ratio is important for the creditors of a company, and is computed by dividing the total liabilities by the tangible net worth. The total liabilities (current liabilities plus long-term liabilities) represent the amount of money temporarily locked up in the company by creditors, and the funds permanently locked up in form of ordinary shares, preference shares, capital reserves, revenue reserves and undistributed profits. The ratio will show the extent to which prior claims (current liabilities plus long-term loans) are covered by tangible net worth. The higher this ratio, (that is, the smaller the net worth and the larger the total liabilities), the less security creditors (including debenture-holders), normally have.

A high ratio of total liabilities to tangible net worth can come about through bad financial policies in the past, for example, when funds had, for some reason or another, been locked up in real fixed assets in excess of tangible net worth. The development of such a company will become impaired through the lack of working capital. This lack of working capital will be reflected by a chronic bank overdraft, or the company may even be forced to issue debentures (on detrimental terms) to provide adequate net working capital. The debt burden of the company may become excessive, and it may take the company some time to rectify the situation.

There are various methods by which the company could accomplish this, but more often than not these methods do call for some sacrifice on the part of ordinary shareholders. First, of course, the company may curtail dividends (if already a dividend-payer), or it may have to pass a dividend, or postpone the maiden-dividend, and retain these net profits in the current assets (cash), and redeem the debentures in whole or in part at the earliest possible date. Secondly, the company can increase its issued capital (ordinary shares), and utilise the additional cash, in part or in whole, to redeem the debentures. This can or may lead to capital-watering and dilution of earnings.

These problems would not have arisen in the first place if the

company had not impaired the net working capital position by investing excessively in fixed real assets, and thus sacrificed the financial balance. The company may become subject to judicial management, complete reorganisation, recapitalisation, or even eventual winding-up, if losses are incurred and no plough-back can take place.

One of the main objects of sound financial policy must be to keep liabilities (particularly long-term financial obligations) at a minimum for a given level of output and sales. A too high gearing of capital structure, particularly in the early stages of a new company, may impair the competitive position, and also eat into profits which could have been ploughed back advantageously or, if already a dividend-payer, may have a depressing effect on the dividend rate and the price of the share which may make future financing on sound terms more difficult. An existing highly geared capital structure may tend to depress or curtail any further new investment by the company which may adversely affect its competitive position. There are limits to the borrowing powers and borrowing terms of companies, and an increase in the ordinary share issue may not be considered feasible at the time either.

The following may serve as an example:-

COMPANY A

	<u>1964</u>	<u>1965</u>	<u>1966</u>
Current liabilities	500,000	600,000	700,000
6 per cent debentures	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>
Total liabilities	<u>R1,500,000</u>	<u>1,600,000</u>	<u>1,700,000</u>
Ordinary shares	800,000	800,000	800,000
Capital reserves	300,000	300,000	300,000
Revenue reserves	<u>100,000</u>	<u>200,000</u>	<u>300,000</u>
Tangible net worth	<u>R1,200,000</u>	<u>1,300,000</u>	<u>1,400,000</u>
Total liabilities			
Tangible net worth	= 125 per cent	123.07 per cent	121.43 per cent.

Although the ratios improved they are still undesirable. The ratio should not be more than 100 per cent. The creditors have more at risk than the owners. If the above company incurred losses, no progress would be made and insolvency might set in. The above ratios will impair the financial and other policies of management, as there is

little flexibility. Although the ratios improved, this was accompanied by a steady increase in current liabilities. If the ratios deteriorated, for example, 1964 - 125 per cent, 1965 - 130 per cent and 1966 - 135 per cent, these relationships would have been even more unsound. A deterioration of the ratios may have been due to an increase in bank overdraft, owing to lack of working capital, or a relatively small amount of profits available for retention in relation to the increase in current liabilities. Too much funds may also be tied up in unsalable inventories.

COMPANY B

	<u>1964</u>	<u>1965</u>	<u>1966</u>
Current liabilities	200,000	300,000	300,000
6 per cent debentures	500,000	500,000	500,000
Total liabilities	<u>R 700,000</u>	<u>800,000</u>	<u>800,000</u>
Ordinary share capital	1,300,000	1,300,000	1,300,000
Capital reserves	300,000	300,000	300,000
Revenue reserves	100,000	200,000	300,000
Tangible net worth	<u>R1,700,000</u>	<u>1,800,000</u>	<u>1,900,000</u>

Total liabilities
Tangible net worth = 41.2 per cent 44.4 per cent 42.1 per cent

Company B is in a better position competitively since the financial balance is more favourable. A condition such as the above also implies that the company may have more liquid resources and a better working capital position. The debentureholders of company A appear to be in a weaker position than those of company B, as the cover provided by net worth is much smaller.

(c) Funded Debt to Net Working Capital

A funded debt is usually defined as a debt (or debts) with a date of maturity of more than one year from the balance sheet date, that is, an ordinary long-term debt, for example, debentures, notes, or any other long-term debt contracts. If a funded debt matures within one year from the date of the last balance sheet, it is necessary to classify such a debt as a current liability.

If the financial condition is to be considered sound the funded

debt should not be in excess of the net working capital. The reason for this is that the funded debt may be due for redemption, in part or in whole, and a weak working capital position may subject the company to some financial strain. The weak working capital position may be due to low operating profits, or if the latter were adequate the management may have ploughed-back the bulk of such profits into fixed-assets thus straining the working capital position. A heavy burden of interest charges on funded debt also constitutes an unnecessary drain on the working capital.

The crux of the matter is that the company may find it difficult to raise fresh capital (an equity or a new debenture issue) with which to repay the debt. The lack of working capital may also place the company in a difficult financial position. If the funded debt consists of a debenture issue, the holders of such an issue may lose their capital, in whole or in part, and the ordinary shareholders will, of course, be in an even worse position.

If a company is forced to finance operations out of funded debt and not out of an adequate supply of working capital, then the financial condition is unbalanced and the position may become serious enough in times of economic stagnation to threaten the stability and solvency of the company. This may particularly be the case in the construction and engineering industries where the business is sensitive to economic fluctuations and changes in the growth rate of the economy.

(d) Fixed Assets to Tangible Net Worth

This ratio is calculated by dividing the depreciated, book value of fixed assets by the tangible net worth, that is,

$$\frac{\text{fixed assets}}{\text{tangible net worth}} \times 100 = \text{the ratio or percentage tangible net}$$

worth invested in fixed assets. The ratio will show the fixed capital utilisation, that is, the utilisation of owned capital in real fixed assets. This ratio is, of course, heavily dependent on the nature of the business, for example, mining, manufacturing, industry or commerce. However, intercompany comparisons, within a given industry, are useful.

The individual must be careful when comparing this ratio with other comparable companies, since the methods of valuation of fixed assets may differ slightly from one company to another. Accounting practice in South Africa is, however, well standardised. Land (or

freehold property) is valued at historical cost, that is, purchase price plus costs, plus all development expenses and buildings. Buildings will normally include the cost, plus capitalised improvements minus depreciation. Freehold property and buildings will normally appear as one figure. Other real fixed assets may be valued at cost minus accrued depreciation, at market price, at replacement cost less accrued depreciation, or at liquidation value. However, it will be normal accounting procedure to value fixed assets at cost minus depreciation, and not at market prices, and there is normally no relationship between balance sheet values and market price. Replacement cost less depreciation may be used as a basis of valuation in the case of mergers and take-overs. Liquidation value is only important in the case of winding-up.

If real fixed assets are valued at cost minus accrued depreciation then, in an inflationary world, such as we are living in today, the conventional accounting methods of valuation may differ radically from the economic value. The individual will find it difficult to place an economic value on the real fixed assets. Accounting value does not relate to economic value, as in the latter case changes in prices are taken into account.

The composite stock of real assets shown at a given value in the balance sheet normally represents assets acquired at different times and thus of varying vintage. The balance sheet cost of an asset represents the initial value, that is, value at the point of time of acquisition. In inflation as experienced over the last three decades, the economic value of land and buildings may be well above the balance sheet values. It is really a problem of stock-adjustment. This problem only relates to the less liquid part of the balance sheet. It has been suggested that this kind of problem can be solved by some system of 'index-accounting', where the value of the fixed assets will change according to changes in some price-index,

The book value of the fixed assets underlying a given security may therefore be considered as somewhat artificial. On winding-up, the tangible assets need not realise (in cash) the values at which they are stated in the balance sheet. The book value of the assets is not really a measure of what the security holders will get on winding-up, but rather a measure of how the finance, (including undistributed profits), they have contributed is tied up in an asset

portfolio, in other words, what they have put into the business.

This ratio should be smaller than one. The lower this ratio or percentage the more advantageous to the ordinary shareholders. If this ratio is greater than one, it means that the creditors are financing some of the fixed assets, which is considered as undesirable. It means that the company will have to retain more profits to increase tangible net worth and repay some creditors, or simply raise more equity capital.

The amount of funds locked up in fixed assets may be excessive in relation to other companies, particularly if the fixed assets are to some large extent represented by prior charge capital. It may indicate that the expansion which took place in the past may have been over-optimistic. If this situation is accompanied by excess capacity within the company the dividend rate on ordinary share capital may tend to be depressed. A situation of this nature may take a long time to rectify itself. Overexpansion, resulting in excess capacity within a particular company, with heavy funded debt, and/or over-capitalisation, is a situation which will only increase the income and capital risk for the ordinary shareholder, and such a share should be avoided. (If, in the individual's view, the current market price is so depressed (low) that the share is clearly undervalued, and he is confident that the management may rectify the situation, he may, however, still wish to purchase the share for its long-run possibilities.)

An excess amount locked up in fixed assets may also impair the working capital condition and the finance made available from the net worth may be too small to carry on operations on a satisfactory basis. Excess capacity, heavy depreciation charges and lack of working capital all tend to weaken the competitive situation, and the shareholders may suffer as a result. The company may be forced to plough-back profits over a long period of time, without necessarily increasing earning capacity, but simply to provide working capital for day-to-day operating expenses. A business incurring losses under these conditions has very little chance of surviving for long, particularly if it is also faced with debenture interest or other high fixed-charges and operating expenses which cannot be easily decreased. The investment in fixed assets should be maintained as low as possible in relation to the size of the company, that is, turnover, net worth, and so forth, as this will also limit the chances of excess capacity, and also lack of working capital. It is better to expand slowly, rather

than tie all available funds up in fixed assets at one point of time. In the long-run the equity shareholders will gain from more balanced financial policies.

Some shares may sell at a price below the book value of the assets behind them. The shares of some companies with relatively little tied up in fixed assets, but with a high expected earning capacity, may sell at a price above book value of assets, for example, Grant Advertising. The tangible net worth per share can be compared with the market price of the share.

The individual should, however, recognise the fact that there is no true relationship between a company's earning power and real fixed asset values (as represented by total capital employed) or by net tangible worth. There is, therefore, no true relationship between asset values and dividends paid. As pointed out in the previous chapter, the price of a share could be well above or below the marginal cost of reproducing the underlying real assets. If we accept the premises that share prices are influenced more by earning power and actual dividends paid, then the 'temporary equilibrium' price of a share need not reflect asset values at all. The asset-value factor contained in a share should therefore not be overemphasised. However, in the case of prior claim, (fixed-interest securities), where safety of principal is normally important, ample tangible assets with economic value, are a necessary requirement or consideration. From the point of view of the ordinary shareholder, we feel that there is some danger though in paying a multiple of the asset value or break-up value of the share. The ordinary shareholder has a better chance of gain if he buys a share which is undervalued in terms of expected earning power, undervalued in terms of book (or break-up value), that is, the current price of the share is below book value of the assets, or well below previous 'highs'.

(e) Net Sales to Inventory

The purpose of this ratio is to calculate the inventory turnover of a company for a fiscal year, or over a given period. For this purpose he can utilise one of the following formulae:-

$$(1) \quad \text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{average inventory at cost}}$$

or

$$(2) \text{ Inventory turnover} = \frac{\text{net sales}}{\text{average inventory at selling prices}}$$

or simply

$$(3) \text{ Inventory turnover} = \frac{\text{net sales}}{\text{inventory.}}$$

Some authors consider (1) to be a superior formula, because it will show the judgment of management in the purchase of goods. The ratio should be high.

It is not our purpose to deal here with the methods of inventory valuation (Lifo, Fifo) and the efficacy of such methods, or whether it is valued at cost or at market whichever is the lower. From the point of view of the individual the balance sheet value of inventory is given, and he may accept the figure as such, or he may place his own conservative subjective valuation on the inventory.

The carrying of excessive inventory in relation to net sales will be reflected in heavy current liabilities. Too much working capital, in relation to sales, will be tied up in the inventory, if the latter is too large. Therefore, excessive inventory accompanied by heavy current liabilities, and lack of working capital, will more often than not lead to financial strain. An increase in the inventory may represent unsalable goods in which some working capital will be tied up. Furthermore, waste can accrue as a result of excessive inventory, due to obsolescence, changes in fashion, price fluctuations, perishability, and so forth.

Management can take a few steps to rectify an unsatisfactory relationship (too small a ratio), for example, it may (1) streamline methods of distribution in an effort to increase sales. This is, however, not always possible without incurring additional costs, such as more advertising, (2) reduce prices, but whether this will increase sales revenue depends on the elasticity of demand for the goods in question, and (3) decrease the inventory, but this again may result in losses, particularly for slow moving items.

Another ratio, which is supplementary to the one above is to calculate the ratio inventory to net working capital. A general rule

suggested by some authorities on ratio analysis is that the inventory should not be greater than three-quarters of net working capital.

(f) Net Sales to Tangible Net Worth

Here again we have a few supplementary ratios.

First, net sales can be compared with fixed assets, that is, $\frac{\text{net sales}}{\text{fixed assets}}$, giving us a ratio showing fixed-asset productivity, or 'plant turnover'. This is a good ratio for inter-company comparisons. The higher this ratio, the better. Second, net sales to tangible net worth, that is, $\frac{\text{net sales}}{\text{tangible net worth}}$, which is known as the net worth turnover or return on tangible net worth. Third, the capital turnover is calculated by dividing the net sales by total capital employed or total assets.

The above ratios are purported to give some indication of profitability. The second ratio measures the velocity of turnover of the tangible net worth, or the activity of the capital supplied by shareholders. The third ratio will give some indication of the effectiveness of the company and productivity of total assets, and resource utilisation.

The above ratios may also give some indication of the degree of overtrading or undertrading. A high ratio, from the shareholder's point of view, in any of the above, may be considered as preferable to a low ratio, but it must be borne in mind that over-trading (if the ratio is too large) can cause some financial strain or imbalance. Overtrading is then the situation of handling an excessive volume of sales in relation to the tangible net worth. Considerable use may have to be made of credit and credit facilities (bank overdrafts, etc.), with the result that current liabilities may be excessively high. Long-term loans may even become necessary. This may again adversely affect the ratio of total liabilities to tangible net worth, which we have already dealt with. To reduce the degree of overtrading more profits should be retained, or a rights issue should be made. The before-tax rate of return on assets can be calculated by earnings before interests and taxes divided by assets.

The above ratios will tend to differ from industry to industry. In those industries producing capital goods, where large amounts are

tied up in real assets, the volume of sales may well be low in relation to the tangible net worth, or even total capital employed. However, the operating profit margin may be high. In other industries, for example, textiles, the turnover may be relatively high in relation to tangible net worth, but the profit margin is smaller.

The company may find it difficult to pay the creditors, and more equity funds should be obtained as the company will be undercapitalised in relation to volume of turnover. A stage may even be reached again where creditors have more at risk than the ordinary shareholders. Overtrading is a relative term and inter-company comparison is necessary.

Undertrading is the opposite situation, but must be viewed more seriously. It may mean that excess capacity exists and some capital is idle, or that the value at which the company was capitalised was too high, that is, the real value placed on the assets was excessive. The company is then considered to be overcapitalised and the sales volume is insufficient in relation to tangible net worth or to total capital employed. From the point of view of creditors and owners such a situation is bound to increase the risks involved. The rate of return to owners will tend to be low as a result of the below average utilisation of the capital invested. Undertrading will tend to reflect adversely on the company's management, and the shares will tend to sell at a low multiple of earnings. The prospects for capital gains may also be fairly limited. The answer to the problem of over-capitalisation is not really a reduction in capital issued or plough-back, but rather efforts to increase turnover of the existing products or proper diversification and better utilisation of existing assets.

The shareholders are interested in the earning power of the assets. The earning power may be calculated by the following equations:-

$$(1) \text{ Turnover} = \frac{\text{sales}}{\text{operating assets}} \quad . \quad \text{Another formula often used to calculate the turnover ratio is } \frac{\text{net revenue}}{\text{total assets}}.$$

$$(2) \text{ Margin} = \frac{\text{net operating income}}{\text{sales}}, \quad \text{or} \quad \frac{\text{net operating income}}{\text{net revenue}}$$

$$(3) \text{ Earning power} = \frac{\text{sales}}{\text{operating assets}} \times \frac{\text{net operating income}}{\text{sales}} \\ = \frac{\text{net operating income}}{\text{operating assets}}$$

As stated earlier, basic measures of earning power are related to the profitability of net sales or revenues: gross profit divided by net sales; operating margin (operating profit divided by net revenues or sales), and net profit margin (net income divided by net sales.)

A ratio frequently used to measure the operating efficiency of a manufacturing company is operating expenses divided by operating revenue. A decreasing (or at least a stable) ratio is beneficial. A rising ratio need not reflect decreasing efficiency, but a slump in operating revenue which may be due to external economic factors. If revenue declines by x per cent due to a fall-off in turnover, it may not be possible for management to decrease operating expenses by x per cent.

Another ratio is gross revenue to fixed assets. The individual must establish trends and compare the trend with comparable concerns in the industry. An upward trend is beneficial to shareholders. The company with a low ratio, relative to other companies in the same industry, should be avoided. A low ratio could mean excess capacity and that too much has been tied up in fixed assets relative to turnover.

(g) Net Sales to Net Working Capital

This ratio is calculated by dividing net sales by net working capital, and its purpose is to show to what extent working capital is being utilised. It will show how many times working capital has reproduced itself in net sales. Working capital as such is again very sensitive to any changes in sales volume. When the ratio is too low, then the volume of sales is not high enough for the level of working capital, and the latter is not fully utilised. On the other hand, a high ratio may reflect a lack of working capital in relation to the volume of sales. Where a high ratio is due to the lack of working capital, current liabilities will tend to be high, and more working capital will be needed. A high ratio may indicate overtrading.

(h) Net Profit to Net Sales

The above ratio is calculated by dividing net profit by net sales. The profit margin can be found by dividing operating income by net sales. There are, of course, numerous factors which may affect the ultimate net profit earned during a fiscal year, and considerable fluctuations may occur which may be due to general economic conditions (temporary and/or more permanent economic developments) or to more efficient management and operations, temporary price-cost advantages,

taxation, economies of scale, and so forth. The individual should make an effort to ascertain whether the fluctuation is due to some permanent factors or whether an unusually large profit or loss is not due to a very temporary factor. To establish the causes of wide fluctuations is not an easy task where inadequate information is given.

(i) Net Profit to Tangible Net Worth

[In the previous ratio, attention was focused on the net profit - net sales relationship.] The net profit can be compared with two other important figures, namely, tangible net worth and total capital employed. The net profit divided by tangible net worth will reflect the rate of return on owners' capital contributed, and the net profit divided by total capital employed (that is, owners' capital plus outside capital) will reflect the rate of return on the total capital employed, and really measures the return on total recorded assets. Account is thus also taken of the gearing and leverage. The ratio of net profit to total capital employed will reflect, to some extent, the degree of asset utilisation. The ratio net profit to net worth is probably a superior ratio to use, because of the effect of leverage. The return on total capital employed shows the return on total capital regardless of how the capital was raised, which is not satisfactory from the point of view of the ordinary shareholders. The above ratios will be indicative of the management's financial and operative skills, and ability in profitable utilisation of the funds locked up in the company. The net sales figures are normally not published, but the net profit figures will be available on which the above ratios can be calculated.

Due to the fluctuations in net profit over time, the above ratios will fluctuate as well, and for comparative analysis a sufficiently long period should be taken, to include good and bad years. The average annual return on net worth and/or total capital should be adequate. Use can be made of a moving average for comparative purposes. Non-recurring items must be excluded from the net profit when comparison over a period of time is undertaken.

A concept sometimes used, with reference to fluctuating profits, is the elasticity of profits. The elasticity of profits serves two purposes, namely, it shows the increments in sales which are required to give the same profits, or the per cent of profit change from one year to another. Profit elasticity can be calculated by using the following

formulae:-

$$E = \frac{P}{P + X} ,$$

where E = profit elasticity

P = profit

X = fixed costs, or

$$E = \frac{\frac{V}{(S + B)} \times O}{R}$$

where E = per cent of profit change

V = per cent of volume change

S = new volume

B = old volume

O = old fixed cost, per cent

R = old profit rate.

The effect of a volume change on profit is thus shown. It is, however, necessary to distinguish between fixed cost and variable cost, which is not always possible in practice, since most costs are only semi-fixed. The important point is, however, that the higher the fixed cost to total cost, the higher the operating leverage of the company, and the greater the business risk. Operating leverage actually refers to the extent to which total operating costs vary with changes in operating revenue. If fixed costs are high, and cannot be changed in the short-run, then it may happen that a small decline in operating revenue can wipe out all profits, or the profit margin. Conversely, an increase in operating revenue would tend to result in a greater than proportionate increase in the profit margin. Where the fixed costs only constitute a small proportion of total cost for a given scale of operations, it may be easier to maintain profit margins.

The higher the ratio net profit to tangible net worth, the higher the rate of return on owner's capital, and the higher the earnings per ordinary share. The ratio of net profit to total capital employed should also be high. An upward tendency in both ratios will be beneficial to the ordinary shareholders, and also from the point of view of fixed-interest security holders (creditors), because of better income protection.

In using the ratio net profit to tangible net worth, the individual must be careful first to establish that an increase in net

profits (and an increase in the ratio between two fiscal years), was not because of or accompanied by an increase in loans or prior charge capital. The increase in the ratio may not be due to an increase in the earning capacity of the assets financed by net worth, but an increase in assets financed by borrowed capital. Whether ordinary shareholders will gain from this depends on the rate of interest paid on the loan capital, the productivity of the assets so financed, and the extent of leverage. In calculating earnings per share over a number of years the individual must allow for any changes in the capital structure, that is, an increase in ordinary share capital, (rights issues and capitalisation issues), conversion, splits, or any other change.

The shareholder should bear in mind that the maximization of profit is no guarantee that all the financial relationships will be sound and satisfactory, and the company may still find itself in a position of financial strain and in difficulty. An analogy can be drawn with the growth of a country. If a country tries to do too much some bottlenecks may develop, and the growth may be accompanied by excessive inflation and other distortions. In the same way the policy of profit maximization, and its continuance, should be consistent with the maintenance of a sound financial structure, that is, balanced financial relationships. The income statements will show how well the company was managed and whether the rate of profit may be considered satisfactory, and the balance sheet whether balanced financial relationships were maintained. A balanced relationship between sales volume, output capacity, (utilisation of asset portfolio) and financial structure should be maintained.

(j) Gearing and leverage

The gearing and leverage and thus the source of capital, have some significance to the various groups of security holders within the company. Both gearing and leverage are important from the point of view of ordinary shareholders as these will have some influence on their residual claim against assets and profits after tax and interest.

In the field of finance the concepts of gearing and leverage are sometimes used interchangeably, whereas in fact they mean different things.

Briefly, gearing means that the capital structure will contain prior charge or loan capital. Gear ratio, in relation to a company's

capital structure is the amount of a company's equity in relation to the fixed-interest security issues, or as the latter is usually called, the prior charge issue. The composition of the capital is again mainly a function of the cost of capital and cash-flow which has been generated in the past by the asset portfolio and the expected cash flows (or rate of return) which the asset portfolio, particularly if it is changed), will generate in the future, and management's multiperiod plans already completed or unfinished, as these will have some influence on the anticipated asset portfolio growth. Instead of gearing the term capital pyramiding has been used by some authors in the past.

Financial leverage refers to a situation where the capital structure is geared, either highly, moderately, or lowly, and the company earns a net rate of return on the prior charge capital which is either above or below the fixed-interest payments on the prior charge capital.

If the net rate of return on the asset portfolio (or on total capital employed) is greater than the fixed-interest payments (or cost) on prior charge capital the rate of return to ordinary shareholders will be levered above what it otherwise would have been in the complete absence of prior charge capital. Conversely, if the net rate of return on the total capital employed is below the fixed-interest payments, the rate of return to ordinary shareholders will be levered below what it otherwise would have been in the complete absence of prior charge capital. Leverage thus works in both ways, and can become a speculative factor. The reason for financial leverage is then the fixed nature of interest payments on the prior charge capital and differences in the net return on total capital as compared to the fixedness of the interest payments.

Normally a distinction is made between balance sheet leverage and income statement leverage. The former is used as synonymous with 'trading on the equity'.²⁷ A company that includes prior charge fixed-interest securities in its capital structure is said to be 'trading on the equity'. The principal is protected by the contribution made by the equity shareholders. Here the individual will be interested in how a given profit will affect equity earnings for different assumed degrees

27. See Hunt, P., "A Proposal for Precise Definitions of 'Trading on the Equity' and 'Leverage'", reprinted in Ball, R.E. and Melnyk, Z.L., editors, Theory of Managerial Finance: Selected Readings, Allyn and Bacon, Inc., Boston, 1967, pp.256-259.

of capital structure gearing as opposed to a capital structure free of prior charge capital. In the second case, that is, income statement leverage, the capital gearing is taken as given and the effects of such gearing on the ordinary shareholders' earnings are considered assuming various changes in earnings on the total capital employed, as against the effects of such changes when the capital structure is free of prior charge capital.

It is not our purpose to discuss the problems involved in choosing an optimal capital structure and the cost of debt and equity capital.²⁸ It will suffice to say that there are a number of factors, from the ordinary shareholder's point of view, which favour some prior charge capital component in the capital structure. This is particularly the case where the company is well-established in the industry, of good size, and where the earnings on total capital employed do not fluctuate violently from one fiscal year to another. If such a company earns a net return on total capital which is above the cost of prior charge capital, the financial leverage will place the ordinary shareholders of this company in a better position than the ordinary shareholders of a comparable company without any prior charge capital, assuming everything else to be more or less equal. On the other hand, the individual must bear in mind that, in the case of some companies, an excessive burden of long-term debt is dangerous, particularly where earnings are not stable. A conservative prior charge component would then be more advisable and to the benefit of ordinary shareholders. Too much financial leverage is an additional risk, particularly if earnings or the rate of return fail to come up to expectations. The financial leverage resulting from some prior charge component in the capital structure will have some influence on the price-earnings ratio (or multiplier) at which the share sells in the market, as will be explained at a later stage in this chapter.

Gearing can be measured in different ways. The usual way is to compute the ratio of prior charge capital to the book value of total capital, that is, $\frac{\text{Prior charge capital}}{\text{total capital employed}}$, for example,

$$\begin{array}{lcl} \frac{1,000,000}{5,000,000} & \times 100 & = 20 \text{ per cent,} \\ \text{or} & & \\ \frac{5,000,000}{10,000,000} & \times 100 & = 50 \text{ per cent.} \end{array}$$

28. See chapter II.

The higher this percentage, the more highly geared the capital structure. The lower the percentage, the lower the capital structure gearing, with 0 per cent as the ultimate limit, where prior charge capital and therefore gearing is absent.

The total capital employed will be the sum of the (1) debentures, (2) notes, (3) preference shares, (4) ordinary shares, (5) capital and revenue reserves. The prior charge capital is the sum of (1), (2) and (3). We may also calculate the ratio by using the market valuation or capitalisation of the company. If the market capitalisation is above the book value of total capital employed, as would normally be expected, the ratio will, of course, be lower. It is said that the nominal money value placed on ordinary shares has no real significance, and market valuation is a superior ratio to use.

Another method sometimes employed is to calculate the ratio amount paid on prior charges / annual distributed profit. The annual distributed profit may be considered as an expectational magnitude. It shows income statement leverage and the degree of gearing fluctuates as the denominator fluctuates, or if we keep the denominator constant, it will fluctuate according to the numerator. For example, taking the latter case, let us assume two companies, each distributing R500,000 in total dividends and interest.

COMPANY A

<u>Capital</u>	<u>Total Dividends and interest</u>	<u>Dividend per share</u>
1,000,000 5 per cent Preference shares of R1 each	50,000	5c
10,000,000 Ordinary shares of R1 each	450,000	4.5c
	<u>R 500,000</u>	

The ratio is 1 to 10. The company is lowly geared, and prior charges absorb little of earnings or profits distributed.

COMPANY B

<u>Capital</u>	<u>Total Dividends and interest</u>	<u>Dividend per share</u>
5,000,000 5 per cent Preference shares of R1 each	250,000	5c

1,000,000 Ordinary
shares of R1 each

250,000	2.5c
<u>R 500,000</u>	<u>20</u>

The gear ratio is 1 to 2, which is highly geared and prior charges absorb a large proportion of earnings or profits distributed. (The effect of changes in profit on the position of ordinary shareholders will be shown below, for example, when a change in profits will completely wipe out the ordinary dividends.)

There are various other methods which can be used to measure the degree of gearing. If we take P to stand for prior charge capital and E for equity, that is, ordinary share capital plus capital and revenue reserves, a few methods can be employed to calculate gearing. (P + E) will thus give us total capital employed. The following ratios can then be calculated, using either book or market value:-

- (1) $\frac{P}{(P + E)}$, which was given above in the first place. The higher the percentage the higher the gearing.
- (2) $\frac{(P + E)}{E}$, where a high gearing will be reflected in a high quotient. In the absence of prior charge capital the quotient will be equal to one.
- (3) $\frac{(P + E)}{P}$, which is the reciprocal of (1). The higher the gearing, the lower the quotient, and vice versa.
- (4) $\frac{E}{(P + E)}$ which is the reciprocal of (2). The higher the gearing, the lower the quotient, and vice versa.
- (5) $\frac{P}{E}$ the higher the ratio, the more highly geared the capital structure.
- (6) $\frac{E}{P}$ which is the reciprocal of (5); the smaller the ratio, the higher the gearing.

A company with a ratio of, say, 1 to 1, is said to be moderately geared; a ratio of 0.2 to 1 is said to be highly geared, and a ratio of 5 to 1 would be considered to be a lowly geared capital structure, as follows (using formula (6))

	<u>Highly geared</u>	<u>Moderately geared</u>	<u>Lowly geared</u>
Equity	R1,000,000	R2,000,000	R5,000,000
Debentures	5,000,000	2,000,000	1,000,000
Ratio	0.20 : 1	1 : 1	5 : 1

The general argument then is that the more highly geared the capital structure, the greater the risk of fluctuating earnings per share, dividend rate and market price, due to fluctuating earnings, for the ordinary shareholders. Such highly geared ordinary share issues in a fairly unstable, or declining company/industry, or immature company/industry, should be avoided by ordinary share investors, although the gains may be very substantial, both from the point of view of income and price, should earnings increase. Moderately and lowly geared ordinary shares are not subject to the same degree of risk of fluctuating earnings, (or profit), and suffer less should profits decline, but also gain less when profits rise.

The gearing of the capital structure is important when the individual is analysing the investment merits of two comparable ordinary shares. The only method of calculating the times cover properly is to make use of priority percentages, or else some misleading conclusions may be drawn. The priority percentage method is often employed to show the income cover for debenture interest and preference and ordinary share dividends. This may tend to influence the price-earnings ratio or multiplier applied to earnings per share. One may concede that in the case of lowly or moderately geared companies it is not necessary to make an adjustment to the multiplier in the valuation process. The investment value of an ordinary share may well be raised in the case of a highly geared company, as long as the net rate of return on the new assets, financed by the prior charge capital, is raised above the average net rate of return on total capital employed. Gearing may, however, tend to make valuation more complex, because of different degrees of leverage and risk.

To illustrate priority percentages we may take the following hypothetical case. The profit after deducting depreciation allowances and taxation, but before deducting debenture interest, is taken to represent 100. Say, company A earns R400,000 after tax, but before deducting debenture interest, and the gearing is such that debenture interest will absorb R100,000, the preference dividend R20,000 and the ordinary dividend R160,000, whilst the balance of R120,000 is transferred to revenue reserves. The priority percentages can then be shown as follows:-

<u>Debenture interest</u>	<u>Preference dividend</u>	<u>Ordinary dividend</u>	<u>Transfer to revenue reserves</u>
0 - 25	25 - 30	30 - 70	70 - 100

The debenture interest is covered four times by the profits and the preference dividend is covered 15 times. The method of calculating the preference dividend cover would be to take $(100 - 25) / 5$, which is 15 times, or $(R400,000 - 100,000) / 20,000$. The ordinary dividend would be covered $(100 - 30) / (70 - 30) = 1.75$ times, that is, $(R400,000 - 120,000) / 160,000$. This information can be compared with another comparable company, but with a far less favourable gearing from the ordinary shareholders' point of view, and which is more risky should earnings be subject to considerable fluctuations.

If the company with a highly geared capital earns only sufficient gross profits to pay the prior charge interest, the possibility of defaulting on such charges is great whenever an unexpected increase in operating expenses, or a decrease in sales revenue, or a combination of the two occur. The times prior charges earned is calculated by the ratio operating revenue (or profit) available for prior charges divided by prior charges, that is, $\frac{R12,000,000}{500,000} = 24$ times. This ratio should be high. The reciprocal of the ratio is prior charges divided by operating revenue which shows the burden of prior charges on operating revenue. Excessive leverage may also be bad for senior securities. There is no cushion of safety and they are to some extent exploited.

Let us take company B with earnings equal to R400,000 after tax but before deducting debenture interest. Let debenture interest absorb R160,000, preference dividend R120,000, ordinary dividend R60,000 and R60,000 be transferred to revenue reserves. The priority percentages will then be as follows:-

<u>Debenture interest</u>	<u>Preference dividend</u>	<u>Ordinary dividend</u>	<u>Transfer to revenue reserves</u>
0 - 40	40 - 70	70 - 85	85 - 100

In this case the debenture interest is covered $100/40 = 2.5$ times, that is $400,000/160,000$, and the preference dividend is covered $(100 - 40) / (70 - 40)$ times, that is twice, that is $(400,000 - 160,000) / 120,000$. The ordinary dividend is also

covered twice, that is $(100 - 70)/(85 - 70)$, that is $(R400,000 - 280,000)/60,000$. Should profits decline by only 15 per cent (or R60,000) the ordinary dividend will be wiped out completely, if the board maintains a transfer of R60,000 (or 15 per cent) of profits to reserves. A decline of 15 per cent in profits will leave R340,000, allocated as follows:- debenture interest R160,000, preference dividend R120,000, and transfer to reserves R60,000. From this it appears, that although the ordinary dividend is covered twice in the case of company B, and only 1.75 times in the case of company A, the ordinary shareholders are in a more dangerous (risky) position in the latter example, (company B), because the income of the company is more highly geared. Although the dividend cover in the case of company A is only 1.75, profits must decline by 40 per cent (R160,000) before the ordinary dividend is wiped out. The profit of R240,000 will then be allocated as follows:- Debenture interest R100,000, preference dividend R20,000, and transfer to reserves R120,000. A decline of 15 per cent in profits in the case of Company A, maintaining the transfer of R120,000 to reserves, will only result in ordinary dividends being cut by R60,000, from R160,000 to R100,000. The R 340,000 will be allocated as follows:- Debenture interest R100,000, preference dividend R20,000, ordinary dividend R100,000, and transfer to reserves R120,000.

A formula can be used to calculate the interest-coverage-ratio.²⁹ The object of this ratio is to relate cash-flow to all interest payments (including preference dividend) during a given fiscal year, and in this way the individual can ascertain the ability of the company, (over past periods), to pay all prior charges. This will also show the extent to which earnings must decline before the prior charges cannot be paid. Use is again made of cash-flows, which will then reflect the long-run ability of the company to meet interest claims. Sinking-fund payments must then be accounted for. The ratio the individual is interested in is referred to as the debt-cash-flow-coverage ratio.

Let us assume a company with the following capital structure:

Ordinary shares	R3m.
Debentures 6 per cent	<u>1m.</u>
	<u>R4m.</u>

29. See Archer, S.H. and D'Ambrosio, C.A., Business Finance: Theory and Management, pp.522-526.

Let us assume the annual cash-flow, before interest and taxes amounts to R1,000,000. The debentures are sinking-fund debentures and 4 per cent of the amount outstanding must be put to the sinking fund. Let us assume the amount to be R40,000 for the current period, that is 4 per cent of R1,000,000 outstanding. The debenture interest will absorb R60,000. The sinking-fund payment is after-tax, but since we are interested in before-tax coverage, the sinking-fund payment is adjusted for this, that is, by dividing the instalment by $1 - t$, where t is the tax rate.³⁰ The denominator of the formula given below will consist of the interest payments plus the tax adjusted sinking-fund obligation. The numerator (cash-flow) will be the net income (before interest and tax) plus depreciation allowances. The following formula can then be used:- $Y = \frac{CF}{I + \frac{S}{1-t}}$

where Y = debt-cash-flow-coverage
 CF = cash-flow, before interest and taxes
 I = interest payments
 t = tax rate
 S = sinking-fund instalment

$$\begin{aligned} \text{Thus } Y &= \frac{1,000,000}{60,000 + \frac{40,000}{1 - .40}} \\ &= \frac{1,000,000}{60,000 + \frac{40,000}{.60}} \\ &= \frac{1,000,000}{60,000 + 66,667} \\ &= \frac{1,000,000}{126,667} \\ &= 7.9 \text{ times.} \end{aligned}$$

The debt-cash-flow-coverage is thus 7.9. Where the cash-flow fluctuates widely from year to year, this ratio should be high.

The same argument can now be followed by also introducing preference shares into the capital structure. We will again assume that the debentures are sinking-fund debentures but the preference shares are not, since such shares are extremely rare. However, we must bear in mind that the debenture interest is deductible for tax purposes, whereas

30. We assume, for illustrative purposes, that the tax rate (including loan levy, when applicable) to be 40 per cent.

the preference dividend is not. In the denominator of the formula this adjustment must be shown.

Let us take the same capital structure as above, but introduce preference shares as well. The capital structure will then be as follows:-

Ordinary shares	R3m.
Debentures 6 per cent	1m.
Preference shares	
6½ per cent	<u>1m.</u>
	<u>R5m.</u>

The annual cash flow, before interest and taxes amounts to R1,000,000. The debenture interest will again absorb R60,000 and the unadjusted sinking-fund R40,000. The preference dividend unadjusted for tax, will absorb R65,000. This latter figure must be adjusted by dividing it by $1 - t$, where t is the tax rate. The numerator will again be net income (before interest and tax) plus depreciation.

The preference-share-cash-flow-coverage ratio is computed by the following formula:-

$$R = \frac{CF}{\frac{I + S}{1-t} + \frac{D}{1-t}}$$

where

R = preference-share-cash-flow coverage

CF = annual cash-flow, before interest and taxes

I = debenture interest payments

S = sinking-fund payments on debentures

D = preference dividend

t = tax rate

We can then calculate the times cover for preference dividend.

$$\begin{aligned} R &= \frac{1,000,000}{\frac{60,000 + 40,000}{1 - .40} + \frac{65,000}{1 - .40}} \\ &= \frac{1,000,000}{60,000 + \frac{40,000}{.60} + \frac{65,000}{.60}} \\ &= \frac{1,000,000}{60,000 + 66,667 + 108,333} \\ &= \frac{1,000,000}{235,000} \\ &= 4.25 \text{ times. } \checkmark \end{aligned}$$

The preference dividend is only covered four times, which may be considered inadequate, should the cash-flow fluctuate widely from year to year.

We can now calculate the times cover for ordinary dividend. Again we must calculate this on an after-tax basis. This is calculated with the same formula as above, except that we add the tax-adjusted ordinary dividend to the denominator. Let us assume that the company followed a stable dividend policy and declared a dividend of 12 per cent on the nominal ordinary share capital of R3,000,000. The ordinary dividend will then absorb R360,000 before adjusting for tax. The ordinary-dividend-coverage ratio is then calculated as follows:-

$$M = \frac{CF}{\frac{I + S}{1-t} + \frac{D}{1-t} + \frac{O}{1-t}}, \text{ where}$$

M = cash-flow coverage of ordinary shares

CF = annual cash-flow, before interest and taxes

I = debenture interest payments

S = sinking-fund payments

D = preference dividend

O = ordinary dividend

t = tax rate

We then obtain the following:-

$$\begin{aligned} M &= \frac{1,000,000}{60,000 + \frac{40,000}{1-.40} + \frac{65,000}{1-.40} + \frac{360,000}{1-.40}} \\ &= \frac{1,000,000}{60,000 + 66,667 + 108,333 + 600,000} \\ &= \frac{1,000,000}{835,000} \\ &= \text{say, 1.2 times.} \end{aligned}$$

The cash-flow coverage of the ordinary dividend is then 1.2.

From the above illustrations it may be useful for the individual to divide companies into categories of highly geared, moderately geared, and lowly geared capital structures and to calculate the cash-flow-coverage ratios.

Financial leverage, as a result of gearing, may now be used to illustrate how the return (or earnings yield) on equity capital (ordinary shares plus revenue and capital reserves) as such may differ from the rate earned on total capital employed and the extent to which

leverage may influence this. It is again best illustrated by taking two companies of high and low gearing respectively

<u>C.W.A. Ltd.</u>		<u>T.P.A. Ltd.</u>	
Equity capital	R1m.	Equity capital	R2m.
Fixed-interest securities (say, 6 per cent debentures)	$\frac{R2m.}{R3m.}$	Fixed-interest securities (say 6 per cent debentures)	$\frac{R1m.}{R3m.}$
	<u><u> </u></u>		<u><u> </u></u>
Ratio 0.5:1, (Highly geared)		Ratio 2:1 (Lowly geared)	

Broadly speaking, we may say that low leverage tends to greater stability in the earnings accruing to ordinary shareholders. Such stability may be considered to improve the quality of the share from the point of view of the income-conscious investors. The capital-conscious investor or speculator may prefer a more highly geared issue, since gearing and leverage may have some influence on price movements. A high gearing and leverage may be considered to add additional risks from the point of view of the ordinary shareholder. However, he may be quite prepared to assume the additional risk in the expectation of larger capital gains.

In both cases the total capital employed is R3,000,000, but in the different ratios as shown above. Suppose that the net profit in both cases, after all taxes have been deducted, but after fixed-interest security interest has been added back, amounts to R300,000. The return on total capital employed is thus 10 per cent, but the interest on the fixed-interest securities only amounts to 6 per cent in both cases. In the case of C.W.A. Ltd., the interest on the debentures will absorb R120,000 leaving R180,000 earned by the equity capital, which is 18 per cent. In the case of T.P.A. Ltd. the debenture interest will absorb R60,000 leaving R240,000 earned by the equity capital, which is an earnings yield of 12 per cent. This can be summarised as follows:-

	Capital structure		Money Value of earnings		Earnings per cent	
	CWA	LTD TPA LTD.	CWA	TPA	CWA	TPA
Equity capital	1,000,000	2,000,000	180,000	240,000	18	12
Debentures 6 per cent	2,000,000	1,000,000	120,000	60,000	6	6
	R3,000,000	3,000,000	R300,000	300,000	10	10
	(0.5: 1)	(2:1)				

The more highly geared company, C.W.A. shows more leverage, that is, 1.8, as to 1.2 for T.P.A.

$$\frac{18}{10} \quad \frac{12}{10}$$

In the case of the highly geared company C.W.A. the equity capital earnings increase to 18 per cent, and in the case of T.P.A. which is lowly geared to 12 per cent, an increase of 8 per cent and 2 per cent respectively, which is due to the 4 per cent difference in the rate of return on total capital employed of 10 per cent and the rate of interest on fixed-interest securities. The crux of the matter is that prior charge capital is borrowed at some explicit cost, and the capital yields an explicit return which may be above or below the explicit cost. If a company can borrow at 6 per cent and earn 10 per cent on the capital, the explicit return is above the explicit cost, and equity earnings will be levered upwards. If a company can borrow at 6 per cent, but only earn a rate of return of 4 per cent, equity earnings will be levered downwards. The explicit cost of the capital funds borrowed is greater than the explicit return earned on such capital.

One may generalise by showing the rate of return on equity capital divided by the rate of return on total capital employed and express this ratio as being greater than one or smaller than one, that is $\frac{18}{10} = 1.8$, or $\frac{12}{10} = 1.2$. If this ratio is greater than one, it shows an upward leverage on equity capital, and conversely, if the ratio is smaller than one, a downward leverage on equity capital. When the ratio is unity, there is no leverage. Even if the capital structure is geared, there may be no leverage as long as the ratio is unity.

The above calculations can be made with the use of the

following formula.³¹

$$e = \left(\frac{m(P + E) - y(P)}{(P + E) - (P)} \right), \text{ where}$$

m = rate of return on total capital employed

y = is the interest rate paid on prior charge capital

P = prior charge capital

E = equity capital

(P + E) = total capital employed

e = rate of return to equity capital

Applying the formula, we can find the upward leverage on e.

As long as $m > y$, e will be levered upwards, and the ratio will be greater than one. When $y > m$, e will be levered downwards, and the ratio becomes smaller than one. When $m = y$ there is no leverage.

The extent of leverage will depend on the size of P compared with (P + E), that is, the larger P the greater the leverage. For example, in the case of C.W.A. the position will be as follows:-

$$e = \left(\frac{(10 \times 3,000,000) - (6 \times 2,000,000)}{3,000,000 - 2,000,000} \right) = 18 \text{ (or 18 per cent)}$$

The ratio = $\frac{18}{10} = 1.8$, which is greater than one (or unity.)

When applying the formula to T.P.A. we find:-

$$e = \left(\frac{(10 \times 3,000,000) - (6 \times 1,000,000)}{3,000,000 - 1,000,000} \right) = 12 \text{ (or 12 per cent)}$$

The ratio = $\frac{12}{10}$ or 1.2, which is again greater than one (or unity).

In both cases e is levered upwards since $m > y$. Let us assume that $m < y$ in the case of both companies, say $m = 5$ per cent and y remains 6 per cent. In the cases of (1) C.W.A. and (2) T.P.A. the position will then be as follows:-

$$(1) \text{ C.W.A. } e = \left(\frac{(5 \times 3,000,000) - (6 \times 2,000,000)}{3,000,000 - 2,000,000} \right) = 3 \text{ (or 3 per cent)}$$

The ratio is $\frac{3}{5}$ or .60, which is smaller than one, (or unity.)

31. See Friedland, S., The Economics of Corporate Finance, Prentice-Hall, Englewood Cliffs, New Jersey, 1966, p.166. In his formula Friedland allowed for the marginal income tax rate. At this stage we are not yet considering the effects of taxation and we do not include the tax rate in our formula.

$$(2) \text{ T.P.A. } e = \left(\frac{(5 \times 3,000,000) - (6 \times 1,000,000)}{3,000,000 - 1,000,000} \right)$$

$$= 4.5. \text{ (or 4.5 per cent)}$$

The ratio is $\frac{4.5}{5.0}$ or .9, which is also smaller than unity.
 e is levered downwards in both cases, since $m < y$. Let us assume $m = y$ in the case of C.W.A., that is, m is also 6 per cent, then

$$e = \left(\frac{(6 \times 3,000,000) - (6 \times 2,000,000)}{3,000,000 - 2,000,000} \right)$$

$$= 6 \text{ (or 6 per cent)}$$

The ratio is then $\frac{6}{6}$, which is equal to one (or unity.)

Although the capital structure is highly geared, e is not levered upwards or downwards.

Account should be taken of the rate of interest paid on prior charges. Let us again take C.W.A. Ltd. and T.P.A. Ltd., but we now assume that C.W.A. Ltd. (the higher geared company) issued the debentures at a time when the rates of interest were high, say, $7\frac{1}{2}$ per cent and T.P.A. Ltd. (the lower geared), issued the debentures when the rates of interest were relatively low, say, 3 per cent.

	Capital Structure		Money Value of earnings (Profit Distributed)		Earnings per cent	
	C.W.A.	T.P.A.	C.W.A.	T.P.A.	C.W.A.	T.P.A.
Equity	R1,000,000	R2,000,000	150,000	270,000	15	13.5
Debentures	2,000,000	1,000,000	150,000	30,000	$7\frac{1}{2}$	3
	R3,000,000	R3,000,000	R300,000	R300,000	10	10
	(High)	(Low)				

Let us take the two examples again to show leverage.

First example C.W.A. $\frac{18}{10} = 1.8$ leverage

T.P.A. $\frac{12}{10} = 1.2$ leverage

Second example C.W.A. $\frac{15}{10} = 1.5$ leverage

T.P.A. $\frac{13.5}{10} = 1.35$ leverage

In comparing companies, account must therefore be taken of the rate of interest paid on prior charges, (fixed-interest securities), as this will affect the leverage. The gap 1.8:1.2 narrowed down to 1.5:1.35, because the lower geared company (in terms of capital structure), issued debentures at a lower rate of interest.

Applying our formula $e = \frac{m(P + E) - y(P)}{(P + E) - (P)}$

the situation will now be as follows:-

(1) C.W.A.:—
$$e = \frac{(10 \times 3,000,000) - (7.5 \times 2,000,000)}{3,000,000 - 2,000,000}$$

$$= 15 \text{ (or 15 per cent)}$$

The ratio is $\frac{15}{10}$ or 1.5, and e is still levered upward, but to a lesser extent than the previous case, because of the smaller difference between m and y, since the size of P compared to (P + E) was kept constant.

(2) T.P.A.
$$e = \frac{(10 \times 3,000,000) - (3 \times 1,000,000)}{3,000,000 - 1,000,000}$$

$$= 13.5 \text{ (or 13.5 per cent)}$$

The ratio is $\frac{13.5}{10}$ or 1.35, and e is levered up to a greater extent than previously, because of the bigger difference between m and y, since the size of P compared to (P + E) was kept constant.

Say, for example, C.W.A. showed $\frac{13}{10}$ or a 1.3 ratio and T.P.A., which is the lower geared, a ratio of $\frac{15}{10}$ or 1.5 which is due to a different rate of interest being paid on prior charges, then the higher geared company, C.W.A. would actually show less leverage. Gearing as such must then be used carefully because different rates of interest will show a different leverage.

This far we have only taken simple capital structures with only one kind of prior charge security, and we have only worked with net profit available for distribution to ordinary shareholders, thus ignoring the incidence of taxation and the distinction between 'earnings before prior charge interest, after tax' and 'earnings after prior charge interest, before tax'.³² This is important, since debenture interest is deductible for tax purposes, whereas the preference dividend

32. The word 'interest' includes preference dividend, that is (Y + Y'), unless otherwise specified. See p. 445.

is not, and should be added back. For purposes of illustration, three hypothetical companies will be taken with different capital structures and paying different rates of interest on prior charges.

<u>Capital Structure</u>	<u>Company A</u>	<u>Company B</u>	<u>Company C</u>
Debentures (6% in A and 5% in B)	2,000,000	1,000,000	-
Cumulative Preference shares (7% in A and 6% in B)	2,000,000	1,000,000	-
Equity (issued capital + plough-back.) (E)	<u>1,000,000</u>	<u>3,000,000</u>	<u>5,000,000</u>
Total Capital Employed (P + E)	<u>5,000,000</u>	<u>5,000,000</u>	<u>5,000,000</u>
Earnings before prior charge interest (including preference dividend) and tax (H)			
H = 10% of (P + E)	500,000	500,000	500,000
(1) less:- debenture interest (Y)	<u>120,000</u>	<u>50,000</u>	<u>-</u>
	380,000	450,000	500,000
(2) less:- company tax (40%) (t)	<u>152,000</u>	<u>180,000</u>	<u>200,000</u>
	228,000	270,000	300,000
(3) less:- preference dividends (Y')	<u>140,000</u>	<u>60,000</u>	<u>-</u>
Net Equity Earnings (r)	<u>R 88,000</u>	<u>R210,000</u>	<u>R300,000</u>

From the above the 'earnings before interest, after tax' (q) and 'earnings after interest, before tax' (s) can be derived. q can be calculated by use of the following formulae:-

- (1) $q = H - t(H - Y)$, where
 q = earnings before interest, after tax
 H = earnings before interest and tax
 Y = debenture interest
 t = company tax rate, say, 40 per cent.

q can also be calculated by using a slightly modified version of equation (1) namely, $q = zH + tY$, where $z = 1 - t$, thus
 $H - t(H - Y) = zH + tY$.

- (2) Before calculating s, it must again be pointed out that the preference dividend is not deductible for tax purposes and must be added back. s can then be calculated with the use of the following formula:-

$$s = H - (Y + \frac{Y'}{z}),$$

where s = earnings after interest, before tax

H = earnings before interest, and tax

Y = debenture interest

Y' = preference dividend

$z = 1 - t$

Applying the above formula to each of the hypothetical companies, q and s will be as follows:-

COMPANY A

$$(i) \quad q = H - t(H - Y) \text{ or}$$

$$(ii) \quad q = zH + tY$$

Using formula (i) we find:-

$$\begin{aligned} q &= 500,000 - .40(500,000 - 120,000) \\ &= \underline{R348,000} \end{aligned}$$

Using formula (ii) we find:-

$$\begin{aligned} q &= (1 - .40)(500,000) + .40(120,000) \\ &= \underline{R348,000} \end{aligned}$$

$$(iii) \quad s = H - (Y + \frac{Y'}{z})$$

$$\begin{aligned} &= 500,000 - (120,000 + \frac{140,000}{60/100}) \\ &= \underline{R146,667} \end{aligned}$$

COMPANY B

Using the formula $q = H - t(H - Y)$ the following would obtain:-

$$\begin{aligned} (i) \quad q &= 500,000 - .40(500,000 - 50,000) \\ &= \underline{R320,000} \end{aligned}$$

Using the formula $q = zH + tY$; then

$$\begin{aligned} (ii) \quad q &= (1 - .40)(500,000) + .40(50,000) \\ &= \underline{R320,000} \end{aligned}$$

$$(iii) \quad s = H - (Y + \frac{Y'}{z})$$

$$\begin{aligned} &= 500,000 - (50,000 + \frac{60,000}{60/100}) \\ &= \underline{R350,000} \end{aligned}$$

COMPANY C

There is no gearing and leverage and $q = R300,000$ and $s = R500,000$.

To summarise then:-

	<u>Company A</u>	<u>Company B</u>	<u>Company C</u>
Earnings before interest, after tax (q)	R348,000	R320,000	R300,000
Earnings after interest, before tax (s)	146,667	350,000	500,000

The above information can now be used to measure leverage in different ways, showing the effect of leverage on the ordinary shareholders.³³

(1) The first measure of leverage is the rate of return 'before interest, after tax' on total capital employed as compared to e, which is the net rate of return on equity capital (Also see previous examples of companies C.W.A. and T.P.A. However, there the incidence of taxation was ignored.) This first measure will be

$$L_1 = \frac{(r + E)}{(q + (P+E))} \text{ . When applied to our hypothetical companies}$$

A, B and C the following would obtain:-

(i) Company A

$$L_1 = \frac{(88,000 + 1,000,000)}{(348,000 + 5,000,000)} = \frac{.0880}{.0696} = \underline{1.26} \times$$

(ii) Company B

$$L_1 = \frac{(210,000 + 3,000,000)}{(320,000 + 5,000,000)} = \frac{.0700}{.0640} = 1.09$$

(iii) Company C

$$L_1 = \frac{(300,000 + 5,000,000)}{(300,000 + 5,000,000)} = 1.00$$

e is thus levered above unity in the case of both companies A and B.

In company C, e is not levered at all, because there is no prior charge capital. e, the net return to equity capital, is increased in the case of both companies A and B. In the case of company A, the net equity return (e) is 8.8 per cent, $(\frac{r}{E} \times 100) = \frac{88,000}{1,000,000} \times 100$, whereas the 'earnings before interest, after tax' (q), on total capital employed is

33. The first four measures are based mainly on the article by I.R. Woods, 'Financial 'Leverage' and 'Gearing' in Perspective', The South African Journal of Economics, Vol. 32, No. 1, March, 1964.

8.8
6.96
1.26

6.96 per cent, that is, $\frac{q}{(P + E)} \times 100 = \frac{348,000}{5,000,000} \times 100$. e is levered upwards by 1.26, that is $6.96 \times 1.26 = 8.8$. In the case of company B, e is also levered upwards. The net equity return (e) is

7.00 per cent, that is, $\frac{r}{E} \times 100 = \frac{210,000}{3,000,000} \times 100$,

whereas q , on total capital employed, is equal to 6.40 per cent. e is levered upwards by 1.09, or $6.40 \times 1.09 = 7.00$ per cent. If L_1 was smaller than one (unity), then e will be levered downwards.

(2) The second measure of leverage measures actual e as compared to what e would have been in the complete absence of prior charge capital, that is,

$L_2 = \frac{r + E}{zH + (P+E)}$ where zH represents the total earnings before interest, but after deducting tax, or as previously stated, $z = 1 - t$. zH is not, however, the same as q , as both companies A and B have issued debentures and preference shares. In the absence of debentures, q would be equal to zH . For each of the companies the following position would obtain:-

Company A

$$L_2 = \frac{88,000 + 1,000,000}{\frac{60}{100} (500,000) + 5,000,000} = \frac{.088}{.060} = 1.47$$

Company B

$$L_2 = \frac{210,000 + 3,000,000}{\frac{60}{100} (500,000) + 5,000,000} = \frac{.070}{.060} = 1.17$$

Company C

$$L_2 = \frac{300,000 + 5,000,000}{\frac{60}{100} (500,000) + 5,000,000} = \frac{.060}{.060} = 1$$

In both companies A and B, zH is equal to R300,000, or 60 per cent of R500,000. In the case of company A, $e = 8.8$ per cent, whereas zH on total capital is 6.00 per cent. Thus, e is levered upwards by 1.47, that is, $6.00 \times 1.47 = 8.8$ per cent. In the case of company B, $e = 7.0$ per cent, whereas zH on total capital is 6.0 per cent. Thus, e is levered upwards by 1.17, that is, $6.00 \times 1.17 = 7.0$ per cent.

(3) The third measure compares any proportionate change in r , with a proportionate change in q , keeping the capital structure as

given.³⁴ Let us assume both r and q change by an amount p , where the change in r is caused by p . The effect is measured by the formula

$$L_3 = \frac{p \div r}{p \div q}, \text{ or simply } L_3 = \frac{q}{r}. \text{ Let us assume}$$

$p = R50,000, R60,000$ and $R70,000$ in the cases of Companies A, B and C respectively.

For each of the companies the position will be as follows:-

Company A

$$L_3 = \frac{50,000 \div 88,000}{50,000 \div 348,000} = \frac{.568}{.144} = 3.94$$

Company B

$$L_3 = \frac{60,000 \div 210,000}{60,000 \div 320,000} = \frac{.286}{.188} = 1.52$$

Company C

$$L_3 = \frac{70,000 \div 300,000}{70,000 \div 300,000} = 1.00$$

The above measure of leverage will be greater than one as long as r and s are positive.

(4) The fourth measure which may be of interest to the investor is a comparison between a proportionate change in 'earnings after interest and before tax' and the proportionate change in both earnings before interest and before tax, assuming the capital structures of the companies to be unaltered. We also assume to simplify matters that tax is proportional, and not progressive or regressive. We assume that p is a change in H , and d the same change in s , which is caused by p . Since tax is proportional $p = d$. This measure of leverage is then

$$L_4 = \frac{d \div s}{p \div H}, \text{ or } L_4 = \frac{H}{s}, \text{ since } d = p.$$

For each of the companies the position will be as follows, assuming d and p to be $R50,000, R60,000$ and $R70,000$ in the cases of companies A, B and C respectively.

Company A

$$L_4 = \frac{50,000 \div 146,667}{50,000 \div 500,000} = \frac{.340}{.100} = 3.40$$

34. The different measures given above and below all assume the capital structure as given. The shareholders normally take the capital structure as given.

Company B

$$L_4 = \frac{60,000 \div 350,000}{60,000 \div 500,000} = \frac{.171}{.120} = 1.43$$

Company C

$$L_4 = \frac{70,000 \div 500,000}{70,000 \div 500,000} = 1.00$$

e, the net rate of return on the equity (E), with reference to the whole capital structure, even where different classes of prior charge capital are issued, can be calculated by the use of the following formula:-

$$e = \frac{z \left[m(P + E) - y_1 D_1 - y_2 D_2 - \dots - y_n D_n \right] - bQ}{(P + E) - (D_1 + D_2 + \dots + D_n + Q)} \times 100,$$

where the subscripts refer to the different classes of debt and the rates of interest paid on such classes of debt; Q is the amount of the preference issue, and b is the dividend rate on the preference shares; (P + E) is total capital employed; D is debt financing, and y the interest paid on debt financing; e is the net rate of return on equity; m is the rate of return on (P + E), and $z = 1 - t$, where t is the tax rate.

To illustrate we need only take Company A, where

$$e = \frac{.60(.10 \times 5,000,000 - .06 \times 2,000,000) - .07(2,000,000)}{5,000,000 - (2,000,000 + 2,000,000)} \times 100$$

$$= 8.8 \text{ per cent.}$$

The question is then how changes in $\underline{m}$ will affect e, that is, how widely will e be levered for changes in m. In a dynamic economy, m will tend to fluctuate from year to year, and as a result, e will be levered for changes in m if the company is geared. e may be levered downwards in a stagnating company or industry which may permanently affect the investment merits or worth of such a share.

Let us take company A again, keeping the capital structure constant, but change H, and therefore, m. Let us assume (1) H is halved, from R500,000 to R250,00, that is, m is decreased from 10 per cent to 5 per cent, and (2) H is increased from R500,000 to R1,000,000, and m is thus increased from 10 per cent to 20 per cent.

Applying our formula above to situation (1), the following would obtain:-

$$e = \frac{.60(.05 \times 5,000,000 - .06 \times 2,000,000) - .07(2,000,000)}{5,000,000 - (2,000,000 + 2,000,000)} \times 100$$

= - 6.2 per cent. A considerable fall in m may have a negative leverage effect on e.

In case (2), the position will be as follows:-

$$e = \frac{.60(.20 \times 5,000,000 - .06 \times 2,000,000) - .07 \times 2,000,000}{5,000,000 - (2,000,000 + 2,000,000)} \times 100$$

= 38.8 per cent.

From the above calculations it is obvious that any change in m will result in considerable changes in e when the capital structure is geared.

The above formula used is a slight modification of the formula used by Friedland,³⁵ since the latter author allowed for marginal tax, where t is 1 minus the marginal income tax rate. In our formula we have used z, which is 1 minus the tax rate, that is, $1 - .40 = .60$, thus, taking tax to be proportional.

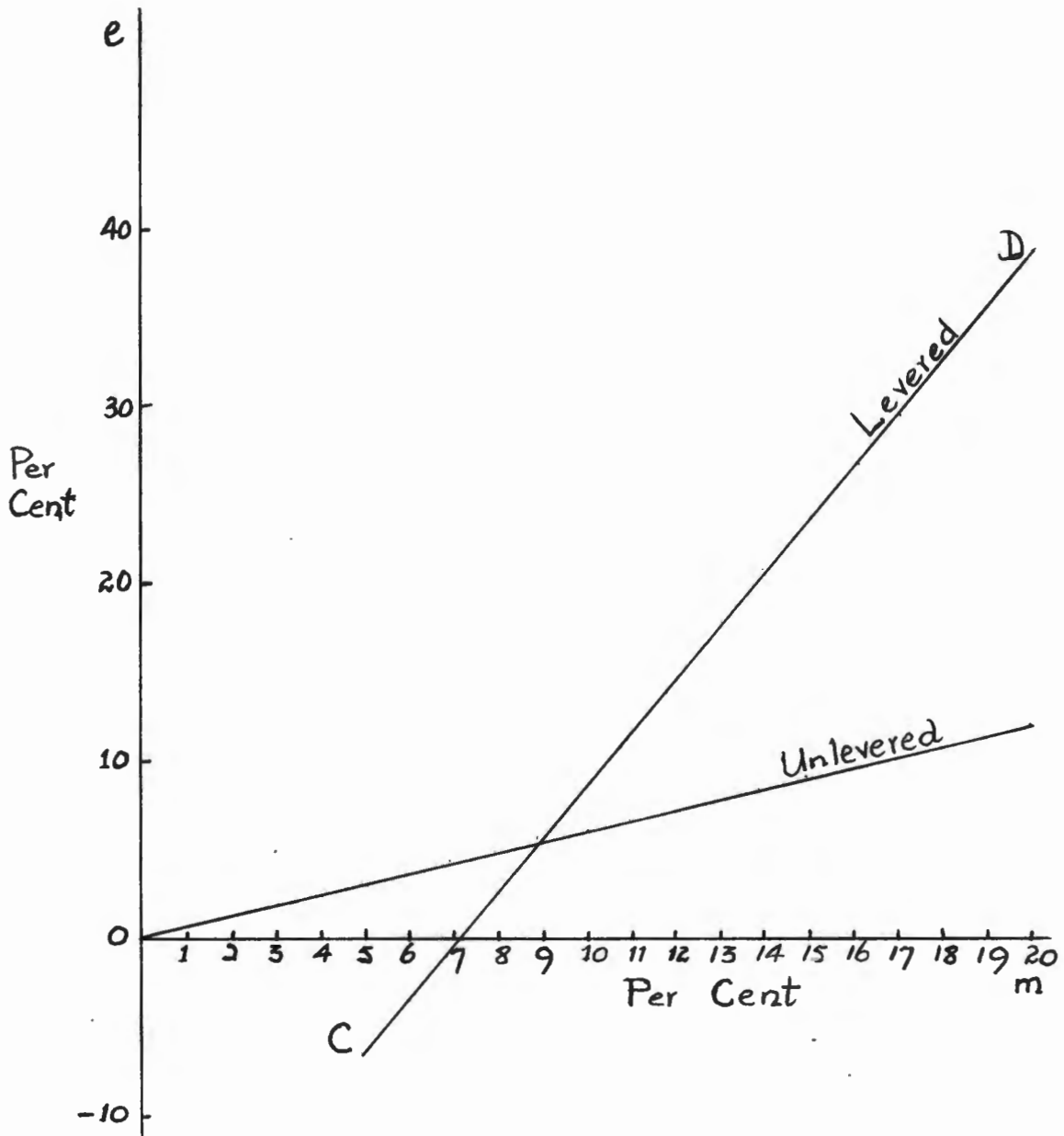
The relationship between m and e has also been shown graphically by Friedland.³⁶ From this graph the individual can calculate the break-even point, that is, by how much m must fall before negative or downward leverage effects are experienced. With reference to company A, applying our formula for values of m ranging between 5 and 20 per cent, the graph will be as shown in figure 7 below.

35. Friedland, S., The Economics of Corporate Finance, p.168.

36. Ibid. p.169.

FIGURE 7

Break-even Point - Financial Leverage



The unlevered line is plotted by using the formula

$$e = \frac{z [m (P + E)]}{(P + E)}$$

The levered line is plotted by utilising the formula

$$e = \frac{z [m (P + E) - y_n D_n] - bQ}{(P + E) - (D_n + Q)}$$

The levered line shows the relationship between m and e where there are differences in m and e, due to gearing. Negative or downward leverage is to the left of the point of intersection of the

two curves, that is, where m is approximately 8.9 per cent. At this stage e becomes smaller than m . The higher the gearing the steeper the curve CD and any change in the gearing will cause a shift of the curve CD either to the left or the right. An increase in prior charge capital, resulting in an even more highly geared capital structure, will cause the curve to shift to the right of the original CD , with the result that negative leverage will set in for a higher value of m than was the case previously.

When a given company in an industry is highly geared, whereas the others are very lowly geared, or entirely free from funded debt, the highly geared company has a competitive disadvantage, particularly if the company is not yet fully entrenched in the industry. Such equity shares are probably best avoided, unless they are currently grossly undervalued by the market.

If the prior charge issues (including preference shares) represent the tangible fixed-assets in their entirety, and the equity capital only the current and intangible assets, then the ordinary shareholders are in a rather weak position. (Only voting control, and possible future dividends, if any.) From the investor's point of view it may not be advisable to purchase the ordinary shares of a company, however stable, where the ordinary shares constitute less than one-third of the total capitalisation on the basis of market values. It will be to the benefit of the ordinary shareholders if fixed-interest (prior charge) securities were issued at times when rates of interest were low, as this would keep interest payments low.

Fixed-interest securities should not be issued if operating revenue is subject to violent fluctuations and/or very marginal.

A ratio which is sometimes used is:-

$$\frac{\text{Gross profit plus interest}}{\text{Total capital employed}} \times \frac{100}{1} = \text{percentage gross profit on capital employed.}$$

A year by year increase in this ratio is a healthy sign, and if this ratio is high and/or rising faster than that of comparable issues, it is indicative of a better or fuller utilisation of the real capital assets, (as partially represented by capital employed), in the company. In the same way the ratio net earned on total capital employed can be calculated. This is a more efficient ratio to use where the capital structure is geared, and is useful for inter-

industry comparisons. This ratio will show the rate of capitalisation realised on the total capital employed.

The measures of leverage, particularly L_3 and L_4 , show some relationships between profits (or sales) and net equity earnings, in the presence or absence of gearing. If we accept the fact that earnings grow in a higgledy-piggledy manner, and that changes in the growth rate of the economy affect profits to different degrees in various industries and also various companies in industries to different degrees, then gearing and leverage must affect net equity earnings or e . Gearing and leverage and the risks associated with it in affecting e , are factors which must be considered by equity shareholders, due to the instability of earnings accruing to ordinary shareholders, as a result of gearing and leverage. The instability of r is actually a function of the degree of gearing, and of changes which may take place in the latter, as well as of fluctuations in the profits earned on $(P + E)$. When the company is highly geared and e substantially levered, a low rate of return on $(P + E)$ may wipe out the net rate of return on E completely, and the company may not even be able to pay fixed-interest charges.

For inter-company comparisons the same leverage measures must be used in order to be consistent. The extent to which a company can afford a large prior charge component in its capital structure will differ from industry to industry and company to company, and will also depend on general economic conditions, such as boom or recession.

It is also important for the individual to ascertain how the company finances new investment. If such new investment is financed by a new issue of fixed-interest securities, then this may change his relative position. If it is financed by a new equity issue, and he does not subscribe, his relative position will also change. Again the rate of return on the new investment will have a strong influence on the position of ordinary shareholders.

(k) Business and Financial Productivity

Some of the foregoing ratios, including leverage, have some bearing on what Mayer referred to as the business and financial

productivity of the company.³⁷ He was interested in the risks inherent in a given company which he expressed in terms of certain ratios. Earnings, and the rate at which earnings are to be capitalised by the individual contemplating the purchase or sale of a given share are important, particularly if we consider subjective tastes and aversion for risk. The individual will be concerned about the financial and business risks of a given company in producing a certain income stream for him. The risk inherent in a given company, according to Mayer, is the probability "...expressed as a fraction not exceeding unity, that the firm will fail."³⁸

According to Mayer, the individual contemplating the purchase of a given share, will be mainly interested in three aspects, namely, the earnings (E), the risk involved (R), and the company's value (V). The capital value of the company is measured by the equation $V = E/R$, and this would give an indication of whether the company is more or less correctly valued (capitalised) by the market. The rate of earnings on market value (or book value) and the question whether it compensates for the risk involved is measured by the equation $R = E/V$. The internal risks are really to be found in unsound financial relationships, operating inefficiency, unenterprising management, low productivity, and so forth.

Mayer defined business risk to mean "...the probability, expressed as a fraction not exceeding unity, that the firm's prospective business productivity will cease to be compensatory. Business productivity means the ratio of net income to total capital. It is compensatory when Business Productivity = Pure Interest + Business Risk."³⁹ In the above context net income means earnings before interest and dividends. Business risk centres round two factors, namely, (1) the activity of total capital employed and, (2) the efficiency of the company's operations. We have already given a ratio indicating capital turnover. Activity is a similar concept and is obtained by the ratio $\frac{\text{sales (or gross revenue)}}{\text{total capital employed}}$.

37. Mayer, R.W., "Analysis of Internal Risk in the Individual Firm", reprinted in Lerner, E.M., editor, Readings in Financial Analysis and Investment Management, pp.133-141.

38. Ibid., p.134.

39. Ibid., p.135.

Assuming other things being equal, Mayer considered business productivity to vary directly with the capital turnover. The larger the fixed asset component included in total capital employed the less active the total capital. The ratio will differ from industry to industry. If two companies within an industry are compared, the one with the less active capital may be taken to involve more business risk.

Mayer measures the operational efficiency by the following ratio:-

$$\text{efficiency} = 1 - \frac{\text{operating expenses}}{\text{sales (or gross revenue)}}$$

Efficiency has a direct influence on business productivity, other things being equal. Sales analysis thus plays an important part in analysing both activity and efficiency. Any decline in sales, unaccompanied by a decline in operating expenses, means that efficiency, and therefore prospective business productivity, must have declined. This would then increase the business risk. In view of the fact that costs also play a role in the ratio determining efficiency, a high level of operating costs relative to sales, means a low productivity, and will thus increase the business risk.

Mayer summarised his discussions in the following four ratios:-

- (1) Activity = sales ÷ total capital employed
- (2) Efficiency = 1 - (operating expenses ÷ sales)
- (3) Net income = sales - operating expenses
- (4) Business Productivity = net income ÷ capital
= activity x efficiency.

Following from ratio (4) the conclusion is that business productivity is determined by activity and efficiency.

From the above Mayer then deals with what he called the financial risk, which he defined as the probability (which is again expressed as a fraction not exceeding unity) that a company's financial productivity will cease to be compensatory. Financial productivity is the ratio of net earnings available to equity to equity capital. Account is thus taken of financial leverage and the risks inherent in leverage. Financial productivity = pure interest + financial risk. Financial risk is a function of (1) business risk, and (2) gearing and leverage. Mayer shows the relationship between

business risk and financial risk in the equation:-

$$S = \frac{b \times (P + E)}{(b \times P) + E},$$

where S = financial risk

b = business risk

P = prior charge capital

E = equity capital

(P + E) = total capital employed.

In the absence of gearing or where leverage is unity, $S = b$, but the higher the company is geared, the greater the financial risk. The degree of financial risk is thus also influenced by the factors influencing the degree of leverage and the cost of borrowed capital. Unsound relationships and the capital structure will increase the financial risk, because of the fixedness of the interest payments, and therefore, magnifies the changes in financial productivity and financial risk.

Mayer considered business productivity, gearing and leverage, and the cost of borrowed capital, the latter being $\frac{\text{financial expenses}}{\text{borrowed capital}}$, as the sole determinants of financial productivity. The latter is arrived at by the following ratio:-

Financial productivity = business productivity -

$$\frac{(\text{cost of borrowed capital} \times \text{gear ratio})}{1 - \text{gear ratio}}.$$

In this equation the gear ratio is taken to be borrowed capital divided by total capital employed, and will thus be smaller than one.

Mayer's approach is useful in the sense that with the use of certain ratios he throws some light on the financial risks inherent in a given company. These ratios can be used for comparing two companies operating in the same industry or in different industries. He is using a quantitative method in an effort to assess risk. His analysis serves the purpose of focusing attention on the efficiency of the operation of a company and how this will increase or decrease the financial risks the shareholders face. He clearly pointed out that financial risk is a function of gearing and leverage, the cost of capital, the activity of capital and the efficiency of the company's operations. We are in general agreement with his exposition. However, the financial risks shareholders face include, not only the

internal financial risk, but also market or price risks as well.

(1) The Price-earnings Ratio

The earnings per share is the net profit divided by the total number of shares outstanding. The dividend rate or dividend per share is the total dividend paid divided by the total number of shares outstanding. The earnings per share divided by the dividend per share will give the times cover of the dividend. The ratio showing the extent of ploughback is the dividend per share divided by earnings per share. The higher the times cover, the higher the rate of ploughback, or the higher the ratio dividend per share/earnings per share, the smaller the ploughback.

We have discussed some leverage relationships which may influence the investment worth and market prices of shares. From the point of view of the individual the price-earnings ratio is considered to be one of the more important leverage relationships. The price-earnings ratio is found by dividing earnings per share into the current market price of the share. For example, if the price of the share is 240 cents, and the earnings 60 cents per share, then the price-earnings ratio is 4, that is $240 \div 60$. The price-earnings ratio reflects the rate at which the market capitalises the earnings. The purchase of the above share means that the individual is purchasing four years' earnings, should the latter be unchanged, or simply, four years' earnings (at the current rate) are included in the price. It is also referred to as the earnings multiplier. For comparative purposes the individual may express the price-earnings ratio in terms of average past earnings, or the current earnings (last balance sheet) or expected future earnings, the latter being referred to as the price-future earnings ratio. This will also be discussed below. The price-earnings ratio is used for inter-industry and inter-company comparisons.

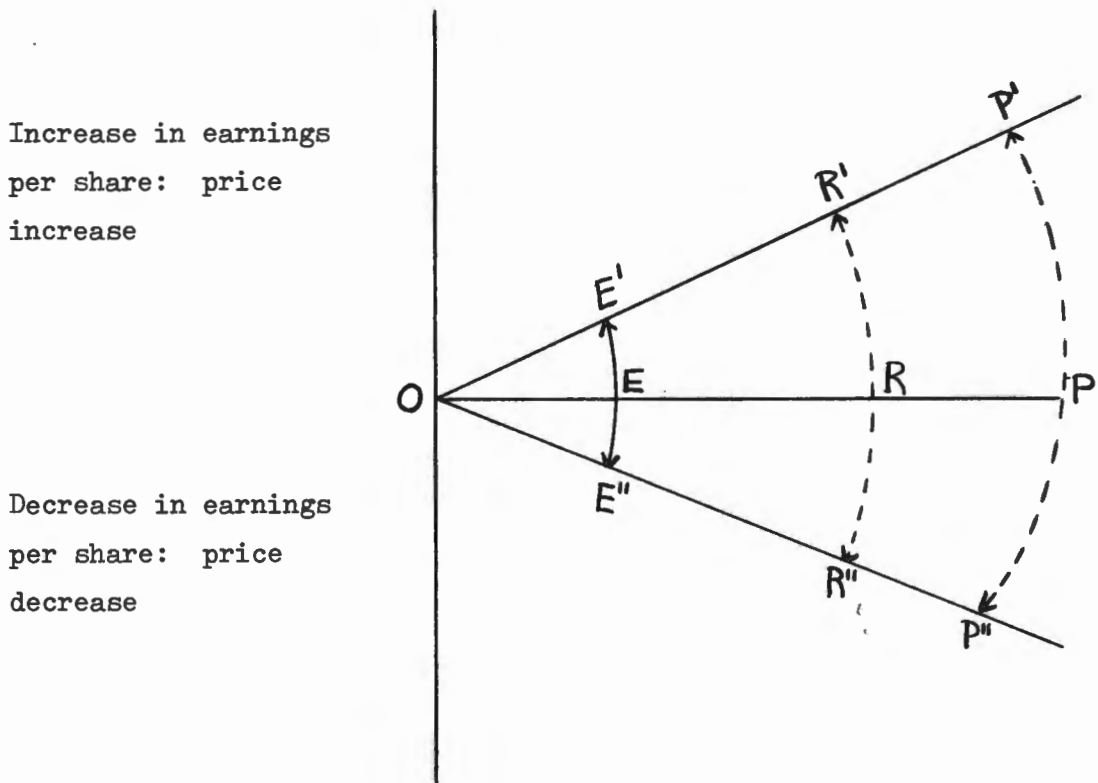
The price-earnings ratio is the reciprocal of the earnings yield. A ratio or multiplier of 10 times earnings is a 10 per cent earnings yield, a multiplier of 12 is an 8.33 per cent earnings yield, a multiplier of 15 is a 6.67 per cent earnings yield, and so forth.

Taking our example above, it means that if a constant price-earnings ratio is maintained by the market price and earnings relationship, a 5 cent increase in earnings per share, from 60

cents to 65 cents, the price must increase by $4 \times 5 = 20$ cents, that is, from 240 cents to 260 cents, ($\frac{260}{65} = 4$). Thus, for every cent increase in earnings, price will increase by 4 cents. The price-earnings ratio of another concern may be 10, that is, for every cent increase in earnings per share, the price will increase by 10 cents. In the former case the increase in earnings per share must be $2\frac{1}{2}$ times greater to result in the same increase (10 cents) in the price of the share. The extent to which an increase in earnings per share will affect the price of the share, depends on the length of the lever. Leverage will magnify fluctuations in earnings and prices. The more highly geared, the longer the lever and the greater the fluctuations to which the ordinary shares are subject to. This can be illustrated graphically.⁴⁰

FIGURE 8

Effect of Leverage on the Prices of Shares



⁴⁰. Also see Dice, A.C. and Eiteman, W.J., The Stock Market, 3rd edition, p.445.

Let EP (longer lever) represent the price of share ABC Ltd. and ER (shorter lever) the price of share KLM Ltd. We assume that both concerns (ABC Ltd. and KLM Ltd.) earn OE per share.

$\frac{EP}{OE}$ and $\frac{ER}{OE}$ represent the price-earnings ratios for shares ABC Ltd. and KLM Ltd. respectively, with $\frac{EP}{OE} > \frac{ER}{OE}$. If we now assume an equal (and, therefore, proportional) and simultaneous increase in the earnings per share of EE', then the price of share ABC Ltd. will increase by PP' and share KLM Ltd. by RR', which is a smaller increase.

It is also obvious that it is to the ordinary shareholder's benefit if the times cover for all prior charges (including preference dividend) is considerable or substantial. The higher the times cover, the more will be available for distribution, after provision has been made for retention of profits. A high earnings cover for prior charges will also reflect the creditworthiness of the company.

Let us apply the above argument to companies A and C given in section E (j) of the present chapter. In that section, when we were dealing with gearing and leverage, we were mainly concerned about the effect of leverage on $\bar{e}$, that is, the rate of return to equity shareholders. We can utilise that knowledge to show the effect on earnings per share. The following equation can be used, but instead of solving for $\bar{e}$, we solve for EPS, namely

$$EPS = \frac{z [m (P+E) - y_1 D_1 - y_n D_n] - bQ}{S}$$

where EPS = earnings per share

$$z = 1 - t$$

(P+E) = total capital employed

D = debt financing

m = rate of return on total capital employed

y = interest paid on debt capital

b = dividend rate on preference shares

Q = preference shares

S = number of ordinary shares

Let us assume company A, the higher geared, has issued 1,000,000 shares and company C, with no gearing, 3,000,000 shares. Using the above equation in the case of company A, and assuming m to be (1) 10 per cent, (2) 5 per cent and (3) 20 per cent respectively,

the earnings per share will be as follows:-

$$\begin{aligned}
 (1) \quad \text{EPS} &= \frac{.60(.10 \times 5,000,000 - .06 \times 2,000,000) - .07 \times 2,000,000}{1,000,000} \\
 &= \underline{8.8 \text{ cents per share}} \\
 (2) \quad \text{EPS} &= \frac{.60(.05 \times 5,000,000 - .06 \times 2,000,000) - .07 \times 2,000,000}{1,000,000} \\
 &= \underline{-6.2 \text{ cents per share}} \\
 (3) \quad \text{EPS} &= \frac{.60(.20 \times 5,000,000 - .06 \times 2,000,000) - .07 \times 2,000,000}{1,000,000} \\
 &= \underline{38.8 \text{ cents per share}}
 \end{aligned}$$

In the case of company C the following would obtain:-

$$\begin{aligned}
 (1) \quad \text{EPS} &= \frac{.60(.10 \times 5,000,000)}{3,000,000} \\
 &= \underline{10.0 \text{ cents per share}} \\
 (2) \quad \text{EPS} &= \frac{.60(.05 \times 5,000,000)}{3,000,000} \\
 &= \underline{5.00 \text{ cents per share}} \\
 (3) \quad \text{EPS} &= \frac{.60(.20 \times 5,000,000)}{3,000,000} \\
 &= \underline{20.0 \text{ cents per share}}
 \end{aligned}$$

To summarise we find the following:-

			<u>Company A</u>	<u>Company C</u>
(1)	m = 10%	EPS =	8.8 cents	10.0 cents
(2)	m = 5%	EPS =	-6.2 cents	5.0 cents
(3)	m = 20%	EPS =	38.8 cents	20.0 cents

If we assume that the shares are selling at a multiplier of 10 in both cases, then the prices will be as follows:-

	<u>Company A</u>	<u>Company C</u>
(1)	88 cents	100 cents
(2)	10 cents ⁴¹	50 cents
(3)	388 cents	200 cents

In the case of Company A, the price of the share will increase 4.4 times for an increase in m from 10 per cent to 20 per cent,

⁴¹. The price of 10 cents is simply assumed.

whereas the price of the shares of Company C will only double, assuming a multiplier of 10. It is, however, not to be taken for granted that the multiplier will be constant. The price of the share may be more influenced by the dividend rate than by the earnings per share, and the price-earnings ratio may change for numerous reasons. Leverage may directly influence the price-earnings ratio or multiplier applied to earnings per share. The extent of this influence is still a controversial matter.

Some debt element in the capital structure may make valuation more complex, because of different degrees of risk and leverage. The yields demanded or expected by lenders may tend to increase if the debt-equity ratio is increased, that is, with high gearing. The entire figure representing earnings-per-share will, of course, not be distributed in cash dividends. Where the company's capital structure is geared, the ordinary shareholder's claim in actual fact represents a residual claim against a residual amount, and is also subject to the risk of the board's dividend, reserve and plough-back policies. It is obvious that the board can only declare a dividend on ordinary shares when all prior claims have been fully paid. When profits fluctuate reasonably widely and the company is highly geared, it may be difficult to stabilise dividends.

Price-earnings ratios are therefore not constant. The price-earnings ratio or the rate of capitalisation will change for a change in any one or both of the two variables. The earnings multiplier will be affected by all the factors which affect both earnings and price, jointly or separately. Factors such as the growth rate of earnings (which tend to be higgledy-piggledy) relative to price changes will affect the price-earnings ratio. So will the rate of return on capital employed, the dividend rate, gearing and leverage, growth prospects, and so forth, in fact, all qualitative and quantitative factors which may affect either price or earnings per share, or both, will have an effect on the price-earnings ratio.

It is sometimes claimed that the trend of the market price of a given share will follow a pattern which shows some close relationship to the trend in earnings. It is said that the shares sell on an earnings basis, and not on a dividend basis.⁴²

⁴². See section G of the present chapter.

This may be a dangerous policy to follow at times, because there need be no positive correlation between the rate of plough-back and the future rate of growth of earnings and the dividend rate. The dividend rate, however, is more stable than earnings per share, since most companies are reluctant to reduce dividends, or to increase dividends substantially after only one good year.

There is, however, no such thing as a normal price-earnings ratio. If the price of the share is high, (discounting future expected earnings), the price-earnings ratio may be high (and earnings yield low). The price-earnings ratio of a fast expanding, successful, and growing company may be high, (due to the higher price of the share on the market), whereas the price-earnings ratio of a declining company may tend to be low. The price-earnings ratio of one individual company may be subject to considerable changes over a period of time, as this ratio is computed by using two variables, price and earnings, and both may be subject to considerable change over time. If the price of a share always moved in unison with or proportional to earnings, the price-earnings ratio of a given share would be relatively constant. In the real world, this is not the case. There is no rule or guarantee that prices will follow earnings. With institutional investors buying heavily or dominating the market in South Africa, the price-earnings ratios may even be considered too high for certain shares.

Gatza⁴³ divided shares into two groups, namely 'gainers' and 'decliners', the former being those which showed the greater relative price increases during 1955, and the latter being those which dropped severely in price in the same period. The gainers sold at low dividend yields and the decliners at high dividend yields. A low dividend yield, one may then conclude, may be associated with a good market performance. Gatza obtained similar results by comparing the price-earnings ratios. The decliners sold at lower multipliers than the gainers. Low multiple issues are then not to be considered as good market performers. The multiplier itself, however, changed over a narrower margin than the changes in the multiplier for the gainers. There may be numerous reasons to explain the fact that the gainers sold

43. Gatza, J.T., "Analysis of Extreme-Performance Stocks", reprinted in Lerner, E.M., editor, Readings in Financial Analysis and Investment Management, pp.38-44.

at a higher multiple of earnings in relation to price. Gatza found that dividend payments and dividend news had nothing to do with the matter, and was as such useless as an analytical tool. He also analysed the position in terms of the price relative to historical price and found this analysis not enlightening. In terms of historical price, the shares were not overpriced or underpriced. Furthermore, insider trading had nothing to do with the situation. Gatza really found that the analytical tools at his disposal could not explain the situation.

Nicholson⁴⁴ took the view opposite to the general one. The general view is that shares selling currently at high earnings multiples are purchased for growth and capital appreciation, and the low multiple issues for income. Nicholson stated that the results of certain studies would refute the general view, and that on the average the purchase of a share selling at a low multiple would eventually result in greater capital appreciation in addition to the higher level of income derived. Nicholson's study covered the periods 1939-1944, 1939-1949, 1939-1954, 1939-1959, 1944-1949, 1944-1954, 1944-1959, 1949-1954, 1949-1959, 1954-1959, and 1957-1959. The prices and price-earnings ratios for each share were ascertained for 1939, 1944, 1949, 1954 and 1959, and the percentage of the price change (appreciation) was calculated for the specific periods as specified above. Nicholson's analysis showed the following results:-

- (1) The 20 shares selling at the lowest price-earnings ratios showed more appreciation in all eleven periods than the 20 shares selling at the highest price-earnings ratio.
- (2) The 40 shares selling at the lowest multiples in all eleven periods showed more appreciation than the 40 highest multiples.
- (3) The individual shares which appreciated at a faster rate than the average of all shares, were mostly to be found in the low multiple group, and not in the high multiple group.
- (4) Furthermore, Nicholson found that should an investor have purchased the 20 lowest multiples in 1939, in 1944 changed to the 20 lowest multiples in that year, and again in 1949 and 1954, then by 1959 his original investment would have appreciated 14.7 times. Had the individual followed the same procedure, but concentrated on the 20 highest multiples each time, his original

44. Nicholson, S.F., "Price-Earnings Ratios," reprinted in Lerner, E.M., editor, Readings in Financial Analysis and Investment Management, pp.300-304.

investment would have increased only 4.5 times.

It may be useful to undertake a similar study in South Africa, and should the results confirm Nicholson's conclusions, we are of the opinion that some advice given to South African shareholders (actual and potential) will have to be revised and reversed in many instances.

The individual concentrating on high multiples for growth may be disappointed, because the price of the share has probably already been bid up to a vulnerable level, as prices have risen faster than earnings. In the case of certain growth companies, the price-earnings ratio may be too high to render them attractive investments. Admittedly, a high price-earnings ratio does show satisfaction with a company's performance, but unrealistically high multiples may reflect past growth and may be out of relation with future prospects. In this respect high multiple shares are no guarantee to capital appreciation through growth.

We have indicated that the price-earnings ratio is the number of year's current or recent earnings included in the price of a given share. However, for purposes of valuation Bell put forward the idea of a price-future earnings ratio, which he defined as "...the number of years' future earnings included in the market price, assuming for each stock an appropriate annual rate of growth of earnings per share."⁴⁵ Bell was interested in relative valuation; his price-future earnings ratio involves two steps, namely, an estimate of the future annual rate of growth of earnings for each share under consideration; and secondly, the current market price in relation to recent or current earnings is then evaluated in terms of the expected rate of growth of earnings. The objective of this kind of ratio is to show the relation of the market price, not only to current earnings, but also to expected growth.

The estimate of the future rate of growth is a hazardous business in view of the higgledy-piggledy nature of the growth rate of earnings which renders the growth rate unpredictable. Any change in any one of the variables on which the price-future earnings ratio is based, will, of course, change this ratio. One may assume some arbitrary figure, equal to, or even better, somewhat below the past

45. Bell, W.E., "The Price-Future Earnings Ratio", reprinted in Lerner, E.M., editor, Readings in Financial Analysis and Investment Management, p.387.

growth rate, or some figure related to the expected growth rate for the sector in terms of the economic development programme or the growth rate of the economy in terms of real gross domestic product. A constant rate of growth may be assumed. The price-future earnings ratio will then simply give the number of years it will take the cumulative earnings per share to equal the current market price. The estimated growth rate of earnings decided upon by the individual is, however, still a matter of subjective expectations. The individual should realise that the company cannot grow indefinitely at a compound rate, and a conservative estimate is suggested.

The element of time is also important when considering the price-future earnings ratio, that is, the distance into the future. The past is only a starting point, and the trend of growth in earnings over the past five to ten years may be taken, and roughly extrapolated into the future, say, for five years. In doing this, broad economic thinking and investigation is again a prerequisite. The price of a share in the future is not influenced by only one but by numerous variables.

It may be useful to illustrate with the aid of a hypothetical example, based on Bell's exposition of the situation.

	Current P/E ratio	Average past rate of growth of earnings per annum	Assumed rate of growth in future	Price- future earnings ratio
	(1)	(2)	(3)	(4)
ABC Ltd.	12	5%	3%	10.4
XYZ Ltd.	15	8%	7%	10.6
CDE Ltd.	20	11%	10%	11.5
HK Ltd.	24	15%	10%	12.8

On the above basis the price to earnings in five years can be compared. Let us compare XYZ Ltd. with HK Ltd., the former selling at a lower current P/E ratio than the latter with the expected rate of growth of earnings per annum 7 per cent and 10 per cent respectively. The question is, however, taking account of the above, which one of the two shares will show more appreciation over a period of five years, plus the cumulative dividend at the current dividend rate per share.

For every 1 cent earnings the individual pays 15 cents, that is, the current multiplier is 15 for XYZ Ltd., and 24 cents in the case of

HK Ltd. If we take the earnings per share of, say, R1.00 in each case then XYZ will be selling at R15.00 (1,500 cents) and HK Ltd. at R24.00 (2,400 cents). On this basis we can now compare XYZ, and HK Ltd.

	<u>XYZ Ltd.</u> Expected growth rate of 7% per year	<u>HK Ltd.</u> Expected growth rate of 10% per year
Price of share per R1.00 of current earnings	R15.00	R24.00
In five years R1.00 of current earnings will grow to	1.40	1.61
Price-earnings ratio in five years equivalent in both cases to + 10 years' future earnings and if growth projection is unchanged	13.8	16.0
Price projected in five years on above basis	R19.30	R25.80
Expected rate of capital appreciation	28.6 per cent	7.5 per cent

On the basis of the above the share selling currently at a low P/E ratio is expected to show more appreciation than the one currently selling at a high current P/E ratio, or in other words, a share selling at a current P/E ratio of 24, (price-future earnings ratio of 12.8), and an expected growth of earnings of 10 per cent, may be slightly overvalued by the market as compared to a share currently selling at a lower price-earnings ratio, that is, 15 (price-future earnings ratio of 10.6) and an expected growth rate of only 7 per cent. This may, to some extent, also be considered to strengthen the argument put forward by Nicholson. However, the gap of 21.1 per cent between 28.6 per cent and 7.5 per cent capital appreciation may be narrowed down if we take account of the cumulative dividends over the five years, particularly if HK Ltd. pays a considerably higher dividend. If we add the cumulative dividends to the price in five years' time, assuming XYZ Ltd. paid R2.00 in dividends over the five years and HK Ltd. R4.00, then the relative prices in five years would be R21.30 and R29.80 respectively, representing an appreciation (including dividends) of 42.0 per cent and 24.1 per cent respectively, that is a gap of 17.9 per cent.

In our view Bell's approach is an advance on the traditional price-earnings ratio. We should, however, bear in mind that there

need not be a close correlation between future earnings growth and the future price of the share, since many exogenous factors may influence the price.

F. Comparative Analysis of Balance Sheets

The investor in equities (or prior charge securities for that matter), should not be satisfied with looking at one or two balance sheets and the computation of a few ratios, which, in any case, may not always be very revealing, owing to the lack of information contained in financial statements and other supplementary information which may not be accessible. Ratio analysis, in the case of one particular balance sheet, is simply concerned with the relationship of one balance sheet figure (or groups of figures) to another figure (or groups of figures), or other computed variables, for example, capital employed, net worth, and so forth.

Comparative balance sheet analysis involves two different steps, both of them of equal significance. First of all, all the ratios briefly discussed above, can be computed and compared over a representative number of years, (that is, various consecutive balance sheet dates) for the same company. The second important step would be to compare these trends within one company with the trends in other companies in the same industry or group of industries. Establishing and comparing any upward or downward trends is not enough. The individual must try to obtain some explanation and understanding of the underlying causes of any upward or downward trends.⁴⁶

In formulating his subjective forecasts of certain trends in a company, the individual may assume a few things. He may assume (1) that past trends will continue to increase or decrease at the same rate, or (2) will increase at an increasing rate, or (3) increase at a decreasing rate, or (4) will decrease at an increasing rate, or (5) decrease at a decreasing rate. It must be realised that trends in ratios, or trends in certain individual items are more important than the static relationships within a given balance sheet. The trends will show how net worth, capital employed, current ratio, earnings, gearing and leverage, if any, current assets, current liabilities, tangible net worth, net sales, net profits, operating expenses, dividend rates and so forth, changed over time.

⁴⁶. This will, of course, not always be possible.

The most common method utilised in comparative analysis (for consecutive balance sheets of a given company) is to draw up a funds statement, that is, a statement of sources and applications of funds.⁴⁷ The funds statement, like charting, is a technical device, showing certain past trends, on which the individual can base his own subjective forecasts and estimates.

The funds statement shows the flow of cash in the company. Of particular interest is how the funds are applied, as well as changes in working capital. The individual is, of course, apart from earning capacity, mainly interested in a company's ability to pay dividends and to honour interest payments on fixed-interest securities, to maintain existing assets, and to finance investment without any further recourse to the capital market, or a cut in dividends. The above implies adequate internal financial resources, proper financial management, and sound financial policies.

The funds statement is mainly concerned with net changes from one fiscal date to another. The statement will then mainly highlight changes in variables such as working capital, capital employed, real assets, and so forth, and has the advantage of showing how net profits were earned and utilised, or the sources of any funds, and how these were utilised. Over a period of time a company may earn reasonable net profits, yet the liquid resources, mainly cash, may be strained to such an extent that the company cannot pay a dividend, or even repay a bank overdraft, or other short and/or medium term loans. This is, of course, important from the point of view of the ordinary shareholder. A funds statement will give an indication why a company, even if profits are reasonable, may still lack the liquid assets with which a dividend can be paid. The funds statement has the advantage that it clearly shows how the funds obtained, from whatever sources, (internal or external), have been used in the business, for example, if an asset is purchased on account (or on an instalment basis), the source of funds will be the creditors (current liabilities will increase) and the application of funds the increase in assets.

1. Sources of Funds

It may be convenient to discuss first the sources of funds,

47. Some accountants feel that a funds statement is more important than the balance sheet or income accounts.

and then the application of such funds, some examples being given at a later stage. In the case of an already established company the sources of funds are mainly the following:-

- (1) Net profits earned during the year.
- (2) An increase in current liabilities.
- (3) An increase in funded debt.
- (4) An increase in ordinary share capital issued.
- (5) Preference shares issued.
- (6) A sale of or a decrease in assets. A decrease in assets, where it is not due to a sale, will be reflected in depreciation, which is a source of funds.

The balance sheet will show the following sources:- an increase in liabilities, a decrease in assets, and an increase in net worth.

2. Application of Funds

The funds, from whatever source, can be utilised or applied in various ways, notably (1) a net loss in the fiscal year, (2) an increase in assets (an acquisition), (3) a decrease in liabilities, and (4) a decrease in debentures, preference shares or nominal capital. It should, however, be noted that a decrease in debentures or preference shares may be reflected by an increase in nominal issued share capital and share premium account due to some conversions which may have taken place, but overall the total figure for capital funds will remain the same. A cash redemption of debentures will, however, be considered as an application of cash funds, the latter being the source of funds. The balance sheet will show three uses of funds, namely, decrease in liabilities, increase in assets, and a decrease in net worth.

The funds statement has the advantage of showing net changes in the net working capital conditions. A decrease in current assets, and an increase in current liabilities are considered as sources of funds, and conversely, an increase in current assets and a decrease in current liabilities as an application of funds. A net increase in working capital represented by a net increase in current assets and decrease in current liabilities, constitutes an application of funds; and a net decrease in working capital, represented by a net decrease in current assets, and a net increase in current liabilities, constitutes a source of funds.

It is obvious that if a given balance sheet is taken, and the

funds statement divided into two sections, namely, sources of funds and application of funds, the two sides must balance in balance sheet fashion. The first step, only for convenience sake, would be to set up the balance sheet differently and to list all assets and then all liabilities. From the balance sheet the individual will then proceed to draw up a proper funds statement. He will normally do this in two or three steps. As a first step, he will give a detailed funds statement. The sources of funds may be classified under the following headings, namely an increase in tangible net worth, increase in liabilities, and decrease in assets, and non-cash costs or expenses. The application of funds will be classified under an increase in assets, decrease in tangible net worth, and a decrease in liabilities.

The balance sheet information and analysis is normally not sufficient and information contained in the income statement should be incorporated to give a more detailed funds statement. Information regarding non-cash expenses, dividends and interest paid, net profits, depreciation and so forth, for a given year must be incorporated. To establish any trends, the income statements for a number of consecutive years will be analysed. An example of a funds statement is given below.

Comparative Figures T.O.N. Ltd. (Retail Chain Store)

Balance sheet

	30.6.65	30.6.66	Increase or decrease
<u>Assets</u>			
Cash	10,000	12,000	+ 2,000
Debtors (Trade)	600,000	550,000	- 50,000
Inventory	1,800,000	1,600,000	- 200,000
<u>Current Assets</u>	2,410,000	2,162,000	- 248,000
Freehold Property	1,000,000	1,100,000	+ 100,000
Buildings (net)	4,000,000	4,200,000	+ 200,000
Trade investments	40,000	30,000	- 10,000
Furniture and fittings (net)	860,000	900,000	+ 40,000
Motor vehicles (net)	60,000	80,000	+ 20,000
Goodwill	20,000	20,000	-
<u>Total Assets</u>	R8,390,000	R8,492,000	+ R102,000
<u>Liabilities</u>			
Creditors (Trade)	150,000	180,000	+ 30,000
Bills payable	250,000	300,000	+ 50,000
Mortgage bond instalment	75,000	75,000	-
Accrued expenses	100,000	80,000	- 20,000
Bank overdraft	25,000	20,000	- 5,000
Taxation	330,000	380,000	+ 50,000
Dividends	300,000	300,000	-
<u>Current liabilities</u>	1,230,000	1,335,000	+ 105,000
Mortgage bond	1,500,000	1,200,000	- 300,000
6% Debentures - 1980	1,000,000	1,000,000	-
<u>Total liabilities</u>	R3,730,000	R3,535,000	- R195,000
7% Cum. Preference Shares	1,500,000	1,500,000	-
Ordinary share capital	2,260,000	2,260,000	-
Share Premium	300,000	300,000	-
Retained earnings	600,000	897,000	+ 297,000
<u>Total liabilities</u>	R8,390,000	R8,492,000	+ R102,000

Income Statement - Year Ended 30.6.66

Net sales (or gross income) R2,427,000

Operating and Administrative Expenses

Rates and municipal taxes	R 155,000	
Depreciation - buildings	100,000	
Depreciation - furniture and fittings	40,000	
Depreciation - motor vehicles	5,000	
General administrative expenses	1,000,000	1,300,000
		<u>R1,127,000</u>

Deductions from Operating Profit
(gross profit)

Interest on mortgage bond	60,000	
Interest on debentures	60,000	
Provision for bad debts	30,000	150,000
		<u></u>

Net income before tax	977,000
Less provision for tax	<u>380,000</u>

Net profit after tax R 597,000

Less Dividends

7% Preference shares	105,000	
Ordinary shares	195,000	300,000
		<u></u>

Net Profit after dividends added to retained earnings	<u>R 297,000</u>
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From the information given above, the following may be extracted:-

	30.6.65	30.6.66	Increase or decrease
Net working capital	R1,180,000	R 827,000	- R 353,000
Tangible net worth	3,140,000	3,437,000	+ 297,000
Net sales	1,900,000	2,427,000	+ 527,000
Net profit (before dividends after tax)	430,000	597,000	+ 167,000
Dividends	300,000	300,000	-

A proper funds statement can then be drawn up.

Funds Statement 30.6.66

Sources

Net profits (before dividends, but after provision for bad debts and tax)		597,000
Reserve for depreciation (non-cash)		145,000
Sale of investments		10,000

Decrease in Net Working Capital

Increase in current liabilities	105,000	
Decrease in current assets	248,000	353,000

Total Sources R1,105,000

Applications

Dividends paid		300,000
Repayment of mortgage		300,000

Increase in Assets (before deducting
depreciation)

Freehold property	100,000	
Buildings	300,000	
Fixtures and furniture	80,000	
Motor vehicles	25,000	505,000

Total Applications R1,105,000

The above can be finally summarised, as shown below.

Funds Statement 30.6.66

Sources

Current Assets (-)

Trade debtors	50,000	
Inventory	<u>200,000</u>	250,000

Current Liabilities (+)

Trade creditors	30,000	
Bills payable	50,000	
Taxation	<u>50,000</u>	130,000

Net Worth (+)

Retained profits		297,000
------------------	--	---------

<u>Investments Sold</u>		<u>10,000</u>
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<u>Total Sources</u>		R <u><u>687,000</u></u>
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Applications

Current Assets (+)

Cash		2,000
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Current Liabilities (-)

Accrued expenses		20,000
Bank overdraft		5,000

<u>Mortgage bond (-)</u>		300,000
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Other Assets (after deducting depreciation)

Freehold property	100,000	
Buildings	200,000	
Furniture and fittings	40,000	
Motor vehicles	<u>20,000</u>	<u>360,000*</u>

Total Applications		R <u><u>687,000</u></u>
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* R505,000 - 145,000 = R360,000

The funds statement then has the advantage of clearly showing changes in the financial status of the company between two fiscal years. The individual can then, to some extent, ascertain how funds are being utilised within the company, and observe any weaknesses.

G. Dividends and Earnings

Apart from the various ratios already discussed, and the comparative analysis of balance sheets, the individual will pay special attention to the dividends and earnings prospects of the company. It is our purpose to discuss the importance of these two magnitudes in this section.

In the existing literature there is, to some extent, still a difference of opinion as to whether a share should be valued in terms of expected earnings or expected dividends.⁴⁸ It should, of course, be clear that investors do not purchase an expected stream of both dividends and earnings. This would result in double-counting. In most of the dividend valuation models earnings are included in the sense that retentions are influencing the future rate of growth of dividends. This means that the rate of retentions will influence share prices. In most of the existing models on the earnings-dividend hypothesis, it is shown that retentions, as a source of finance for further new investment, will influence the future dividend stream via increased earnings on the new investment, and thus the value of the

48. The most important studies in this field have been undertaken by Gordon, M.J., The Investment, Financing and Valuation of the Corporation, Fisher, G.R. "Some Factors Influencing Share Prices", The Economic Journal, Vol. 71, No. 281, March, 1961, Merrett, A.J. and Sykes, Alllen, The Finance and Analysis of Capital Projects, Graham, B., Dodd, D.L. and Cottle, S., Security Analysis, Clendenin, J.C., "Dividend Growth as Determinant of Common Stock Values", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investment: Selected Readings, Walter, J.E., "Dividend Policies and Common Stock Prices" in Wu and Zakon, Gordon, M.J., "Dividends, Earnings, and Stock Prices", in Wu and Zakon. Miller, M.H. and Modigliani, F., "Dividend Policy, Growth and the Valuation of Shares", in Wu and Zakon. Harkavy, O., "The Relation between Retained Earnings and Common Stock Prices for Large Listed Companies", Journal of Finance, Vol. 8, 1953. Morgan, E.V. and Taylor, C., "The Relationship between Size of Joint Stock Companies and the Yield of their Shares", Economica, New Series, Vol. 24, 1957. Lintner, J., "Distribution of Incomes of Corporations among Dividends, Retained Earnings and Taxes", American Economic Review, Vol. 46, May, 1956. Lerner, E.M. and Carleton, W.T., A Theory of Financial Analysis.

share. We have already pointed out in chapter II that the availability of internal funds may have some influence on investment decisions and the rate of capital stock growth. Whether retentions will increase future dividends via increased earnings on the asset portfolio depends entirely on the productivity or rate of return on the enlarged asset portfolio. Retentions will, of course, increase the net worth.

The relationship between the rate of plough-back and the rate of growth in earnings and dividends is, however, complex, and will differ from one company to another. We may generalise and state that the higher the current rate of retention and relatively higher the absolute level of reserves (or retentions) of a given company, the smaller the risk that the dividend rate per share will fall, provided that the company does not also resort to the capital market for additional funds. As we have pointed out before, earnings will fluctuate from year to year, and so will the rate of retention, but the board of directors will normally endeavour to keep dividends reasonably stable. Dividends over time will thus tend to fluctuate less than earnings and retentions. The rate of retention will, of course, differ from company to company within an industry, and should not be ignored by potential buyers, for the simple reason that the rate of retention may be indicative of the relative future dividend potentialities of companies, particularly in the long-run, where a higher dividend rate may compensate for a currently niggardly dividend policy. Investors are increasingly more interested in earnings and capital appreciation and not dividends. This will inevitably be the case in an inflationary world. The amount of dividends a company can pay to shareholders in the long-run is thus directly dependent on earnings and the rate of ploughback. The buyer of an ordinary share actually purchases a future income stream. Earnings growth may, however, tend to be higgledy-piggledy, and this will influence the growth rate of dividends.

The dividend-hypothesis and the earnings-hypothesis respectively state that a share should be valued in terms of prospective dividends and prospective earnings. Gordon pointed out that "The dividend hypothesis implies that investors are interested in both the dividend and earnings."⁴⁹ Taking the dividend as given (or at least as

49. Gordon, M.J., The Investment, Financing and Valuation of the Corporation, p.55.

reasonably stable), then retentions will fluctuate according to earnings, and these retentions will again in turn have some influence on the rate of growth of dividends, and the price of the share is a function of the expected rate of growth of dividends. The individual must, however, realise that dividends are not contractual payments and they are not fixed. This makes the valuation of shares far more complex than any fixed-interest securities.

The rate of growth of dividends is an expectational magnitude which is influenced by numerous factors, namely, all internal and external factors which influence the earnings per share and the board's dividend policy. In this sense earning power is important, because both the rate of dividend and the rate of retention are functions of earnings. But earning power as such is also an expectational magnitude, and may be considered as the earnings that may reasonably be expected over a period of time. This is again something which cannot be predicted with a high degree of confidence. Past and current earnings may not be a useful guide. Past and current earnings and dividends do not explain the price of a share at time $t = 0$. The price of the share is influenced by the expected earnings and the dividend rate and expected capital gains. As we have stated in the previous chapter, the yield on a share is made up of two components, namely, the dividend stream plus capital gains or minus capital losses. The dividend yield is referred to as the apparent yield. The apparent yield plus any capital gains or minus any capital losses (on sell out) has been termed the 'resultant yield' by Hicks.⁵⁰ In the latter case we do not distinguish between capital and income. The shareholder will thus be concerned, not so much with the apparent yield, but with the resultant yield, the latter being also a subjective, expectational magnitude, which will have a strong influence on the composition of the individual's portfolio.⁵¹

There are many reasons why it may be necessary to reject past earnings and dividends as a guide to forecasting what will happen in the future, for example, a change in the general economic and political climate, a change in management, a change in demand conditions for the product, a basic change in the line of products produced, changes in

50. Hicks, J.R., Critical Essays in Monetary Theory, p.20.

51. See chapter VIII.

markets and sales policies, the loss of some comparative advantages and contracts, a change in the capital structure, taxation, and so forth. Trend analysis may not be useful unless supported by qualitative and quantitative data related to the company. Trend analysis as such is subject to certain limitations and dangers, and may be deceptive. A trend as such must not be simply projected into the future to arrive at some answer or forecast, for such a trend may easily be reversed in a dynamic world. The average earnings per share, the average rate of return on capital employed, the average dividend rate, and the average rate of retention may be calculated over a representative number of years, and forecasts based on that, with some adjustments for expected future changes.

The dividend projection is to some extent related to the earnings projection, but a dividend projection may be considered less hazardous. The retention and pay-out policy in the past may give some indication of the policies established in the company. The times covered may give some indication of this. In the previous chapter we have pointed out that the price of the share cannot be forecast with any degree of confidence, and we feel the same about earnings. Perhaps one may, however, forecast the dividend rate with more confidence than earnings, since management may follow a policy of dividend stabilisation. Earnings and the retention rate will then tend to fluctuate more than the dividend rate, unless a dividend payment is impeded by the liquid position. The rate of growth of dividends may, however, not be related to the past trends in any way, and some disparities between earnings and dividends, or earnings growth and dividend growth may arise. The investors in ordinary shares are inclined to measure the success of a company (and management) in terms of the rate of return on capital and the dividend pay-outs. However, the discounted value of near-dividends will be more important than the discounted value of remote or distant dividends.

Like any investment, the investment in securities is the outlay of resources in the expectation of a future gain, which in the case of stock exchange investment is the expectation of some income stream in the form of dividends or interest and possible capital gains. These cash flows are, of course, uncertain, as future dividends and prices are uncertain. This, of course, makes valuation complex and the element of subjective risk attitudes again enters. When cash flows

are known, with reasonable certainty, as in the case of some fixed-interest securities, the discounting methods are well-known.

The apparent dividend yield of a share expressed as a percentage, from the individual's point of view, is the gross of tax dividend on a share as a proportion of the current market price. The apparent earnings-yield is the earnings per share as a proportion of the current market price. However, as pointed out above, the dividend rate may be expected to grow over time at some expected rate. The true or expected yield on a share is thus the existing yield plus some factor of growth.

The apparent dividend yield is part of the existing market knowledge, but this yield is subject to change over time. This is due to a change in either the price, or the dividend rate or both, over time. The share may have been undervalued by the market in terms of the dividend growth prospects, or the share may have been overvalued, and over time, the market rectified this situation. For example, if an individual buys a share at the time when the dividend yield is high and sells the share again when the dividend yield is lower than at the date of purchase, it may be because the price of the share has increased at a faster rate than the dividend rate, and a capital gain may result. The overall return to the shareholder will in this case tend to be higher than the apparent dividend yield plus the rate of growth of dividends. The opposite will hold where the dividend yield is higher at the time of sell out than at the date of purchase. However, the above are generalisations. The problem is that the long-run rate of growth cannot be exactly forecast and is a subjective matter on which the individual will have to decide.

We must accept that the value of the ordinary share is the sum of all the future dividends discounted at a given rate, allowing for risk. But as pointed out above, nobody knows what the future growth rate of the dividend will be. Tax considerations, unfinished capital expenditure plans, financing plans, general economic and political conditions, all shape the board's policy from time to time.

The arguments put forward so far can be summarised in Fisher's

equation,⁵² namely:-

$$p = f(d, u, v)$$

where

p = current price

d = last declared dividend per share

u = last declared undistributed profits per share

v = a residual term summarising all other variables

v shows that d and u are not enough to explain p at time $n = 0$. d and u are again functions of the earnings per share, that is, d plus u must give the last declared earnings per share. According to Fisher, the price of the share will be a homogeneous linear function of the two components of net earnings, that is, d and u. However, the question of capitalisation or capitalisation rate of d and u arises. The price of the share, in terms of Fisher's analysis, can then be written as $p = \alpha_1 d + \alpha_2 u + v$, where α_1 and α_2 are capitalisation factors applying to dividends and retentions respectively.⁵³ On the basis that d exerts a more definite influence on share prices, the capitalisation factor applied to d will be greater, therefore α_1 will be greater than α_2 . In Fisher's model the proportional effect of dividends on share prices is greater than the proportional effect of retentions. Fisher correctly pointed out that in the estimates of the parameters α_1 and α_2 it is necessary to give equal weight to shares with different prices and dividend rates, and when we consider the number of years' purchase of dividends as a function of times the retentions cover the dividends, the equation will be $\frac{p}{d} = \alpha_1 + \alpha_2 \frac{u}{d} + E$, where $E = \frac{v}{d}$. α_1 is not the same as the dividend yield or the dividend multiplier. In view of the fact that u is also a factor influencing share prices, the company can influence the price of the share by changing u.

With reference to dividends the capitalisation rate is sometimes considered to be determined by the underlying yield on safer securities, such as long-term government stock, and by the required risk premiums.⁵⁴

52. Fisher, G.R., "Some Factors Influencing Share Prices", The Economic Journal Vol. 71, no. 281, March, 1961, p.124.

53. Loc. cit.

54. We shall show below that this is not sufficient, and the discount factor may be considered to be the cost of capital or the rate of profit which shareholders expect.

In this sense the mathematical present value of all future dividend receipts from a given share will give the investment worth of the security at time $n = 0$, where the present value is computed at a rate of interest commensurate with the estimated risk involved. This is still in line with capital theory, where the present value of any asset is represented by the prospective income stream discounted by an appropriate rate. The price an individual is willing to pay for a share at time $n = 0$ is then the present value of the expected future dividend stream plus any capital gains when he sells out. There are three important variables which must be considered in the valuation and dividend capitalisation process, namely the current dividend, the expected growth rate of dividends, and the discount rate applied to an uncertain growing stream, where the future dividend stream or every future dividend payment is not equal to the current dividend.

We may then construct a model based on Gordon, M.J. (The Investment, Financing and Valuation of the Corporation), Lerner, E.M. and Carleton, W.T. (A Theory of Financial Analysis), Merrett and Sykes (The Finance and Analysis of Capital Projects), and Miller, M.H. and Modigliani, F. ("Dividend Policy, Growth and the Valuation of Shares", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments: Selected Readings.) Lerner and Carleton first considered the present value of a growing stream and then considered three alternative measures of shareholder return, namely, (1) the shareholder's return as a growing stream of earnings, (2) a stream of dividends plus some capital gain, and (3) the return as a combination of both earnings and dividends. We shall consider two methods of valuation, namely, (1) the current price of a share expressed as a function of a growing stream of dividends to infinity, and (2) the current price of the share expressed as a function of a finite dividend stream plus some capital gain when the investor sells out at the end of period n . We shall show that the two approaches are mathematically equivalent and will give the same result.

We shall assume that the company has no gearing and leverage, and that the company does not resort to the capital market for further external finance. The current dividend rate is influenced by leverage rates, outside financing rate, earnings instability, retention rate, and so forth. All the above will be abstracted, except the retention rate. We shall assume that undistributed profits are used to add to the asset portfolio, and not merely retained in the form of cash, in other words, a rate of return will be earned on retentions. The dividend

expectation is represented by the current dividend and its rate of growth, where the latter is a function of the rate of retention, current income and return on investment, and the current dividend.

In terms of Gordon's model the predicted value of a share is then the function of four variables, namely, current income or earnings, retention or investment rate, rate of return on investment, and the rate of profit investors require on the share. The above may then be used to arrive at the value of a share, when the rate of investment, retention financing, and rate of return on investment is taken as given, in other words, reduced to some certainty-equivalent. Such an approach, however, does not tell us how leverage and gearing, or what rate of retention will maximize the price of the share, because for the latter purpose the above factors cannot be taken as given, and numerous other problems arise. In the latter case there is some optimal investment and financing policy (gearing and leverage, retention, and rate of investment) which will maximize the capitalised value of the company in the market. This problem falls outside the scope of this section, as we are mainly interested in the process of valuation for investment purposes.

The following symbols will be frequently used in the discussions that are to follow:-

P_0 = current price of the share

P_n = price of the share at end of period n

D_0 = current dividend per share, net of tax in the hands of the investor

D_n = dividend per share paid during period $n + 1$, net of tax

Y_0 = current income per share (EPS)

Y_n = income per share during period $n + 1$

d = the dividend yield based on current dividend, that is,
$$d = \frac{D_0}{P_0}$$

r = return on investment the company is expected to earn in every future period, and which is assumed positive, and net of tax

b = the fraction of income the company is expected to retain in every future period, which is also positive

k = per cent return on investment that shareholders require on the company's shares. (k is a rate of discount)⁵⁵
 g = the rate of growth of dividend payments.

(Note: P_n , D_n , Y_n and g , are subjective estimates or expectational magnitudes.)

The first problem is the present value of a growing stream of dividends, where the rate of growth of dividends will vary over time. If r is positive and will thus be earned in the future, and b , the rate of retention, is also given and positive, the dividend in every future period may be given by the equation:-

$$D_n = Y_n(1-b)$$

If the expected rate of growth of the dividend is g , the present value of the security can be computed, assuming g to be constant over time. Using our symbols given above, where the current net earnings is Y_0 , then the net earnings in the following year, Y_1 , will be $(Y_0 + br Y_0)$, where $br Y_0$ are the earnings resulting from the retention, b , being invested at a rate r of the retained earnings bY_0 . Therefore, $Y_n = Y_0 (1 + br)^n$. The net earnings in each successive period will be greater by a factor $(1 + br)$ than the earnings of the preceding period. The net earnings therefore grow at a rate br per annum, and may be taken for n periods. The assumption implicit in this reasoning is that the rate of growth of net earnings is equal to the rate of retention b times r , or br , the rate of return on the investment financed by b . We have already written the future dividend payment as $D_n = Y_n(1 - b)$. But $Y_n = Y_0(1 + br)^n$, which is approximately equal⁵⁶ to $Y_0 e^{brn}$, the expected rate of growth of earnings with br given. Therefore $D_n = Y_0(1 + br)^n(1 - b)$

$= Y_0(1 + br)^n - b(1 + br)^n Y_0$. This equation means that the dividend at time n is the difference between the expected rate of growth in earnings and the expected rate of retention, both at time n . This means that D_n is the expected rate of growth of the current dividend to time n , that is $D_n = D_0(1 + br)^n \doteq D_0 e^{brn}$. With $br = g$, $D_n \doteq D_0 e^{gn}$.

55. It may also be considered as the cost of capital.

56. $e^{\log(1+br)n} \doteq e^{brn}$, provided n is not too large.

Now if D_n is a function of Y_n and b , that is $D_n = Y_n(1 - b)$, and dividends are assumed to be proportional to net earnings, then dividends can be assumed to grow at the same rate. For example, assume that a company retains 50 per cent of its earnings, that is, the dividend is covered twice, and that the company can earn 10 per cent (net of taxes) on the investment of retentions, then the earnings and thus dividends, are growing at the rate of $50\% \times 10\% = 5\%$. g is then considered to be 5 per cent and constant over time, and the problem is to find P_0 in terms of a series of cash flows which are growing at a constant rate to infinity.

Discounting the growing dividend stream, P_0 , the current price of the share, can be calculated as follows:-

$$\begin{aligned} P_0 &= \frac{D_0}{(1+k)} + \frac{D_0(1+g)}{(1+k)^2} + \frac{D_0(1+g)^2}{(1+k)^3} + \dots \\ &= \frac{D_0}{(1+g)} \sum_{i=1}^{\infty} \frac{(1+g)^i}{(1+k)^i} \\ &= \frac{D_0}{(1+g)} \left(\frac{(1+g)}{(1+k)} \right) \left(\frac{1}{1 - \frac{(1+g)}{(1+k)}} \right), \quad (\text{if } k > g) \\ &= \frac{D_0}{k-g} \end{aligned}$$

This can be written as $P_0 = \frac{Y_0(1-b)}{k-g}$. If k is greater than g , that is, the rate of discount, k , is greater than the rate of growth of dividends, g , then $\left| \frac{(1+g)}{(1+k)} \right|$ is numerically smaller than one, and therefore the geometric series obtained above will converge to a finite sum.

The equation $P_0 = \frac{D_0}{k-g}$ can be written in different form. In this equation it was assumed that a dividend payment has been received in each of the separate periods up to infinity.

We may now assume continual discounting and compounding, and arrive at the same equation with the aid of calculus. If the current dividend payment is D_0 , and we assume that the rate of growth of the dividend is proportional to D_t , then $\frac{dD_t}{dt} = gD_t$. Then the value of the dividend $D_t = D_0 e^{gt}$, where e is the base of natural logarithms.

The price P_0 , of the share, from the present to infinity, is

$$P_0 = \int_0^{\infty} D_t e^{-kt} dt, \text{ where } D_t = D_0 e^{gt}.$$

The value of the above integral is $P_0 = \frac{D_0}{k-g}$

The condition for carrying out the integration is that $k > g$. If g is greater than k , then P_0 will become infinitely large, which we know in the real world can never happen. In valuing a share, selling at a finite price, it will be necessary for k to be greater than g . The equation means that the present price, P_0 , of a share, is defined in terms of D_0 , the current dividend, capitalised at the rate $k-g$, the discount rate minus the rate of growth of the dividend, as previously described. The higher g or the larger D_0 , other things being equal, the higher the price of the share, P_0 , or the higher k , the discount rate, the lower will P_0 be. We can substitute br for g , since we showed that earnings and dividends will grow at the rate br .

We then find that $P_0 = \frac{D_0}{k-br}$.

The current dividend is, $Y_0(1-b)$, that is current income minus the fraction, b , retained. Therefore, $P_0 = \frac{Y_0(1-b)}{k-br}$ and where k is greater than br , the price of the share will be finite. In terms of the above, the current price of the share is its current dividend divided by the rate of return shareholders require on the shares, k , minus the rate of growth in the dividend, g , which is equal to br . The price of the share is therefore the current dividend divided by the excess of k over g , or to put it another way, the price of the share P_0 , is the current dividend divided by the yield required on the share, where d is the current dividend yield, which is

$$d = \frac{D_0}{P_0}. \text{ But } P_0 = \frac{D_0}{k-br}, \text{ and therefore } d = k-br. \text{ } d \text{ is then}$$

really a subjective estimate of the quality of a share, taking account of the expected growth rate of dividends, ($g=br$), and the discount factor, k . For example, if the current dividend is 30 cents, $k=8$ per cent and g (or br) = 3 per cent, the price of the share (P_0) will be $\frac{30}{0.08-0.03} = 600$ cents.

The above equations give some relationship between P_0 , earnings,

and price, but as we have already pointed out, we have not allowed for uncertainty, since we have assumed that both r and b are positive and given, that is, the company will earn a rate of return on investment and retain a fraction of income b , and that the dividend rate is constant. The above model is not very useful, for the individual cannot know with any certainty what r and b will be, and we also know that earnings growth will be higgledy-piggledy. The equation $P_0 = \frac{D_0}{k-g}$, does not define the determinants of the actual dividend, the growth rate of the dividend stream, or k , the discount factor.

The individual can estimate r and b from historical data and expect them to remain constant and to continue. At any point of time, if conditions change, the expected r and b can be changed and a new expectation formed at a different point of time. The new values of r and b will then be expected to remain constant and to continue, that is, what r and b will be in each future period. It will, of course, be realised that if the individual were to give a different value to r and b in each future period, the mathematical model will become unmanageable, and secondly, b and r in any case are expectational, and cannot be forecast with any degree of confidence, since b depends on earnings and the board's policy, both of which can change over time, and r is a function of the marginal productivity of investment, which can also change over time. d , as defined above, then contains two expectational magnitudes, b and r . This means that we must still find k , the discount factor, and we have not yet said anything about P_n , the price of the share at end of period n . Let us take the latter first.

Using the same method as was used in obtaining P_0 , we have

$$\begin{aligned} P_n &= \frac{D_n}{(1+k)} + \frac{D_n(1+g)}{(1+k)^2} + \frac{D_n(1+g)^2}{(1+k)^3} + \dots \quad (\text{Equation A}) \\ &= \frac{D_n}{k-g}, \quad (\text{if } k > g \text{ as before}) \\ &= \frac{D_0(1+br)^n}{k-g}, \quad (\text{where } g=br) \\ &= P_0(1+br)^n + P_0e^{brn} = P_0e^{gn}. \end{aligned}$$

The price will grow at the same rate as earnings and dividends, namely, br , as long as k remains constant. The higher g , or D_n (or D_0e^{gn}), other things being equal, the higher will be P_n , or the higher k , other things being equal, the lower will P_n be.

Discount Rate (k)

We have shown P_0 to be equal to $\frac{D_0}{k-g}$ or $P_0 = \frac{Y_0(1-b)}{k-br}$.

When $k = r$, the price of the share is independent of b , the retention rate. When k is greater than r , that is, the rate of return on investment is smaller than the discount factor, then the price of the share falls with an increase in b , the rate of retention or the rate of investment and conversely, if r is greater than k , the price of the share will increase with an increase in b . This conclusion is not feasible with reference to the real world, because in order to maximize the price of the share, b should be equal to Y_0 , that is, the company should retain all earnings and pay no dividend, or wind-up, depending on whether $r \geq k$. The question is then whether r is independent of b , or whether k is independent of b . In the real world, taking account of the marginal productivity of investment, r may be considered a function of b , the rate of retention or the rate of new investment. However, k may also possibly vary with b . The problem is then to establish k , and its relationships.

We have already:

$$P_0 = \frac{D_0}{k-br} \quad \left(\text{or} \quad \frac{D_0}{k-g} \right)$$

$$= \frac{Y_0(1-b)}{k-br} \quad \left(\text{or} \quad \frac{Y_0(1-b)}{k-g} \right).$$

Solving for k , we obtain

$$k = \frac{Y_0(1-b)}{P_0} + br$$

$$= \frac{Y_0(1-b)}{P_0} + g. \quad \text{Now} \quad \frac{Y_0(1-b)}{P_0} = \frac{D_0}{P_0} = d, \text{ the current}$$

dividend yield. If the share is not to be sold in the distant future, that is, $n \rightarrow \infty$; then k , the discount factor, or the rate of return shareholders require on a share, is defined as the current dividend yield, d , plus the rate of growth in the dividend, that is, $d + g = d + br$. Then $k = d + br = d + g$. Each share will, of course, have its own discount rate. From the above one may again state that an individual buying an ordinary share expects to receive a dividend

growing at a rate of br , but br will not grow indefinitely, as r will fall over time. One may, therefore, assume that dividends will increase exponentially only for a time, and then level off asymptotically.

The differentials in k between different companies are due to differences in risk between companies. It is generally accepted that k , the discount factor, should contain at least two variables, namely, an interest rate α , which, according to Lerner and Carleton, "...represents a pure time preference rate common to all capital asset prices,..."⁵⁷ and the second variable is the risk attached, or risk-premium inherent in the uncertainty of the growth rate of dividends, br , since the individual cannot know what b and r will be. Following from the above $k = k(\alpha, u)$, where u is the risk variable. α , may be considered as the yield on safe stock, which also includes some capital or price risk, due to changes in the long-term rate of interest. u is then the risk factor accounting for the fact that Y , b and r may vary over time, and that the expected growth rate will not materialise. The expected growth-rate, which is a function of a number of variables, will be adjusted downwards by the individual, and k is a function of the expected br or g . The greater the risk and uncertainty associated with g , the higher the rate of discount an individual will apply to the expected future dividend stream. Lerner and Carleton⁵⁸ specify the discount rate as $k = \alpha + s \text{ Var } (g)$, where s represents the risk-aversion preference of shareholders, or risk-aversion coefficient, and $\text{Var } (g)$ represents the variance in the growth rate. $\text{Var } (g)$ thus measures the riskiness of a given share. Thus $\text{Var } (g)$ is the same as u in the equation $k = k(\alpha, u)$ above. We have defined $P_0 = \frac{D_0}{k-g}$. Substituting $\alpha + s \text{ Var } (g)$ for k we obtain

$$P_0 = \frac{D_0}{\alpha + s \text{ Var } (g) - g} \quad . \quad \text{We have given } P_n \text{ to be}$$

$$P_n = \frac{D_n}{k-g} \quad . \quad \text{Substituting as above, we find } P_n = \frac{D_n}{\alpha + s \text{ Var } (g) - g} \quad .$$

The price of the share will change for a change in any one of the variables in the equation.

57. Lerner, E.M. and Carleton, W.T., A Theory of Financial Analysis, p.113.

58. Ibid., p.114.

Capital Gains

So far we have said nothing about capital gains or losses when the share is sold out at time n . Any capital gains should be added to the income stream the individual received, and capital losses deducted. This means that the current price of the share P_0 must be adjusted to allow for any expected capital gains, which must be added to the discounted expected dividend stream. The present value of the dividend stream is given by:

$$\frac{D_0}{(1+k)} + \frac{D_0(1+g)}{(1+k)^2} + \frac{D_0(1+g)^2}{(1+k)^3} + \dots + \frac{D_0(1+g)^{n-1}}{(1+k)^n}$$

To obtain P_0 , we must now add to the above the present value of the expected proceeds from the sale of the share at time n . This means that

$$P_0 = \frac{D_0}{(1+k)} + \frac{D_0(1+g)}{(1+k)^2} + \frac{D_0(1+g)^2}{(1+k)^3} + \dots + \frac{D_0(1+g)^{n-1}}{(1+k)^n} + \frac{P_n}{(1+k)^n}$$

Therefore

$$P_0 = \sum_{m=0}^{n-1} \frac{D_0(1+br)^m}{(1+k)^{m+1}} + \frac{P_n}{(1+k)^n}, \quad (\text{where } g = br)$$

$$= \sum_{m=0}^{n-1} \frac{D_m}{(1+k)^{m+1}} + \frac{P_n}{(1+k)^n}, \quad (\text{where } D_m = D_0(1+br)^m)$$

The second term on the right-hand side of the equation represents the value proceeds from the sale of the share in year n . We have already expressed the price of the share at year n , that is P_n , as the present value of the stream of dividends from year n forward. Thus by equation (A), using the fact that $D_n(1+g)^{m-n} = P_0(1+g)^n(1+g)^{m-n}$

$$= D_0(1+g)^m = D_m$$

$$P_n = \sum_{m=n}^{\infty} \frac{D_n(1+g)^{m-n}}{(1+k)^{m-n+1}}$$

$$= \sum_{m=n}^{\infty} \frac{D_m}{(1+k)^{m-n+1}}$$

Substituting this value for P_n

in the equation above we obtain:

$$\begin{aligned}
 P_0 &= \sum_{m=0}^{n-1} \frac{D_m}{(1+k)^{m+1}} + \sum_{m=n}^{\infty} \frac{D_m}{(1+k)^{m+1}} \\
 &= \sum_{m=0}^{\infty} \frac{D_m}{(1+k)^{m+1}} \\
 &= \sum_{m=0}^{\infty} \frac{D_0(1+br)^m}{(1+k)^{m+1}} \\
 &= \frac{D_0}{(1+k)} \sum_{m=0}^{\infty} \frac{(1+g)^m}{(1+k)^m}, \quad (\text{where } g = br) \\
 &= \frac{D_0}{(1+k)} \left(\frac{1}{1 - \frac{(1+g)}{(1+k)}} \right), \quad (\text{if } k > g) \\
 &= \frac{D_0}{k-g}, \quad \text{as previously obtained.}
 \end{aligned}$$

We may then conclude that the current price of the share, P_0 , can be defined as the present value of an infinite stream of dividends, or equivalently, the present value of a finite stream of dividends up to period n and the present value of the capital gain when the share is sold at the end of period n .

The valuation of a share at time $n = 0$, that is, P_0 , then depends on three variables, namely, r , b and k . When r and b are estimated values, which are assumed to remain constant, P_0 will depend on k . The individual will not expect r to be very high indefinitely.

The discussions so far were mainly moulded into a certainty-equivalent method, particularly where the expected b and r and thus g were taken as known and constant over time, that is, that D_0 will grow at a constant rate. Where b and r , and thus g , were taken to be known, the mathematical models are very straightforward, but probably not very useful and difficult to test empirically.

If we follow Knight in distinguishing between risk and uncertainty, then risk describes situations where certain outcomes or prospects are subject to chance, but the chance mechanism may be considered as known, and probability theory has some application. True uncertainty is found in a situation where the chance mechanism is not known, and in the case of the purchase of stock exchange equities,

the investor is faced with true uncertainty.⁵⁹

It may be useful to quote Graham at this stage, namely, that "...there is a special paradox in the relationship between mathematics and investment attitudes on common stocks, which is this: Mathematics is ordinarily considered as producing precise and dependable results; but in the stock market the more elaborate and abstruse the mathematics the more uncertain and speculative are the conclusions we draw therefrom. In 44 years of Wall Street experience and study I have never seen dependable calculations made about common-stock values, or related investment policies, that went beyond simple arithmetic or the most elementary algebra. Whenever calculus is brought in, or higher algebra, you could take it as a warning signal that the operator was trying to substitute theory for experience, and usually also to give to speculation the deceptive guise of investment."⁶⁰

This view expressed by Graham appears to be very true and apt. The reason for this is that the combination of exact or precise mathematical formulae with highly imprecise assumptions about expected future growth, may result in some absurd value for a given issue, or any value, one really wishes to place on such an issue.⁶¹ The point is that no one given value, or range of values can be maintained, even by a growth company, and the market price of a share, being only a 'temporary equilibrium' price, will tend to be rather volatile. We cannot say to what extent expectations in the future will tend to diverge or converge, or to what extent speculation may either lead to price increases or decreases. There is also no guarantee that a company can maintain dividends during adverse economic years, and when such adverse conditions will come nobody can tell. Changes in the growth rate of the economy will also affect some companies more than others, and optimistic assumptions about the growth rate of earnings, especially if projected sufficiently far into the future, may lead to rather spurious valuations with the aid of higher mathematics. Favourable conditions pertaining to one individual company are something to look for, but not

59. See chapters VI and VIII.

60. Graham, B., "The New Speculation in Common Stock", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments: Selected Readings, p.175.

61. Also see Durand, D., "Growth Stocks and the Petersburg Paradox", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments: Selected Readings, pp.179-193.

necessarily something which one should 'pay' for. Public optimism about the future prospects of certain issues certainly drives the price above the real investment worth, unless one is prepared to hold the issue for a considerable period of time, which only enhances the market risks.

H. Growth

It is normally maintained that a share has growth prospects if the earnings-per-share has increased, over a representative period of time, by more than the average rate of other issues, and when it is expected that this will continue in the future. A growth company is sometimes defined as a company which is entering a phase of rapid expansion or development, and it is expected that the shareholders will reap considerable benefits in the form of a high growth rate in the earnings per share and dividends, in asset protection through a high rate of growth in the asset portfolio and tangible net worth, and capital appreciation through increased stock exchange prices. Kotler considered a growth share to be one "...which has shown for a number of years and/or is showing annual percentage increases in net earnings which substantially exceeds the long-run growth rate in the economy."⁶² This is rather dangerous, since different sectors grow at different rates, which may change substantially over time.

It has already been pointed out that growth rates of earnings cannot be estimated, and therefore, growth shares cannot be easily isolated from others or valued with any degree of confidence. One question which certainly cannot be answered is for how long into the future such past trends will be maintained, or as Graham, Dodd and Cottle (as well as Rayner and Little) pointed out, the element of uncertainty as to the magnitude of changes in the rate of growth and the uncertainty of duration into the future will always be present. This simply implies that some so-called growth shares, at a point of time, may be an unsound or a bad investment. An individual investing in growth shares at the wrong time will not only be disillusioned or disappointed, but he may also incur heavy capital losses. The price, value and quality of a given issue are subject to violent fluctuations, as pointed out before. According to Graham, Dodd and Cottle, growth shares have

62. Kotler, P., "Elements in the Theory of Growth Stock Valuation", reprinted in Lerner, E.M., editor, Readings in Financial Analysis and Investment Management, p.355.

become speculative in nature in the United States of America.⁶³

We must also realise that there is no optimum size for a given company. The rate of growth of earnings has nothing to do with size, and it will be difficult to decide on the most profitable size for any given company or group of companies. There may be an initial period when earnings grow gradually, followed by a period of rapid growth, and this is again followed by a period of consolidation when the rate of growth levels off. Each company must, however, be studied on its merits and the rate of growth of earnings will be influenced by a number of factors, such as the marginal productivity of investment, operating efficiency, the rate of expansion of markets, the ease with which additional capital can be raised, plough-back rate, the efficiency and skills of management, the special risks of the company and the industry in which it is operating, the degree of diversification, economies of scale, the degree of competition and whether the product has close substitutes, and the general economic and political climate.

Growth shares tend to have certain characteristics. We have already pointed out that growth shares will tend to sell on the stock exchange at a low dividend and earnings yield and a high multiplier. It is also normally assumed that a growth share will out-perform other issues on the market, that is, the price will increase at a faster rate than other issues, and during times of adverse market and economic conditions, the price will not decline as rapidly and fall to the same low levels as other issues. This implies that the price will normally be carried above previous highs, and will not decline to previous lows. The price-earnings ratio and dividend yield may fall out of line with what could be reasonably expected. The fact is that the market may pay too much for the anticipated growth potential.

The timing is one very important factor. As we have stated, a growth share will tend to sell at a high multiple of earnings and at a low dividend yield. An individual who buys such a share must feel confident that the growth will continue and eventually manifest itself in a rapid growth in the dividend rate and the price of the share, giving a satisfactory rate of return on the initial outlay. The growth must continue for long enough to justify the price paid. At the time of purchase the share might already be overvalued by the market and the

63. Graham, B., Dodd, D.L. and Cottle, S., Security Analysis, 4th edition, p.58.

high price-earnings ratio which the individual paid might not be justified. We may again generalise and state that if the dividend yield is lower at the time the share is sold out than at the time the share was purchased, it means that during the time the share was held the price of the share has increased at a faster rate than the growth in dividends. In such a case the high-multiple paid would have been justified as the share was not yet overpriced in the market. Conversely, if the dividend yield at the time the share is sold is higher than at the time of purchase, it means that the rate of increase in price lagged behind the growth in dividends. This means that at the time of purchase, the share may have been overvalued already, and that the high earnings multiple may not have been justified. The expected rate of growth in dividends and price may or may not materialise, depending on whether P_0 fully reflects the growth or not. If P_0 does not fully reflect the impending growth the individual's expectations of a growth in dividends and price may be confirmed at some future point of time, but if P_0 more than reflects the expected growth in the dividend rate and price, he will find that the purchase was after all not very sound or profitable, giving an unsatisfactory rate of return on the capital invested.

When dealing with the price-earnings ratio, we have already reported the findings of Nicholson and others. The factor of timing is thus one of the most important considerations, and the individual should try to establish whether the current price reflects an overvalued or undervalued situation; this is again a subjective matter. The risk inherent in the case where P_0 already reflects an overvalued situation is that the individual will pay a price for a prospect which does not any longer exist. In this case the market took an over-optimistic view of the future earning power of the asset portfolio, or over-optimistic view of br , the rate of return on plough-back, or the rate of growth in dividends, g , which is equal to br .

Estimating the distant future is a risky business, and the price of a share, if it is selling at a high multiple of earnings, may already be discounting, not the immediate future, but the 'hereafter'. The question the individual should ask himself before he commits his funds to a so-called growth share is 'what rate of growth is implicit in P_0 , or what rate of growth over the next few years is required to justify P_0 ?' In the purchase of so-called growth stocks, price is the most

important risk-factor. There is thus an investment risk inherent in the purchase of a share selling at an unnecessarily low dividend yield or high earnings multiplier. We have stated that the timing of the purchase of a so-called growth share is important. On the selling side it is equally important. Conklin⁶⁴ pointed out that there are risks involved in the prolonged holding of growth shares, as they may become vulnerable in the market, and once the label of 'growth share' disappears, the price may be subject to severe decline, in other words, the theory that growth shares must always be accumulated and never sold is dangerous. It should, above all, be realised that a rapid rate of growth in earnings and dividends over a representative past period cannot continue forever, and to take the past as a guide to forecast the future may be an expensive pastime. The past growth rate is but one of the many variables in forecasting the future growth rate.

The process of valuation of a growth share is not different from the processes which we have discussed in the previous sections, and repetition will be avoided. We fail to see how valuation of growth shares would materially differ from the general valuation model given previously. An individual purchasing a growth share should, however, very carefully investigate the relationship between current price, P_0 , the current dividend, D_0 , the expected growth rate, g , and k , the discount factor used. In calculating g , the selection of the base year will be important. In dealing with growth shares investment analysts sometimes suggest that g , the expected growth rate of dividends and P_0 be scaled upwards or downwards according to whether the share is of a premium or discount investment quality. To define investment quality clearly is, of course, impossible, as it is a subjective matter. Each individual will arrive at a subjective P_0 depending on his own subjective forecasts of g , and his k , both of which are subject to a number of factors. The latter argument has been briefly explored in the previous section where it was shown that an infinite price will result when g is greater than k , or eventually becomes greater than k . It will, therefore, be necessary for k to be greater than g in calculating finite prices.⁶⁵

64. Conklin, G.H., "Growth Stocks - A Critical View", reprinted in Lerner, E.M., editor, Readings in Financial Analysis and Investment Management, pp.349-354.

65. Also see Durand, D., "Growth Stocks and the Petersburg Paradox", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments: Selected Readings.

Durand in his article emphasised the difficulties and pitfalls in the appraisal of growth stocks. The shortcoming in our previous section, where a valuation model was given, was the fact that we considered the present value of a forecast dividend stream (which was expected to grow exponentially) to be represented by the sum of all forecast dividend streams discounted at a uniform rate. The discount rate should vary from payment to payment, and very remote dividends and large dividends should, of course, be discounted at a very high rate. The main reason for this is that the individual will not be prepared to pay an excessive price and thus risk a very large sum of money for a larger sum in the remote future and whose attainment is infinitely remote as time (n) approaches infinity. In any event our resources are limited and money has some utility.

We have stated above that the element of time and timing is important, and the growth rate of a company, which may be initially high, or higher during a given period than other companies, will slow down. An initially high earnings multiplier or a high earnings multiplier during a given period, will be likely to fall sometime in the future. When a high rate of growth will come to an end, no individual will know, and in this sense the purchase of a growth share may even be considered riskier than the purchase of a so-called non-growth share.

In a model constructed to show how important the duration of growth is, Holt⁶⁶ assumed that the growth of earnings per share will continue at a high exponential rate until some point of time in the future, and then the rate of growth drops abruptly to the average rate of non-growth companies. In this sense the duration of growth is a selected 'time duration of the high growth rate' and is an expectational magnitude. On this basis "...companies with long durations of growth should be valued more highly than those with short durations of growth, other things being equal. Also companies with high growth rates of earnings should be valued higher than companies with low growth rates, other things being equal."⁶⁷ (The one unfortunate

66. Holt, C.C., "The Influence of Growth Duration on Share Prices", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments: Selected Readings, pp.194-203.

67. Ibid., p.196.

part is that in the real world 'other things' are not normally equal, and such qualifying clauses deprive the theory of all practical value.) The Holt-model is based on an analysis for determining whether a high price-earnings ratio for a given share is justified or not, by considering the duration of growth estimate implicit in the market price.

I. Market Analysis

1. General

In the first part of this chapter we have devoted some space to security analysis. As we have pointed out it is necessary to distinguish between security analysis and market analysis. We consider the former more important than the latter, and this section will be very brief, although we feel that an individual should look at both before committing his funds to a given issue for the purpose of long-term investment. Market analysis and security analysis are supplementary, and one is not a substitute for the other. They must be integrated.

However, some people place considerable emphasis on the history of price movements of a given share, or on indices constructed of given groups of shares. Here we would already like to point out that an index or average of a group of shares may move in the opposite direction to some of its component parts.

One of the main objectives of market analysis is to establish when to buy and when to sell; these decisions are then based on the price movements of a given security or on the movements of certain indices.

An individual devoting his energies to a study of the price movements of a given security is known as a chartist. It is claimed that the chartist also considers general economic and political developments, as well as the fundamental factors of a given security. However, Graham, Dodd and Cottle pointed out that "1. Chart reading cannot possibly be a science. 2. It has not proved itself in the past to be a dependable method of making profits in the stock market, at least not one available to the general public. 3. Its theoretical basis rests upon faulty logic or else upon mere assertion. 4. Its vogue is due to certain advantages it possesses over haphazard speculation, but these advantages tend to diminish as the

number of chart students increases."⁶⁸

Two interesting articles by Seligman appeared in Fortune, (both reprinted in Wu and Zakon), the first being 'Playing the Market with Charts' and the second 'The Mystique of Point-and-Figure'. In the first article Seligman maintained that the pure technician or chartist (as opposed to the fundamentalist) claims that charts may, in certain respects such as the volume of turnover, serve a useful purpose by showing public interest, and whether a price movement occurred in a thin market or whether the price movement was accompanied by a large turnover, and so forth. However, he concluded that charting is not a useful device in playing the market.

In the second paper Seligman described the now fashionable point-and-figure method, as opposed to the bar charts described in the first paper. After a careful study of this method he appeared to have very little confidence in it. Some suggested the use of the Advance-Dcline Line, and suggested that this would give a better picture of the market than any average. The Advance-Dcline Line is arrived at by subtracting declines from advances. The differentials, which will be negative when declines exceed advances, are added every day to give a cumulative, continuous total. When charted as a series the cumulative differentials between the advances and declines form the Advance-Dcline Line. It shows the number of issues advancing and declining, and the trend shows whether bullish or bearish sentiment is increasing or decreasing.

On the whole, however, charting is not accepted as being of much practical use. The reasons for this may be found in the discussion below on the random character of stock exchange security prices. In the previous chapter we have maintained that both the demand and market-supply functions are governed by expectations. It was also pointed out that expectations and multiperiod plans are subject to changes and that new expectations are formed at different points of time. The point is that we do not know how expectations will change in the future, and we do not know how these changing expectations will influence the future demand and supply functions, and thus price. The expectations of individuals regarding earnings, dividend rates, interest rates, and so forth, will be inherently restless, and prices will be volatile.

68. Graham, B., Dodd, D.L. and Cottle, S., Security Analysis, 4th edition, p.713.

Furthermore, prices will change for changes in the capital structure, asset values, and the terms of new rights issues, split-ups, changes in management and the reputation of management, stock market psychology, changes in the cost structure, and the general economic and political climate. A change in any of the above factors will influence expectations, and the magnitude of price changes will be of a random character. The attitude of the investing public towards a given issue can change considerably, and this will be reflected in bids, offers and market price.

2. The Random Character of Stock Exchange Prices

Considerable research has been undertaken in this field and the random-walk hypothesis of share price movements has received considerable support. Work done in this field has come mainly from mathematical statisticians and not from business or theoretical economists. A collection of the more important works is to be found in The Random Character of Stock Market Prices, edited by P.H. Cootner, which contains excellent articles by Roberts, Kendall, Granger and Morgenstern, Osborne, Alexander, Mandelbrot, and others. By the very nature of the problem investigated, these articles are of a mathematical and technical nature, the complexities of which will be entirely avoided in this discussion.

Whether stock exchange price changes follow a random walk or not is still a controversial matter. The stochastic nature of the prices is analysed in terms of one major question, namely, whether there is substantial evidence that any historical data about the price of a given share will enable an individual to improve his forecasts of the future market price or performance of the share, and thus, to improve his chances of making capital gains. The assumption that share price changes can in theory be forecast by a detailed investigation or analysis of previous price fluctuations has been found to have very little, if any, empirical support. This is due to the random character of the magnitude of such price changes, which is now considered by statisticians to be analogous to the well-known Brownian Motion of molecules, and other stochastic processes, that is, the physical motion of a particle subject to random shocks. Any prediction or forecast will do no better than a random forecast.

Rayner and Little in their investigations⁶⁹ worked with dividend yields rather than market prices, on the premises that a long-term investor who is concerned with the future prospects of a company should be interested more in the dividend yield than in short-run price movements, the latter implying that the individual only buys a security for income and not capital gains. In the previous chapter we have pointed out that it is not necessary to distinguish between capital and income. The capital gain an individual expects to make is really an ingredient part of the expected or resultant yield. The return an individual gets really consists of the future dividend stream plus or minus the capital gain or loss at the time of selling out. The future changes in dividend pay-out rates may be of a random character, and so will be the price changes.

Roberts published an important paper on the random-walk hypothesis. In this paper⁷⁰ he concerned himself with some of the more important methodological issues. His approach is locked up in what is normally referred to as the heuristic approach. He pointed out that some market analysts believe that the historical data contains patterns that will give a clue to the future, provided that the past patterns can be properly interpreted and fully understood. Some even maintain that all we need do is to analyse and study the past patterns in a technical fashion.

Roberts pointed out that technical statistical analyses may not be very useful, and in any case some subjective judgment is involved in the application. He also contended that the "...usual method of graphing stock prices gives a picture of successive levels rather than of changes, and levels can give an artificial appearance of 'pattern' or 'trend'!"⁷¹ Furthermore, chance behaviour itself produces 'patterns' that "...invite spurious interpretations."⁷² This really means that the

69. Rayner, A.C. and Little, I.M.D., Higgledy Piggledy Growth Again.

70. Roberts, H.V., "Stock Market 'Patterns' and Financial Analysis: Methodological Suggestions", reprinted in Cootner, P.H., editor, The Random Character of Stock Market Prices, the M.I.T. Press, Cambridge, Massachusetts, 1964, pp.7-16. (Any pages cited will refer to the latter publication.)

71. Ibid., p.8.

72. Loc. cit.

charting of past market prices over a representative period of time masks the possibility of a random factor in the actual determination of prices, because such randomness may itself enter into the changes of prices.

Furthermore, these random changes, if examined statistically, show that the history of market levels behaves as if the levels had been produced by a cumulation of results given by an extremely simple chance model, producing some systematic-looking patterns in the levels. One must really analyse price levels as well as price changes, the latter being more significant. However, if there is a random walk or process, then it is a waste of time to analyse past data and changes in order to forecast future price changes. If a certain pattern is discovered by looking at historical data, we feel that it does not imply that this pattern was predictable or that a future pattern can be forecast.

The investigations undertaken by Kendall, confirming the random-walk hypotheses, are probably the best-known.⁷³

Kendall analysed the Actuaries' Index of Industrial Share Prices for the London Stock Exchange for the period 1928-1938. His main object, using lags of from one to twenty nine weeks, was to test whether there was any relationship between the change in the market price this week, and that of one week earlier, or two weeks earlier, and so on to twenty-nine weeks earlier. Kendall's results, broadly speaking, are that

- (1) "In series of prices which are observed at fairly close intervals the random changes from one term to the next are so large as to swamp any systematic effect which may be present. The data behave almost like wandering series."⁷⁴
- (2) The result is that one can hardly distinguish between a genuine wandering series and a series wherein the systematic element is weak.
- (3) Unless the problem in (2) is solved, trend fitting, (or the construction of a workable model), is a hazardous and complex undertaking.

73. Kendall, M.G., "The Analysis of Economic Time Series....Part 1: Prices", reprinted in Cootner, P.H., editor, The Random Character of Stock Market Prices, pp.85-99.

74. Ibid., p.85.

- (4) Kendall doubted the validity of results obtained from aggregative index numbers, even if they behaved more systematically than their component parts, that is, an index may show serial correlation, whereas the individual industries did not. It is thus clear that an index can show a relationship which is opposite to the individual component parts constituting the index.
- (5) The analysis of share price movements revealed little serial correlation within the series, and little lagged correlation between series. No predictions of price movements, even for a week ahead, are possible. Furthermore, it is impossible to use the price changes of a given industry to predict price changes in another industry.

From the above we may then conclude that the construction of series and trends over time does not help an individual much since there is hardly any connection between price changes over time. Kendall concluded that "Such serial correlation as is present in these series is so weak as to dispose at once of any possibility of being able to use them for prediction. The Stock Exchange, it would appear, has a memory lasting less than a week except perhaps for Investment Trusts, Stores and Catering and all series together. It may be, of course, that series of individual share prices would behave differently; the point remains open for enquiry. But the aggregates are very slightly correlated and some of them are virtually wandering."

"Investors can, perhaps, make money on the Stock Exchange, but not, apparently by watching price-movements and coming in on what looks a good thing. Such success as investors have seems to be due (a) to chance, (b) to the fact that at certain times all prices rise together so that they can't go wrong, (c) to having inside information so that they can anticipate a movement, (d) to their being able to act very quickly, (e) to their being able to operate on such a scale that profits are not expended in brokers' fees and stamp duties. But it is unlikely that anything I say or demonstrate will destroy the illusion that the outside investor can make money by playing the markets, so let us leave him to his own devices."⁷⁵

75. Kendall, M.G., "The Analysis of Economic Time Series Part 1: Prices", reprinted in The Random Character of Stock Market Prices, pp. 92-94.

Kendall's research is considered as very strong evidence of the fact that share prices follow a random walk and that the magnitude of share prices cannot be predicted. It is clear from Kendall's investigations that any knowledge of past price changes does not mean that any knowledge of future price changes can be derived from that historical picture. It appears that if an individual already holds a given security it is also a matter of getting out in time. The point is, however, that timing can never be perfect. It will be a subjective matter, and the individual may expect the next move to be up or down. His actions will again depend on the confidence with which he holds a given expectation.

The analogy between share price movements on the stock exchange and the movement of molecules in a liquid or a gas appears to be very apt. The movement of a molecule in a liquid or gas is known as Brownian Motion. Osborne discussed this analogy in two interesting articles.⁷⁶

In his first paper Osborne maintained that "...the logarithms of common-stock prices can be regarded as an ensemble of decisions in a statistical steady state, and that this ensemble of logarithms of prices, each varying with the time, has a close analogy with the ensemble of co-ordinates of a large number of molecules."⁷⁷ By comparing the two Osborne showed that share prices must follow a random walk, since the movement of molecules in a gas or a liquid depends on the chance contacts with the large number of other molecules in the area. We do not know what the position of the molecule will be next. It should be noted that Osborne, in his first paper, used the logarithm of price change and not the arithmetic value.

In his second paper Osborne analysed the sequential or across-the-market dispersion of price changes, in other words, he examined the distribution of price changes for certain firms. He also showed that there is evidence of "...strictly periodic behavior in the volume for intervals of a day, week, three months and one year, and

76. Osborne, M.F.M., "Brownian Motion in the Stock Market" and "Periodic Structure in the Brownian Motion of Stock Prices", both reprinted in Cootner, P.H., editor, The Random Character of Stock Market Prices.

77. Ibid., p.160.

hence by implication a periodic oscillation in the across-the-market dispersion of price change for the same interval of time."⁷⁸ In other words, there is a time periodic structure in prices. Although there may be such a structure, prices do not show a pattern over time.

We feel that since we do not know how expectations will change over time, we will not know how demand and market-supply will behave in the future. The magnitude of a price change, accompanied or unaccompanied by activity volatility, will depend on the extent to which expectations either diverge or converge. The extent to which expectations and multiperiod plans change, will again be a function of market knowledge or any fresh news which reaches the actual and potential market participants, and how the information or news is interpreted. If this news or new information is of a random character, and also not equally quickly diffused throughout the market, then it must also be expected that changes in these 'temporary equilibrium' prices must be random movements, that is, they are statistically independent of one another. By summing random movements, the prices may appear to some observers as a pattern or cycle. This is not the case. Past price series can tell us nothing about the magnitude of future price changes or levels. The Brownian Motion of the physicists aptly describes the random-walk of stock exchange price movements.

This again brings us back to the distinction between fundamentalists and technicians (or chartists). In this respect Alexander's investigations are particularly significant and interesting.⁷⁹

In his first article Alexander contended that "...professional analysts operate in the belief that there exist certain trend generating facts, knowable today, that will guide a speculator to profit if only he can read them correctly."⁸⁰ These facts are believed to generate trends. All those who gain knowledge before anybody else stand to gain more and to profit.

78. Osborne, M.F.M., "Brownian Motion in the Stock Market" and "Periodic Structure in the Brownian Motion of Stock Prices", both reprinted in The Random Character of Stock Market Prices, p.275.

79. Alexander, S.S., "Price Movements in Speculative Markets: Trends or Random Walks" and "Price Movements in Speculative Markets: Trends or Random Walks No. 2", both reprinted in Cootner, P.H., editor, The Random Character of Stock Market Prices.

80. Ibid., p.199.

The fundamentalists will study the general economic conditions and devote considerable time to security analysis, which we have discussed in the earlier part of this chapter. The technician also adopts the attitude that certain facts currently existing will govern prices at some future time, and he studies the history and movements of market prices to serve as an indication of future prices. The technician is more concerned about market analysis and not security analysis. There is thus a complete difference in approach, but as Alexander pointed out, both schools believe in the existence of some trends. When these stock exchange operators talk about a trend they normally refer to a smooth underlying movement on which the short-run fluctuations are superimposed. The path a share price might follow is then considered as a smooth underlying trend or cycle of which the direction changes only very infrequently, and superimposed on this the short-run upward and downward fluctuations, which are due to a number of factors, including the technical position of the market.

Alexander tested the possibilities of random walks and trends by studying the first order serial correlations of Kendall's data, but using longer intervals of differencing. Taking the longer intervals the influence of the short-run random fluctuations should become smaller and smaller, and the effect of the trend, if such a thing does exist, should become more dominant. Alexander, in the first part of his first paper, supported the random walk hypothesis. The second part of his paper he devoted to an investigation in an effort to establish whether a trend does exist. For this purpose he used the 'filter technique', that is to filter away the short-run fluctuations in prices to establish whether a long-run smooth underlying movement can be detected. Alexander used the filter as follows. He selected a 5 per cent filter, and applied the following rule, namely, if the price moves up by 5 per cent or more, the operator must go long and stay long until the price again moves down by 5 per cent and then sell and go short until the price again moves up by 5 per cent. All movements in price of less than 5 per cent must be ignored. The smaller or the more stringent the filter the fewer losses are made, or losses are minimised by the use of a filter, but also the smaller the gain for any move in the price in excess of the filter. Alexander demonstrated that the smaller the filter the safer the position of the operator, but the profit margin is small, and the magnitude of profits will depend on the volume of turnover. With a

5 per cent filter, ignoring dealing expenses, the operator still incurs a loss of any movement in price between 5 per cent and 10.53 per cent, for example, should the price move from 100 to 110.53, then the operator would go long at 105, and sell at 105 (110.53 minus 5 per cent), and just break even, ignoring dealing expenses. With an increase in the size of the filter the number of transactions will be reduced, and the gains on large moves will be reduced and the losses with a large filter will probably be larger, although losses on small price movements are eliminated. He found that smaller filters yield the highest profits and are, from the point of view of profits, more remunerative than the 'buy and hold' method.

Using American indices he calculated considerable gains by using a 5 per cent filter from 1897-1959. He then concluded that there are "...trends in stock market prices, once the 'move' is taken as the unit under study rather than the week or the month."⁸¹ He summarised the findings in his first paper by stating that "...in speculative markets price changes appear to follow a random walk over time, but a move, once initiated, tends to persist."⁸² In other words, the finding of "...a random walk over the time dimension is quite consistent⁸³ with non-random trends in the move dimension. Such a trend does exist." The random walk hypothesis is thus based on investigations over some constant time period, whereas the filter technique is concerned with the magnitude of the move itself, irrespective of the time period involved.

In his second paper Alexander reviewed the findings of his first paper, particularly with reference to the technique of filtering. The findings in his first paper were based on daily closing prices of industrial averages on the New York Stock Exchange for computing gains and losses from the utilisation of the filter technique. He also pointed out that it is more convenient to use a logarithmic filter than a percentage filter.

Rayner and Little correctly criticised the first paper particularly on the grounds of the use of closing prices.⁸⁴ They

81. Alexander, S.S., Op. cit., p.215.

82. Ibid., p.218.

83. Loc. cit.

84. Rayner, A.C. and Little, I.M.D., Higgledy Piggledy Growth Again, p.105.

maintained that during any given day, the price of the share may have fluctuated widely enough to have triggered off the filter mechanism. By using only closing prices, the position might have been reversed, with the result that the filter was not triggered. Losses would have been made on each of these transactions, since they were short-swings which did not last until the end of the day. Actual price movements must therefore be used for the filter mechanism to be of any use, and profits will be less once the bias is removed.

Alexander recalculated his profit figures obtained in his first paper to allow for this bias and found them to be substantially lower than the original figures shown, and the 'buy and hold' method proved as profitable, or even more profitable, than the use of the filter technique. He found that "...filters only rarely compare favorably with buy and hold,..."⁸⁵ Alexander admitted that the big bold profits of paper 1 must be replaced by rather puny profits, and that 'the fun has gone out of it somehow'. From this one must conclude that the use of a filter technique by an individual will not be an additional aid in an effort to make money on the stock exchange.

Granger and Morgenstern⁸⁶ used what is called spectral analysis. They considered a discreet time series, and they established some pattern in price movements over time. Their data confirms the random-walk hypothesis for short-run price movements, but they found some long-run features which cannot be explained by a random-walk model. However, they did not find a strong cyclical pattern of price movements, and they considered cyclical investment only marginally worthwhile. The conclusion is really that individual share price changes follow a random walk.

In some sense Osborne, Alexander, and Granger and Morgenstern found some deviation from the pure random models of others, but the deviation was small when compared with the overall closeness of the figures to the random path. The random-walk theory must still be accepted, as it has not yet been theoretically refuted. An analysis of past price movements in the form of charts, undertaken by the technicians, cannot form the basis for predicting the magnitude of future price changes or price patterns. To make money on the stock

85. Alexander, S.S., Op. cit., p.344.

86. Granger, C.W.J. and Morgenstern, O., "Spectral Analysis of New York Stock Market Prices", reprinted in Cootner, P.H., editor, The Random Character of Stock Market Prices.

exchange, the individual will have to act faster than the market as a whole to any news about the prospects of a given share. A study of the past history of prices and an analysis of the company or security (to which some attention was given at the beginning of this chapter) must be undertaken to evaluate a security and to make some profit.

Whether he is concerned with the fundamentals of security analysis or with the prediction of prices, the individual should not attach too much weight to his own forecasts. Furthermore, even if the fundamentals are sound, the price of the share may already be too high, and conversely, the fundamentals may be poor, but the price so low that an investment may not be entirely irrational. We feel that security analysis has certain advantages over market analysis, and the latter may be considered not very useful, particularly in the light of the random-walk hypothesis.

J. Fixed-Interest Securities

Under this heading we include public sector stocks of all kinds, and debentures, notes, and non-participating, but redeemable preference shares issued by the private sector. In chapter V, we have already indicated that there are differences between these securities from the point of view of safety of principal, stability of income, marketability, control, risk, and so forth. In this section we are primarily interested in calculating the different yields on these securities, and thus group them together.

1. Yield

The individual must bear in mind that fixed-interest securities issued by the private sector are subject to the risks inherent in the issuer, and default cannot be ruled out. In the case of securities listed on foreign stock exchanges there is a risk of moratorium or repudiation of debt, for example, Japanese bonds and the 1906 Russian bonds.

Although government and other public fixed-interest securities (including South African Reserve Bank stocks) are, as far as principal payment and interest payments are concerned, virtually riskless, these securities are still subject to price volatility on the stock exchange. This is, of course, due to the inherently restless nature of the rates of interest (including yields on equities.) According to the Stock Exchange Commission Report

"The price of long-term Government stock has since 1946, on the basis of a 3 per cent coupon rate, which was representative about that time, fluctuated between R152 and R88 per R100 and in the case of the Reserve Bank Stock, between approximately R295 and R160, giving a yield, in the case of the former, of between roughly $2\frac{1}{2}$ and $5\frac{7}{8}$ per cent and in the case of the latter, of roughly between $3\frac{3}{8}$ and $6\frac{1}{4}$ per cent."⁸⁷ Capital gains and losses can thus occur on fixed-interest securities in the same manner as on ordinary shares.

A large variety of institutional investors (including intermediaries) invest in gilt-edged stocks. Apart from the legal requirements, the popularity of gilt-edged stock and the high level of demand for them, lies in the relative risklessness of gilt-edged securities.

The date of maturity will play an important part in calculating yields and present value, and possible gains if held to maturity. The difference between the par value of the stock and the purchase price on the stock exchange will determine the extent of the capital gain or loss if the stock is held until the date of maturity. This capital gain or loss, if taken over the life of the stock, or over the period for which the stock is being held, (stocks need not be held until maturity and substitution will take place when it is advantageous to do so), constitutes an adjustment to the rate of return. We must, therefore, distinguish between the flat yield and redemption yield or current yield and net yield. The redemption yield is calculated accurately on a compound interest basis. However, Dowrie, Fuller and Calkins gave an arithmetical approximation formula for a ~~£~~\$1,000 bond, which is usually correct within 0.1 per cent for maturities up to 20 years. The formula is:-

$$Y = \frac{[C - (P - 1,000)] / n}{(P + 1,000) / 2} \times 100,$$
 where Y is net yield, C is the coupon amount for a \$1,000 bond, P is the market price of a bond, and n the number of years to maturity.⁸⁸ For example, let us take a R100 stock, with a coupon rate of 5 per cent, maturing 10 years from the date of purchase. The market or purchase price is R80. The purchaser will gain R20 or R2 per annum if the stock is kept to maturity.

87. Report of Commission of Inquiry into the Stock Exchange, para. 31, p.5.

88. See Dowrie, G.W., Fuller, D.R. and Calkins, S., Investments, 3rd edition, p.97.

Add the R2 to the R5 interest receivable annually, and divide this by $(P + 100) / 2$, the average value for the ten years. We then obtain:-

$$\frac{50 - (80 - 100) + 10}{(80 + 100) + 2} \times 100$$
$$= \underline{7.777 \text{ per cent.}}$$

The flat yield and redemption yield can be shown with the following very simplified example. The flat yield on a stock with a par value of R100, paying 5 per cent interest on par value, will be $6\frac{1}{4}$ per cent if the stock is purchased on the stock exchange for R80. If the stock is held until the date of maturity, the holder thereof will make a capital gain of R20.00 over the period of ten years, or R2.00 per annum. This R2.00 per cent per annum, if we add it to the flat yield of $6\frac{1}{4}$ per cent, or R6.25 per cent, would give a redemption yield of R8.25 per cent. (This rough arithmetical calculation is only to illustrate that if a stock is purchased below par or redemption value, or above par value, and is then held until the date of maturity, an increased yield or a decreased yield is obtainable respectively.) If the fixed-interest security is purchased at face value (at par) then the yield will be equal to the interest rate or coupon rate, otherwise the yield and coupon rate will diverge. Using this rough arithmetical calculation and the above formula, the difference on redemption yield over the 10 year period amounts to 0.473 per cent.

Three formulae are given by Merrett and Sykes which give an approximation of the yield to redemption.⁸⁹ The following terms are used in the formulae:-

- p_0 = the purchase price of the stock
- p_n = the redemption or terminal payment on the stock
- n = the period of the stock at which interest payments are made
- A = the amount of interest payments per period
- i = the annual yield on the stock.

The first formula corresponds to the one given by Dowrie,

89. See Merrett, A.J. and Sykes, A., The Finance and Analysis of Capital Projects, pp.17-19.

Fuller and Calkins, and is called the method of averages. In this case

$$\begin{aligned} i &= \frac{nA + p_n - p_o}{\frac{1}{2}n(p_o + p_n)} \times 100 \\ &= \frac{10 \times 5 + 100 - 80}{5(80 + 100)} \times 100 \\ &= \underline{7.77 \text{ per cent}} \end{aligned}$$

(When i is smaller than 7 per cent, the answer is also accurate to one-tenth of a per cent.)

The second formula is more accurate, and when i is smaller than 7 per cent, it is accurate to within one-hundredth of a per cent. Here

$$\begin{aligned} i &= \frac{A - \left(\frac{p_o - p_n}{n} \right)}{p_n + \frac{n+1}{2n} (p_o - p_n)} \times 100 \\ &= \frac{5 - \frac{(80 - 100)}{10}}{100 + \frac{10+1}{20} (80 - 100)} \times 100 \\ &= \underline{7.865 \text{ per cent}} \end{aligned}$$

The third formula is considered the most accurate, and reads

$$i = \frac{A - \left(\frac{p_o - p_n}{2} \right) \left(\frac{1}{S_{\overline{n}|i_1}} \right)}{p_o}$$

where i_1 is an estimate based on the second formula. Taking i to be 7.5 per cent, and using $S_{\overline{n}|i}$ tables, then $S_{\overline{n}|i_1} = 14.14709$.

The yield is then

$$\begin{aligned} &\frac{5 - \left(\frac{80 - 100}{2} \right) \left(\frac{1}{14.14709} \right)}{80} \times 100 \\ &= \underline{7.13 \text{ per cent}} \end{aligned}$$

Let us now consider the interest to be paid semi-annually and then find i , the yield to redemption. The stock pays 5 per cent per annum, and was purchased for R80, and is redeemable at par, that is, R100, in 10 years' time. The solution to this problem has no exact

algebraic solution, and tables for $a_n \overline{i}$ and $V_n \overline{i}$ must be used and interpolated. The solution would be to solve for i in the equation $P_0 = A_n \overline{i} + P_n V_n \overline{i}$. From our previous examples we may take i to be between 7 and 8 per cent.

$$i = 8\% \quad 100V^{20} + 2.50 \overline{a_{20}} \quad (4) = R79.62$$

$$i = 7\% \quad 100V^{20} + 2.50 \overline{a_{20}} \quad (3.5) = R85.79$$

$$i = ?\% \quad = R80.$$

$$\frac{i - 7}{8 - 7} = \frac{85.79 - 80}{85.79 - 79.62}$$

$$i - 7 = \frac{5.79}{6.17}$$

$$= .94$$

$$i = \underline{7.94 \text{ per cent}}$$

2. Calculation of Present Value

According to Burton Malkiel 'Bonds are traded in terms of price, *not* yield. They are bought and sold by speculators, long-term investors and financial institutions who are vitally concerned with price movements.'⁹⁰ Malkiel then showed that a bond (stock) price or market value is determined by four factors, namely, (1) the par or face value of the stock, (2) the interest rate paid on face or par value, (3) the effective interest rate or net yield per period, where annually compounded, gives the annual yield to maturity, if held until maturity, and (4) the number of years to maturity. The market price, P , is then the sum of the present values of the interest payments received and the principal amount to be paid at maturity. This can then be summarised in the following two equations:-

$$(1) \quad P = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \dots + \frac{C}{(1+i)^n} + \frac{F}{(1+i)^n}$$

which, if we sum the geometric progression, becomes

$$(2) \quad P = \frac{C}{i} \left(1 - \frac{1}{(1+i)^n} \right) + \frac{F}{(1+i)^n}$$

90. Malkiel, B.G., 'Expectations, Bond Prices, and the Term Structure of Interest Rates, The Quarterly Journal of Economics, Vol. 76, no. 2, May, 1962, p.200.

where F = face value of stock
 C = coupon rate
 i = the effective interest rate per period
 n = the number of years to maturity.

From equation (2), the present value of the fixed-interest security is made up of two components, namely, the present value of the interest receipts and the present value of the principal. Take for example, a stock with a face value of R100, issued in 1958 and which still has 10 years to maturity. The stock pays R3 per annum, that is, 3 per cent, which is the coupon rate. Say the effective interest rate per period, or the rate of interest on new stock issued is 4 per cent. The present value of the old stock is found by discounting at the latter rate, since the latter rate is considered as an alternate. In this case i is considered to be the effective rate of interest per period, which was taken to be one year. Using equation (2) we obtain:-

$$P = \frac{3}{.04} \left(1 - \frac{1}{(1+.04)^{10}} \right) + \frac{100}{(1+.04)^{10}}$$

$$= \underline{R91.89}$$

The present value of the stock is then made up of two components, namely, the present value of the interest receipts (assumed to be annual), and the present value of the principal. Say, for example, a new stock is issued at a lower rate than 3 per cent, say, 2 per cent, then i will be 2 per cent, and the present value of the old stock will be approximately R109. The longer the date to maturity the more sensitive will P be to changes in the rate of interest. As we have previously pointed out, the capital-risk increases with the time to maturity. The closer to the date of maturity, the closer will P approach to R100 and the less sensitive will P be for changes in i .

Using tables the following would obtain for our hypothetical example:- $P = F(1+i)^{-n}$ or $V_n \over i = (1+i)^{-n}$ where V is the present value of 1 (R1) at the end of n years, discounted at the rate i .

Therefore, $V_{10} \over 4 = (1+.04)^{-10}$

$$= .675564$$

The discounted value of the principal is R67.56 to the nearest.
 The interest receipts discounted, using tables

$A_n \overline{i} = \frac{1 - (1+i)^{-n}}{i} = 8.111$. Multiplied by 3, the coupon rate, the value of the interest is equal to R24.33, and the present value of the stock is therefore R91.89. The discounted or present value of the interest stream can also be calculated by the use of the following formula, which is the same as the formula for calculating the present value of an annuity, namely,

$$A_n \overline{i} = \frac{1}{(1+i)} + \frac{1}{(1+i)^2} + \dots + \frac{1}{(1+i)^n}$$

The sum of the geometrical progression is

$$A_n \overline{i} = \frac{a(1-r^n)}{1-r}$$

Substituting the common ratio by $\frac{1}{1+i}$

$$\begin{aligned} \text{we obtain } A_n \overline{i} &= a \times \frac{1}{1+i} \times 1 - \frac{\frac{1}{(1+i)^n}}{\frac{1-1}{1+i}} \\ &= a \times \left(1 - \frac{1}{(1+i)^n} \right) \frac{1}{i} \end{aligned}$$

(The symbol for the fraction $\frac{1 - \frac{1}{(1+i)^n}}{i}$ is $A_n \overline{i}$.)

Taking our example, the present value of the interest stream will be

$$\begin{aligned} &3 \times \frac{1 - \frac{1}{(1+.04)^{10}}}{.04} \\ &= \underline{\underline{R24.33}} \end{aligned}$$

If the interest is paid semi-annually then the nominal rate must be converted to an effective rate. The present value of the principal will remain constant, that is, R67.56, but the interest now compounded semi-annually, will change.

Let us denote the nominal rate by 'j', and the effective rate of interest by 'i', which are the internationally accepted symbols. Let m be the number of conversion or compounding periods per year. If j is the nominal rate, then $i = \frac{j}{m}$

which is the interest rate per conversion period. In our previous example i was taken to be 4 per cent and the coupon or nominal rate to be 3 per cent. Compounded semi-annually the 4 per cent will actually be more than 4 per cent effectively, that is, 4.04 per cent and the coupon rate compounded semi-annually will be 3.02 per cent.

The formula used for interest conversion is $(1+i)^n = (1+\frac{j}{m})^{mn}$, which is reduced to $(1+i) = (1 + \frac{j}{m})^m$. To convert the 4 per cent and 3 per cent to effective rates we find $(1+i) = (1 + \frac{j}{m})^m$

$$= (1 + \frac{4\%}{2})^2$$

$$i = \underline{4.04} \text{ per cent}$$

3 per cent converted will be:-

$$(1+i) = (1 + \frac{j}{m})^m$$

$$= (1 + \frac{3\%}{2})^2$$

$$i = \underline{3.02} \text{ per cent}$$

The present value of the interest stream, using the effective rates of interest will be

$$P = \frac{3.02}{.0404} (1 - \frac{1}{(1+.0404)^{10}})$$

$$= \underline{R24.24}$$

The present price of the stock is therefore R98.90.

Assume that the above stock will be redeemed at a premium, say 108. The present value of the principal will change, but the interest will be the same. The present value of the principal will be

$$\frac{108}{(1.04)^{10}}$$

$$= \underline{R97.21}$$

The prices and yields of gilt-edged securities are published weekly in the Financial Mail and Financial Gazette.

K. A Note on Mining Shares

While the balance sheet provides many useful clues in valuing the property of industrial, commercial and finance companies, its reflection on the fixed assets of mining and prospecting companies is almost always a distorted one.

The cost of property as shown on the balance sheet of a mine normally bears little relation to the actual value, which is practically always altered by exploration. The actual value depends on what has already been disclosed by development, or in the case of a new mine, by the preliminary drilling results. Although worthless in valuing mining property, the balance sheet is useful in other respects; namely, it is possible to determine whether there is enough working capital for the company to carry on mining, and it can often be seen whether the company is still solvent. Where capital is inadequate and enough cannot be appropriated for capital expenditure in appropriation account, the additional capital has to be raised, either through a new issue or by sacrificing dividends, or by a loan.

A new company (the mining company) is usually formed to take over proved mining ground and several exploration companies pool their holdings to set up an economic mining area. The cost of the ground or vendor consideration is negotiated between the interested parties who simultaneously determine the number of shares each is entitled to take up in the new company.

The investor in mining shares must take account of a number of factors. In the case of a new mine it is a matter of the purchase price of the mine, the cost of all plant and equipment, the cost of development and shaft sinking, operating costs until production starts, the state's share of profit, taxation, capital amortisation, and eventually then profits to the investor. A careful distinction must, therefore, also be made between developing and already producing mines. The investor is, of course, basically interested in estimating the annual profits available for distribution that can be expected over the entire life of the mine, or its remaining life. The valuation of a stable producing mine depends largely on the life of the mine and the expected annual dividend over the entire life.

In the case of mining shares all available data must be analysed,

The quarterly reports published in newspapers will be useful. In the case of new mines, the prospectus must be carefully studied. The prospectus will include information about the proposed financial structure and about the property, as well as the significance of the borehole results as explained in the consulting engineer's report. The development programme is also usually carefully set out.

It should be pointed out at the outset that mining shares are risky investments and there are also many pitfalls and hazards in the valuation. The risks are of a geological and technical nature, accidents, faulty estimates of yield values and costs, salting of boreholes, and so forth. The risks inherent are largely reflected in the yields. The risks are really locked up in two main factors, namely, the working or operating costs of the particular mine and the recovery grade and payability. For example, in the case of a mine still in the developing stages, the valuation is hazardous and is based on borehole intersections of reefs and so forth. We have heard the expression that 'many a good gold mine has been spoiled by shaft sinking'. In the initial stages any unproved mining venture may be considered as speculative. Valuation based on borehole results may eventually turn out to have been quite wrong.

The investor must take account of a number of factors, some of which will be discussed below. He must acquaint himself with the following terms:-

A claim is a measure of area of mining territory, and is nearly $1\frac{1}{2}$ acres.

A reef is a geological layer - used more particularly to mean a layer of ore.

Development consists of shaft sinking or tunnelling for the purpose of locating and exposing the payable ore.

Stoping is the actual mining of the ore. The stope width is determined by the width of the reef being mined.

Dip - the angle of the reef with the horizontal.

Recovery - the amount of the mineral won from the ore, generally expressed as ounces, or dwts. per ton. - (20 dwts. to the ounce)

Ore Reserve is payable reef blocked out. Ore in reserve which has not yet been uncovered by development does not form part of the Ore Reserve.

Payability - Ore is payable when it has sufficient mineral content to cover the cost of stoping, extraction and handling.

Life of Mine is the estimated time in which all the payable ore on the property will be mined.

Inch-dwts - a conventional expression in gold mining obtained by multiplying the recovery rate (expressed in dwts per ton) by the width of the reef in inches. The form is convenient for comparison and gives an indication of what the recovery in actual mining is likely to be.

The life of the mine is calculated by applying the estimated milling rate to the mill tonnage. The latter depends on a number of factors, namely, the available reef tonnages in the various zones, the dip of the reef, stoping width, waste sorting, dilution of ore, and so forth.

The estimate of yield is, of course, one of the most important magnitudes. A small error of say 1 dwt of gold per ton (which at a price of R25 per ounce represents an error of R1.25), will amount to well over R1 million per annum at a milling rate of 110,000 tons per month. An estimation of development value over the various zones will have to be made, and converted into yield values. The ore reserve value, percentage extraction and so forth must be taken into account. Individuals usually work with an average or mean future yield, and trends over the life of the mine are estimated. Other income, from by-products, must also be added.

The working costs must be estimated and inflated at a rate of 2 to 3 per cent per annum. The working costs are an important factor affecting the life of the mine. Working costs can be estimated from the history of mines in the same area. To estimate working costs all expenditures must be included over the expected life of the mine.

The initial capital outlays will be high, then fall off, and increase again at later stages when new shafts are sunk. The capital and working costs also depend on the depth of the mine and mining methods. Interest on loans must be added to the working costs.

Estimates can be made on an annual basis and working profits estimated. Taxation, capital expenditure, and the state's share of profits (based on a lease formula) must be deducted from working profits to arrive at the estimated figure available for distribution

to shareholders. Taxation and lease payments are fairly high and may absorb as much as 60 per cent of the working profits, depending on how rich the mine is. Allowance must also be made for capital redemption, since mines are a wasting asset. New mines can incur an assessed tax loss by redeeming the capital expenditure (pre-production) incurred in a particular year in that year. This assessed tax loss can be carried forward to the next year. Deep level mines are granted further concessions.

Let us assume a gold mine already in production and the remaining life of the mine to be 20 years, with a milling capacity of 150,000 tons per month, or 1,800,000 tons per year. Say, the average values assayed from the payable intersections are 60 dwt over 10 inches, or 600 inch-dwts. Dividing by the stoping width of, say 60 inches, gives an average recovery of 10.00 dwt per ton milled. Say, the price of gold is R25 per ounce or R1.25 per dwt. With a recovery of 10.00 dwt the revenue per ton will be R12.50.

The cost per ton milled will depend on the stoping width, the depth of the mine and other technical problems. Let us assume the cost per ton to be R8.50. We then obtain:-

Revenue per ton.....	R12.50
Working cost per ton.....	8.50
Working profit per ton.....	R 4.00

With a milling rate of 1,800,000 tons per annum the working profit from gold will be R7,200,000. To this figure must be added the gross profit from uranium, if the mine is a uranium producer. Say, this amounts to R4,800,000. The gross profit will then amount to R12,000,000. From this figure taxation and lease payments and capital expenditure must be deducted. Say, this amounts to R6,000,000 leaving R6,000,000 to be distributed over 20,000,000 shares, giving a dividend of 30 cents per share per annum. We may assume that the company will pay R0.30 divided per annum over the life of the mine (20 years), or we may assume that the dividend will increase over the next seven years and then decline gradually until the mine starts repaying capital until it closes down.

The expected dividends over the next 20 years must be converted to present value to arrive at the estimated market value of the share.

Let us assume that the mine will pay RO.30 per annum for the next 5 years, then RO.50 for the following 5 years, then RO.30 per annum again for the next 5 years, and then RO.20 per annum for the last 5 years. To calculate the present value we will use a 10 per cent factor, which may be considered as the rate of return the shareholders expect from their invested money. We must thus calculate the present value of the stream of dividends on the basis of compound interest at a rate of 10 per cent per annum.

Year	Dividend due at the end of each year. (Rand)	10 per cent factor. 2	Present value of dividend (Rand)
1	R .30	.909	.2727
2	.30	.826	.2478
3	.30	.751	.2253
4	.30	.683	.2049
5	.30	.621	.1863
6	.50	.564	.2820
7	.50	.513	.2565
8	.50	.467	.2335
9	.50	.424	.2120
10	.50	.386	.1930
11	.30	.350	.1050
12	.30	.318	.0954
13	.30	.290	.0870
14	.30	.263	.0789
15	.30	.239	.0717
16	.20	.218	.0436
17	.20	.198	.0396
18	.20	.180	.0360
19	.20	.164	.0328
20	.20	.149	.0298
R6.50		R8.513 ³	R2.9338

1. The dividends are paid six monthly, that is, 15 cents twice a year, giving 30 cents a year. (To be more precise we should actually use discreet time calculations, which we have ignored.)
2. Present value of R1 (V^n).
3. Present value of R1 per period at 10 per cent (a_{n7}).

The price of the share should be 294 cents (R2.94) assuming that 10 per cent is required. Both the estimated life and the rate of interest will, of course, affect the present value.

The following points should be observed:-

- (1) Mines, whether gold, coal or base metals, are wasting assets and when finally exhausted, the share will have little or no

value. A prudent investor will need to amortize his investment by putting aside a proportion of his annual dividends, so that when the life of the mine draws to a close, a sufficient sum has been accumulated to recoup the original cost of the investment. To calculate amortisation, the cost of the share, the estimated life of the mine and a projection of anticipated interest rates, together with a book of compound interest tables, will be required.

- (2) Because mines are wasting assets, the investment in fixed assets such as mine claim areas, shafts, mills, hoists, etc. is largely irrecoverable. Because this is so, it is traditional for the mining industry in South Africa not to provide for depreciation of fixed assets. When mines reach the stage of 'returning capital', they merely aim at returning the par value of their shares, which will normally differ from the price paid by the investor. This cannot be considered by the investor as a return of his investment.
- (3) Owing to the nature of a mining company, the traditional policy is to distribute all net earnings in the form of dividends, after meeting necessary requirements for capital plans, loan repayments, tax and lease payments, and capital amortisation.

One must, therefore, not be misled by an apparent yield of, say 8 per cent, on a mining share, because 2 - 3 per cent of this dividend may be required to amortise the cost of the share over the remaining years of the life of the mine. In addition, one may be paying tax on a dividend that is in reality a return of capital. In the early stages of a mine the shares are highly speculative. It is only as primary development proceeds that it is possible to assess the prospects more accurately. The ordinary investor should concentrate on mines in the expanding phase of their development.

In view of the fact that some part of the dividend must be considered as a return of capital, the prudent investor will provide for a sinking fund, the form which this sinking fund will take being really a subjective matter. The investor must decide what amount of his dividend he will set aside each year. He may simply accumulate the dividends each year until he has recovered his capital, and any further dividends may be considered as interest on his investment. If he paid 300 cents for a gold share paying 30 cents dividend a year,

it will take a few years for the capital to be returned. Secondly, and probably more acceptable will be to consider some portion of the dividends as a return of capital, until his investment has been returned. The remaining portion may be considered as the yield on the investment. Two uncertainties still remain, namely the expected dividends and the period of time over which the dividends will be paid.

In our example we have taken the life of the mine to be 20 years. The original investment of R2.94 (294 cents) must be repaid over 20 years, and for this purpose a sinking fund is established. We will take 10 per cent as the sinking fund rate. A private individual could take, say, 5 per cent.⁹¹ The following formula may be used to calculate the factor:-

$$f = \frac{i}{(1+i)^n - 1}$$

where

f = factor

i = rate of interest (.10 = 10%)

n = number of years (life of mine) (20 years)

$$f \text{ is then } = \frac{.10}{(6.73) - 1}$$

= .0175. This means that for every R1

invested, 1.75 cents must be reinvested every year at 10 per cent to return R1.00 at the end of 20 years. The present value (or price) in our example was R2.94. Therefore, R2.94 x 1.75 = 5.15 cents (say 6 cents) per share must be reinvested each year. The dividend of 30 cents per share represents a yield of 10.2 per cent on the R2.94 invested. After the sinking fund deduction of 6 cents, the 24 cents dividend represents a yield of 8.2 per cent on R2.94.

The above was really a very crude exercise with reference to a particular mine. The investor should, however, establish standard methods of valuing a mine, and then compare with other mature and developing mines. Comparative analysis is again advisable.

L. Conclusions

In this chapter we have outlined some of the factors which the fundamentalist or security analyst will consider, as well as the

91. The rate ruling on bank or building society savings deposits could be taken.

problems involved in market analysis. We are of the opinion that broad economic thinking is also a prerequisite in security analysis.

In his classification of securities the individual will carefully consider the type and nature of the company and also acquaint himself with the characteristics, risks and hazards of the given industry in which the company operates. Not all the sectors in the economy will share equally in actual and potential economic growth, and even during a period of prosperity, some depressed industries and companies may still be found. We are of the opinion that industry classification is important in the process of valuation. Furthermore, it is important to ascertain the relative positions of companies within a given industry, and for this comparative analysis is a prerequisite.

The individual will also consider the prevailing conditions on the stock exchange before he commits his funds to a given class of security, or a given group of securities of the same class. There may be times when certain groups or classes of securities will be in strong demand and others not. The emphasis in the market tends to shift from time to time, and the conditions prevailing on the stock exchange will exert some influence on the individual's strategy. The individual will also consider the prevailing monetary policy, fiscal policy and important economic trends which may affect certain sectors, or industries, and which may communicate themselves to the stock exchange.

The individual will carefully investigate the financial statements of companies in an effort to establish certain trends and to focus attention on points of weakness and strength. The knowledge gained from an investigation of the financial statements must be supplemented by knowledge of the managements' future multiperiod plans. The individual must bear in mind that past financial statements are no criterion for the future.

The future performance of managements cannot be judged entirely by their past performance. Balance sheet and income statement figures cannot answer all the questions with which the individual is confronted. Quantitative statistical analysis and ratio analysis have certain limitations. A large number of intangible factors, which do not lend themselves to mechanical or statistical analysis, are involved. The whole process of valuation and the value placed on a given security by

an individual is a highly subjective matter.

We have discussed a number of ratios which the individual may consider important. The advantage of ratio analysis is that the ratios are the symptoms reflecting certain financial imbalances. The limitations of ratio analysis are, of course, that ratios do not show the underlying causes of any adverse changes in a company's financial status nor the remedies which can be applied to rectify the situation.

We have considered two methods of valuation, namely, (1) the current price of the share expressed as a function of a growing stream of dividends to infinity, and (2) the current price of the share expressed as a function of a finite stream of dividends plus some capital gain when the investor sells out at the end of period n . We have mathematically demonstrated that the two approaches are equivalent and yield the same result. The current price of the share is then a function of the expected rate of growth of dividends, (that is, the rate of plough-back, and the rate of return earned on the investments financed by the retentions), and the rate of discount, k . We have also pointed out that the individual must be careful before he commits his funds to so-called growth shares. Such growth shares are highly prized and may already be overvalued by the market.

We are in full agreement with Graham, Dodd and Cottle that chart reading cannot possibly be a science, and that its theoretical basis rests on faulty logic. However, we are of the opinion that proper security analysis and market analysis supplement each other and must be integrated.

We support the random-walk hypothesis. The magnitude of price changes cannot be predicted, and a careful study of past price fluctuations can tell us little or nothing, of the magnitude of future price changes. It would, however, be possible to make money on the stock exchange by acting and reacting faster than the market to any news regarding future developments or any other factors which will influence the expectations of a large body of individuals.

CHAPTER VIII

RISK AND PORTFOLIO SELECTION

A. Introduction

The purpose of this chapter is briefly to discuss risk and then to focus attention on the theory of portfolio selection.

As we have pointed out before, one of the major functions, indeed the 'raison d'être' for the existence of the capital market is the spreading and the shifting of risks to those who are willing to assume such risks. We have also indicated that a large number of differentiated securities are listed on the stock exchange, and that there are various risks inherent in every kind of investment or security to a greater or lesser degree, because of the uncertainty as to future yield, price, stability of income, safety of principal, and so forth. In some of the earlier chapters we have already referred to risk and uncertainty to some extent. In chapter VI we pointed out that stock exchange prices are volatile and subject to sudden and unexpected change. In chapter VII we supported the random-walk hypothesis. The facts that prices are volatile, that the magnitude of price changes is of a random nature, and that future returns cannot be predicted are of primary significance to a security holder. His attitude toward these will influence his strategy and the composition of his portfolio.

B. A Note on Risk

Price flexibility, upwards or downwards, may be caused by numerous factors, which can be divided into two main groups, namely exogenous (external) factors and internal factors; the first, being external risks which affect the whole stock exchange, or a sector or sectors, or a certain group of securities or classes of securities, (that is, equities or fixed-interest securities), whereas the internal risks affect only the fortunes of the securities of a given company. We must, therefore, distinguish between external and internal risks, but always bearing in mind that the external and internal risks will be operating simultaneously and in many respects be interrelated, the external risks being superimposed on the internal.

Risk is rather a vague term, and we must distinguish between risk and true uncertainty. Risk means the chance of bad consequences or of contingent loss. Uncertainty really refers to 'that which is

not sure', doubt, or something unpredictable. In the case of risk probability measures can be ascertained in an objective sense, while in the case of uncertainty the probability measures of outcomes cannot be identified and ascertained in an objective sense. In the case of uncertainty the element of personal judgment cannot be disposed of. In the case of risk the chance mechanism can be taken as known, while in uncertainty this is not so. In uncertainty the mechanism is so complicated that equally confirmed outcomes cannot be identified. Stock exchange investors cannot predict the magnitude of price changes and they are faced with true uncertainty. Once they have funds locked up in securities they assume the risk of loss, due to misjudgment of forecasts of the real value of financial assets at some future date, resulting in destruction of savings for creditors or lenders.

We have also pointed out that the shareholders as such, taking account of price volatility on the market, really face more risks than the company of which they are members.¹ There is no doubt that the market price of a share at a point of time reflects the tastes and preferences of present and potential shareholders, and the taste for risk and risk-aversion are important factors in decision-making.

In a dynamic market economy sudden change is always present and to be expected. The external factors which may directly affect a given company, a group of companies, a particular sector of the economy, or even the whole economy, to name but a few, are mainly things such as technological progress, war, riot, international relationships, inflation, deflation, legal changes, and any other political and economic changes, apart from the risks attaching to the investment in a particular security which is inherent in a company, such as financial risks, bad management, operating risks, property risks, the board's policy, and so forth. An individual may have his funds tied up in a stagnating or declining sector, or industry, or a stagnating or declining company, which will only increase the chances of loss.

The complete unpredictability of the future trend of the price of an individual security or a class of securities, is to be expected and accepted. All the individual can really do is to try to analyse the true nature of the risks involved, to measure the risks

1. See chapter V, pp.187-192.

(subjectively), and then decide on the degree of risk he can afford to assume to suit his own temperament, accumulation programme and goals. The latter will largely depend on his motives and whether he is a capital-conscious or income-conscious investor, the former placing considerable emphasis on the safety of principal and the latter on the income that can be derived from the investment. Whichever subjective object the individual has in mind, he will still find that in a dynamic economy there is no such thing as a riskless investment, whether he holds his wealth in the form of money, near-money, or any other financial asset, real capital or real estate.

In any investment programme or plan, whether long-term or short-term, the investor in stock exchange securities must take due account of all the risks which will be attached to his portfolio. There are actually only three important aspects which he should carefully take account of when confronted with questions related to risk, namely, what these risks are, how they can be reasonably measured, and what alternative policies he can adopt to minimise or spread his risks, without unduly sacrificing income or return on his capital invested. The degree to which he is willing to assume risk, or his aversion to certain kinds of risk, will have an important influence on his decisions, his investment policy and the composition of his portfolio. Each investor in stock exchange securities must subjectively determine his own policy towards risk, and his behaviour is again a function of his attitude and taste for risk and risk-aversion. The choice of a portfolio is again a matter of subjective value judgments. Each and every individual will adopt a different strategy, depending on attitudes towards risks, expectations, and multiperiod accumulation plans, and thus also his investment horizon. The prospect must be sufficiently lucrative to induce the individual to adopt a particular strategy after risk has been subjectively considered.

1. Internal Risks

The internal risks are those which directly affect the company concerned, and thus the shareholders and creditors of that company. The internal risks will include all those factors inherent in the company as such which will have a direct bearing on the earning capacity of the company, the profitability of the capital employed, the liquidity, the state of solvency or insolvency, the operating and managerial

efficiency, and so forth.

To judge the internal risks inherent in a given company security analysis is advisable. The individual can only subjectively judge the risks inherent in a given security by investigating the tangible and intangible factors related to a given company or by investigating the qualitative and quantitative information available, in a manner described in the previous chapter.

Internal risks are normally referred to as business risks, such as the financial risks, property risks, and operating risks. All three affect the position of the shareholders of the company, in the sense that these risks materially affect solvency and earning power. The profitability of a company may be seriously impaired by managerial error in any one decision affecting the financial structure, the asset portfolio or the operating efficiency.

The financial risks are, as we have pointed out in the previous chapter, to be found in unhealthy or unbalanced financial relationships which may exist, such as inadequate working capital, excessive funded debt, inability to finance maturing loans, poor credit control, risk of default, low interest coverage, decline in money profits, and so forth.

The property risks are locked up in the management of the asset portfolio, and also in improper locality. The assets of the company may consist mainly of obsolete plant and equipment, or it may be a wasting asset, such as a mine. Furthermore, the assets may not be properly insured against fire, riot, and theft. The company's patents may be due to expire and this may affect the future earning power.

The operating risks include all factors which affect the costs of production, such as rapidly rising marginal costs of production, inefficient management, weak trade position and strong competition.

2. External Risks

The external risks are those which are not merely outside the control of the individual company, but outside the control of all the companies in the community. As opposed to the normal business risks inherent in one company, these external risks can affect a large group or section, though to differing degrees. Therefore, the investor in

securities, particularly if investing in ordinary shares must, apart from analysing and investigating the investment merits of one individual company in which he intends investing, also try to predict to the best of his ability and knowledge, the broader economic trends in the country before committing himself. The external risks are just as important as the internal when it comes to security investment. Dowrie, Fuller and Calkins² broadly classified the external risks into four main categories namely:-

- (1) Risk of cyclical change;
- (2) The purchasing power risk;
- (3) The money rate risk; and
- (4) Political risk.

To this we must also add a fifth, namely, taxation changes.

(a) Risk of Cyclical Change

This risk was referred to by Dowrie, Fuller and Calkins as the 'conflagration' risk, and involves the deterioration of economic conditions which influences the whole market or sectors in the market as opposed to the internal risks which normally pertain to a given security. Some investment advisers or analysts have given some attention to cyclical changes in the economy and the patterns or trends in security prices, and some lagged correlation between the two.

Today the ebb and flow of the business cycle is less fearsome, but certain groups of industries are still affected by changes in the growth rate. A slow-down in the growth rate, or the growth rate not coming up to expectations, may be considered tantamount to a recession, and may adversely affect certain groups of securities. However, the emphasis is today again on the long-term bullish trends in the market as a result of persistent inflation and the expected continuation of inflation in our age. Numerous economists believe today, or have apparently concluded, that monetary and fiscal policy and other direct and indirect instruments of controls in economics, together with the increased skills and quality of managements will lead to a continuation of a satisfactory rate of growth and a high level of business activity, and the elimination of recessions and depressions. We may point out

2. See Dowrie, G.W., Fuller, D.R. and Calkins, F.J., Investments, 3rd edition, pp.141-183.

that Irving Fisher held similar views just before the great dollar crash and slump on Wall Street in 1929. Some economists are inclined to overlook the fact that growth and inflation have favourites and victims when it comes to investment in stock exchange securities.

We know already from our previous discussions that price changes and earnings are random variables and cannot be predicted. Nor can general economic trends be predicted in an uncertain world. There is, however, no doubt that changes in employment, interest rates, bank credit, taxation, savings, total output, and so forth, exert some influence on the earnings and solvency of companies, which are in turn again communicated to the stock exchange and reflected in price movements of various groups of securities in the market. Changes in general economic conditions have some bearing on the overall investment policies of individuals.

Economic fluctuations and changes in the growth rates of various industries or sectors may affect the income and the capital of the investor, particularly, of course, in the case of equities. A lot depends on the inherent quality of the securities included in a portfolio. Even fixed-interest securities of a low quality may become worthless during a severe economic depression and slump on the stock exchange.

We must also bear in mind that different industries are affected differently by the business cycle or by changes in the growth rate. Even in times of general economic prosperity and a satisfactory rate of growth in gross national product, some depressed industries may still be found. Ordinary share price indices do not necessarily correctly reflect general economic or cyclical trends in a given industry.

Business cycles and changes in the growth rate of the economy will thus affect the individual through changes in dividend income, yields, interest income, safety of principal, adverse changes in market price, and changes in growth prospects. It should be borne in mind that market price is a forward-measure of expected income streams, and if the economic conditions change adversely, the expected income stream will be valued lower, resulting in capital losses for some individuals.

The individual is thus faced with a price risk which is caused by changing economic conditions and shifts in the emphasis in the market, that is shifts from fixed-interest securities to ordinary shares, and vice versa. The real risk for the individual is that he may purchase a given security at an excessive price at the top of the boom, or just before a general shift of the emphasis in the market. It is a matter of timing purchases and sales. The prices of shares are relatively sensitive to changing economic conditions, and may be subject to waves of optimism and pessimism, with the result that the market valuation may again diverge from long-term prospects. We are all familiar with bull and bear markets and this refers to both equities and fixed-interest securities. Although equities are more volatile, holders of fixed-interest securities are also subject to capital losses, even though their prices are considered to be more stable. Not all fixed-interest securities are of the same quality, and quite a few marginal companies have listed fixed-interest securities outstanding. A severe downward trend in the business cycle will tend to weed-out such marginal companies, resulting in capital losses for all such security holders.

It is, therefore, advisable for the individual to ascertain the general economic climate and future economic developments before committing his funds to a given industry, or a given kind of security. The individual's policy and multiperiod accumulation plans must allow for the fact that in a dynamic world some economic fluctuations and changes in the growth rate of sectors will always occur.

(b) The Purchasing Power Risk

The attention of economists is today focused on the inflationary world in which we are living, and likely to live in the foreseeable future.

We have previously pointed out that fixed-interest securities promise a fixed rate of interest and a fixed principal at some future date, and that investors in such securities are particularly prone to the risk of changes in the purchasing power of money. They are faced with the fact that the real value of the obligation, which is expressed in money terms, may change considerably before maturity. The securities otherwise regarded as the safest are thus particularly subject to the purchasing power risk, where inflation is continuing over time, or where a currency may be suddenly devalued. Money and

near-money balances are also affected by this risk and must be considered as an imperfect store of value.

The shifts in the value of money are today not at all moderate, and investment advisers should not overlook this fact. Measured by the consumer price index, South African currency has already lost more than three-fifths of its purchasing power since 1938. Since 1947 it has depreciated by approximately 50 per cent, since 1953 by approximately 30 per cent.

In an inflationary world, the purchasing power risk will adversely influence the conservative investor with the bulk of his funds in fixed-interest securities over the long-run. To hedge against the risks involved in inflation, investors have, of course, turned to equity investments to a very large extent. In a small market like the Johannesburg Stock Exchange, this change in the emphasis in the market has again the disadvantage of leading to an overvaluation of equities. Individuals may pay too much for equities, which they consider as a hedge against inflation. They again expose themselves to the risk of paying excessive prices and all other risks and it may also be dangerous to put all funds in equities. Inflated prices only serve to enhance the risk of capital loss. There are definitely certain periods when most ordinary shares are clearly overvalued by the market and a general downward adjustment usually follows.

(c) The Money Rate Risk

We have already devoted some attention to the interest rate structure in chapter VI and we accept the fact that the yield on fixed-interest securities and equities includes a premium for risk, although there is no clear mathematical relationship between yield and risk. We also know that the price of fixed-interest securities varies inversely with the rate of interest. The date to maturity plays a very important part, and the prices of short-dated fixed-interest securities are therefore less sensitive to changes in interest rates than long-term ones. The crux of the matter is that fixed-interest securities which are considered to be less risky than equities, may still involve capital losses when interest rates change. If the principal is safe, and the security is held to maturity, no capital loss will be incurred unless the security was purchased above par.

We have already pointed out in chapter VI, with reference to equities, that changes in the money rates will only be one of the numerous factors affecting prices, and that dividends and earnings are more important in influencing prices.

The individual may attempt to forecast changes in the rates of interest, but in the long-run this is not so easy.

(d) Political Risk

From a historical point of view, this risk is important and has at times resulted in serious losses to individuals and institutional investors alike, for example, through war and other political strains, riots, and other fundamental social and economic structural changes brought about by political developments.

(e) Taxation

The system of taxation may be changed and adversely affect the after tax earnings available for distribution to shareholders, for example, of brewery and gold mining shares. Furthermore, a capital gains tax may be introduced, or the marginal tax on dividends received may be changed, adversely affecting some individuals. The rate at which company tax is calculated may alter in the future.

3. Measurement of Risk

It is only when the individual has assessed the degree of internal and external risks however crudely that he can decide on a particular policy or strategy and line of action to combat or minimise the risks. To estimate the degree of internal or external risk attached to a particular security or group of securities with any degree of accuracy is, of course, impossible. In the real world there is no such thing as perfect foresight. However, even if this is so, some course of action will be taken by the individual, or alternatively, he will stay out of the market completely. According to Rix "The decision to hold one or several types of asset, or to choose one security rather than another, implies an attempt, however crude, to assess the degree of risk attached to any course of action."³ It is, however, not possible to measure risk precisely or cardinally. (The analogy in economic theory is the measurement of utility.) Risk is

3. Rix, M.S., Stock Market Economics, p.197.

weighed subjectively, and the individual may consider security A to be more risky than B, or B more risky than C, and so forth, and base his strategy on such reasoning. Risk has everything to do with the individual's subjective belief in the actual occurrence or non-occurrence of a future outcome, favourable or unfavourable. The expectation of the outcome will determine his strategy. Risk need not be considered in terms of probability distribution of the frequency type, but just on the likelihood of success or failure. The individual may possess sufficient knowledge and experience to form some reasonable judgment as to the likelihood of success or failure, and to be reasonably confident in his subjective forecasts, although he measures risk only very indirectly.

If the individual considers the risk too high, that is, at some subjective critical level, but the prospective return (or gain) exceptionally high, he may allocate some fraction of his funds to that security; if the risk is below this subjective critical level, he may decide to allocate more of his funds to the security, while above the critical level no purchase will be made. The strategy which the individual will adopt depends on two factors, namely his investment horizon, and secondly, whether he has a weak or strong aversion to risk. The measurement of risk and the degree of risk an individual is willing to assume is entirely a subjective matter, and this will have a definite bearing on the allocation of wealth between various alternatives. The multiperiod accumulation plans of the individual will then be largely determined by his attitudes towards risk. The taste or aversion to risk can only be inferred from the way in which an individual behaves, given the choice of many risk-bearing alternatives in the stock exchange. He may have an aversion to some risks and a taste for other risks, in the sense discussed hitherto. Two individuals may assess risk in the same way, but they may have different aversions to risk. They will therefore adopt different strategies in wealth allocation and the composition of their portfolios will differ.

Hicks⁴ explained the above in terms of the slopes of what he called the marginal advantage curves, which measure the gain in utility which an additional investment offers in respect to the whole portfolio. The slope of the marginal advantage curves will depend on

4. See Hicks, J.R., Critical Essays in Monetary Theory, pp.19-26.

two factors, firstly, upon the degree of uncertainty attributed to the specific investments they stand for, and secondly, upon the degree of risk-aversion itself. The slope of the curves will then determine the amount of total capital allocated to each security. If a portfolio is spread over a number of securities in an optimum manner the marginal advantage from each security contained in the portfolio must be equal. We shall return again to Hicks' exposition at a later stage in the present chapter.

Dowrie, Fuller and Calkins contended that 'Most internal risks, at least those involved in fixed-income obligations, may be graded individually without an excessive margin of error, because of the possibility of reducing them to mathematical formulas. None of the intangible risks and few of the external tangible risks, however, are susceptible to mathematical treatment, though they are frequently of great importance. Particularly troublesome to measure are the dynamic risks involving prediction of future economic trends, which are so important to equity securities.'⁵ Some contemporary economists, however, use statistical and mathematical measures of risk all of which in some way or another measure the dispersion of the probability distribution, such as the standard deviation and variance. The larger the variance, the greater is the risk considered to be. When we are faced with true uncertainty we cannot, however, 'go mechanical'.

The question is whether the uncertainty of future prices and earnings, which are random variables, is subject to probability analysis. We know that risk always refers to situations of which the outcome is uncertain, but where the probabilities of the outcome are taken to be known, particularly when compressed to a certainty-equivalent. This does not apply to true uncertainty, where the unknown outcomes cannot be predicted or estimated in probabilistic terms, and probability principles cannot be applied to the situation to assist in the decision-making process. In deciding on a given action which involves risk, such as the purchase of a given security or securities, the subjective elements of risk-aversion, taste for risk, and utility functions again come in. The decision to invest in securities is complicated by the fact that there are many alternatives. To each investment decision, with reference to a given

5. Dowrie, G.W., Fuller, D.R. and Calkins, F.J., Investments, 3rd edition, p.130.

equity, there is not a unique eventual outcome, but a number of mutually exclusive outcomes, which it is claimed, may be described by a subjective probability distribution. Uncertainty is not eliminated by the use of probability mechanisms, as outcomes depend on too many unknown variables. The probabilities themselves can only be roughly estimated, and uncertainty remains. In a world of uncertainty rational action cannot really be defined, and as we know, uncertainty is an ingredient part of security investments, since we have to do with random magnitudes which cannot be predicted. All the internal and external forces mentioned above impinge on market value.

However objective the information at the disposal of the individual, faulty decisions based on the subjective interpretation of the information, will still lead to capital losses, which, from the individual's point of view constitutes a real risk, for which he feels he should be compensated. The risks emanating from possible capital losses and instability of income attached to equity shares are the main factors which will influence the composition of a portfolio reflecting the efforts of the individual to spread his real risks. The information at the disposal of the individual may be objective, but there is still the subjective risk that the information may be completely misinterpreted. Risk may thus arise due to bias in the data and in the assessment of such data, and also from errors in analysis.

According to Rix "The calculation of risk in the stock market bears only limited resemblance to insurance. The shareholder, who is the risk-bearer or insurer, instead of receiving a premium for carrying a risk, pays a lower price for a speculative than for a non-speculative security."⁶ This depends on the individual's preferences, his aversion to or taste for risk - and Rix apparently assumes that risk-aversion is always greater than taste for risk (or risk preference). This need not be so. It is also maintained that though no prediction can be made with any high degree of certainty about any one particular event, "...relatively safe assertions are possible about what will happen, on the average, within a particular class of events."⁷ The idea is that in a diversified portfolio, including a large number of different securities, it can be mathematically demonstrated that the

6. Rix, M.S., Stock Market Economics, p.198.

7. Ibid., p.193.

stability of the average increases as the number of items increases.

4. Risk and the Time Factor

We agree with Rix that the time factor is a very important factor or element of uncertainty with which the investor is faced. A small profit is of little interest twenty years hence, but may be of great interest if it can be realised next week. On the other hand, a very large prospective profit is of no value if the time of its realisation is infinitely remote. Profit has no meaning unless related to time in some way.⁸ Things can run according to plan for a time, but sudden, unexpected changes can occur and the whole position will change again, and this change may be of a temporary or more permanent nature.

We have pointed out in the previous chapter that it is difficult to forecast future dividend rates and the growth rate in dividend rates (and the growth rate in earnings), and we have pointed out that as time approaches infinity, the rate of discount of such remote dividends must be very high. Short-term, medium-term, and long-term expectations again play a role and the individual's investment horizon is significant, since this will have an influence on his attitude towards risk. If he buys on margin and is a short-swing trader he must feel confident about his short-term price forecasts and he assumes the risks inherent in short-run price fluctuations. In the case of the medium-term investor, medium-term prospects are significant, and he may change his portfolio frequently. He also assumes price risk. The long-term investor is concerned with long-term prospects, but he is certainly faced with changes in risks over time. Short-term, medium-term and long-term investors all assume some risks.

5. Risk-spreading (Diversification)

Rational action on the part of the stock exchange investor will be to recognise the risks for what they are, and then to endeavour to hedge against them. The objective of the investor will be to avoid disaster. A policy which will afford him some protection against the external risks will simultaneously afford some protection against the business or internal risks. For this purpose he will diversify his financial asset holdings, which is really the cornerstone of a sound investment policy. A properly diversified

8. Rix, M.S., Stock Market Economics, p.201.

portfolio will offer some protection against the risks mentioned above.

The object of diversification of financial asset holdings is to minimise the impact of a single decision or judgment, and to reduce the risks inherent in separate issues. Any miscalculation or forecast about the future prospects of a given security will result in a loss, but only a loss of a relatively small proportion of total wealth, provided that the portfolio is properly diversified. Not all expectations will be confirmed or fulfilled at some future point of time and some expectations will not be right. If it was possible to reduce uncertain expectations to a certainty-equivalent, diversification would be unintelligible. The individual is confronted with a large number of possible situations, and for this reason he will hold more than one financial asset. Diversification of financial assets means that these assets are not perfect substitutes, that is, an expected gain in one situation is not a perfect substitute for an expected gain in another situation.

The risk-lover will prefer a portfolio with greater chances of exceptional gain, but with greater chances of exceptional loss. Risk-lovers thus prefer portfolios with greater chances of above-average gain. (In this thesis the term risk-lover is not to be taken to mean a gambler.) The risk-avertter (or defensive investor) is more conservative, and will prefer portfolios with smaller chances of exceptional gain or loss. In order to minimise risk, he will be satisfied with below-average returns.

Some individuals may hold only a few assets, because they may feel fairly confident about the outcomes or pay-offs, and they stand to gain more should their expectations be confirmed by result, but they may also incur greater losses should their expectations be frustrated. Other individuals may hold more financial assets, and they have a more secure hope of a smaller gain, but coupled with less risk of loss. The question is then to what extent an increase in numbers (diversification) is necessary to reduce the degree of risk inherent in a single judgment, or in other words, to what extent will an increase in numbers reduce the dispersion of the estimated contribution. Proper or careful diversification is not merely a matter of large numbers, but rather a question of careful selection. The quality of the portfolio is a function of the quality of the underlying securities. Beyond a certain point the individual does not necessarily

gain by simply adding different issues; there may even be some disadvantages. Only a limited reduction in variance (variability) can be achieved by increasing the number of securities. An individual can thus hold a long list of securities without any real safety or gain. Excessive diversification may, therefore, also be dangerous, as some high-risk, low-grade securities may unnecessarily be included in the diversified portfolio.

In order to diversify properly the returns and relative price changes of the constituent securities should not be highly correlated, in other words, the portfolio should not contain securities which are highly complementary in the ordinary sense of the word. The more highly correlated the returns and relative price movements or the more they tend to move in unison, the less powerful is diversification and the less are risks reduced. Conversely, the more uncorrelated the returns and relative price movements, the more powerful is diversification in reducing risk. An individual investing all his funds in the shares of a company assembling motor cars, a company manufacturing motor car component parts, and a company distributing motor cars, has not properly diversified his portfolio, since the relative price movements of the shares of these companies will tend to be highly correlated. Such diversification affords little protection. For purposes of risk-spreading and satisfying the requirements of the individual, securities with the same price-earnings ratios and apparent yields may not serve the purpose of risk-spreading equally well. There may be a tendency for a high correlation in the same industry, for example, textiles, or engineering, and a portfolio with a high correlation should be avoided. Diversification between industries, where returns and relative price movements tend to be uncorrelated, or do not move to the same degree, is again advisable, since here diversification will tend to reduce risks. Different industries are affected differently by changing conditions, and so are different kinds of securities. Diversification must therefore be by industry and by kind of security. The equity-holder of one company may also be assuming less real risk than the fixed-interest security holder of another company.

A policy of diversification and portfolio selection cannot be undertaken without taking account of the general economic conditions, and changes in them. As economic, political and legal situations change, risks will change. Risk is a variable, dynamic factor, and the individual who does not act on these changes will find that the real

risks he is facing will be increasing, whereas changes in the composition of his portfolio may actually decrease the risks. The process of adaptation is, therefore, never complete. The individual's multiperiod plans must be flexible to accommodate shifts in risk differentials. Any diversified portfolio will be in a perpetual state of flux, because it must be adapted to dynamic conditions in an uncertain world.

An individual, in diversifying his financial asset portfolio, tries to maximize a utility function of his portfolio, that is to obtain the maximum prospective net yield and to minimise the general and specific risks with which he is confronted. However, both risks and expectations are always changing and this will shift the individual's utility functions. The individual's attitude towards risk will thus be one of the major factors which will influence the composition of the portfolio.

Diversification of financial assets is a defence against changes in the real value of such assets, which may be due to numerous factors. As we have pointed out in chapter VI, even money itself is not free from risk, and money and near-money will be included as financial assets in all well-balanced or diversified portfolios, because the risks of money and near-money balances move in the opposite direction than the risks pertaining to equities.

Diversification also has limitations. The extent to which an individual can diversify is limited by total wealth. Economies of scale are also important in diversification and portfolio management. The extent to which an individual can diversify will also be influenced by the financial assets to which he has access in the market. The diversified portfolio that fits in with the multiperiod accumulation plans of an individual is then really a function of the financial assets that are accessible and their relative risks, relative prices, expected rates of return, total wealth, and the rate of accumulation. These factors will then influence the composition of his portfolio and the marginal substitution ratios when risks change. An individual with modest capital funds at his disposal can achieve some degree of diversification by buying the units of mutual funds.

The expectation of return on a diversified portfolio is merely an average of averages, or more correctly a weighted average of the expectations of return of the underlying financial assets, each

weighted by its share in the diversified portfolio. Diversification is thus nothing but the averaging of risks, and offers average results, that is, not a result as good as the best constituent financial asset or as bad as the worst. The risk attaching to a diversified portfolio is smaller than the weighted average of the separate risks. Risk can therefore be reduced by diversification, even if the independent, constituent assets show greater individual risk. But it should always be borne in mind that diversification cannot eliminate risk completely, that is, all variance cannot be eliminated by diversification.

The outcome of a properly diversified portfolio cannot be known with certainty, because the outcome depends on uncontrollable variables, such as relative price movements and changing risks. The uncertainty of the outcome of a portfolio also makes the individual uncertain about his future wealth. For this reason money and near-money balances will be included in the portfolio to satisfy the precautionary motive, and to mitigate the effect of fluctuations in security prices. Money and near-money balances also satisfy diversification demand.

According to Hicks the speculative demand for money has become a back number and is not nearly as important as the precautionary motive.⁹ He identified the precautionary demand for money with the demand for money as a reserve asset. The money is held to be available for use in the case of some emergency. Other financial assets, which are more or less liquid (in the Treatise sense) and readily marketable, may also be held as reserve assets. These financial assets are probably close albeit imperfect substitutes. Money held under the speculative motive is held as an investment asset. Given a strong enough aversion to risk, money is held under the speculative motive, even if there is no expectation of an impending fall in the mean value of securities.

The assets of the professional financier, whose business it is to deal in marketable securities, such as bills, stocks and equities, and unmarketable securities, such as mortgages, are mainly reserve assets, that is assets which are held in forms that are largely determined by the need to have them easily convertible into cash in the event of any emergencies which may arise due to the fact that the financier's liabilities are not asleep. On the other hand, some new opportunities

9. See Hicks, J.R., Critical Essays in Monetary Theory, pp.38-49.

for financial business may present themselves. Hicks then concluded that the corresponding demand for money as a reserve asset is the precautionary demand for money.

No individual can forecast cyclical economic changes or trends. The best he can do is to refrain from buying when he considers prices to be exceptionally high, and not to sell when the market as a whole is depressed. To protect against committing his funds to the market in a given short space of time, when prices may be unduly high, the individual should rather follow a policy of averaging, or what is sometimes called 'time diversification'. To protect against the cyclical risks of security prices, the individual will also diversify his portfolio between different kinds of securities, the proportion of resources devoted to each kind of security depending on each individual. He may follow an accumulation policy based on 'rand averaging', certain 'formula plans', and a 'balanced fund'.¹⁰

The purchasing power risk, as we have pointed out, is really a threat to money and fixed-income securities, including preference shares, where the interest or dividend and principal is expressed in fixed monetary terms, and which under normal conditions would be viewed as safe securities from the point of view of other risks. The more an individual has his eyes fixed on the purchasing power risk, the more vulnerable he becomes to other risks. To protect against this risk, without assuming too many other risks, some balanced diversified fund, including a few fixed-interest securities with conversion privileges, and a few short-dated fixed-interest securities, is suggested. Ordinary shares of property companies are also a useful protection. If the individual expects devaluation of, say, the dollar or sterling, some gold and gold financial shares should be included in the portfolio.

The fixed-interest securities included in a diversified portfolio will be vulnerable to changes in the money rates of interest. Here spaced maturities will be of some significance. The individual may then be in a position to re-invest funds received on maturity on better terms. By spacing maturities some balance is also maintained between short-term and long-term fixed-interest securities, giving some degree of protection against adverse changes in the real value of the portfolio, with stability of income provided by the fixed-interest

10. See chapter IX.

securities. It is obvious that the individual will diversify according to the types of risks about which he feels most strongly, the nature of the issues, and the kind of security.

Hypothetical Examples of How Diversification can take place

(1) Diversification by Type of Security.

	<u>Per cent</u>
Money and near-money balances	4
Stocks (government, semi-government, municipal)	10
Debentures	10
Preference shares	16
	<u>40</u>
Ordinary shares (including units of mutual funds)	60
	<u>100</u>

(2) Diversification by Class of Undertaking

	<u>Per cent</u>
Developing and producing mines	5
Industrial finance	10
Mining finance	8
Government and other stocks	8
Building society shares	5
Banks	8
Metals and minerals	8
Land and property	9
Investment companies (including mutual funds)	10
Beer and wine	6
Tobacco	5
Building	4
Wholesale and retail	4
Engineering	4
Money and near-money balances	6
	<u>100</u>

To the above list can still be added sugar, motors, food, fish, paper, household, furniture, textile, clothing, and so forth. The above percentages can be divided amongst ordinary shares and fixed-interest securities.

(3) The third method would be geographical or international diversification, that is by country.

C. The Theory of Portfolio Selection

The process of portfolio selection and the subsequent changes which may take place in the composition or structure of the portfolio

can be divided into two parts, firstly, the analysis of individual securities and the formation of expectations about the future pay-offs or prospects of such individual securities (which we discussed in chapters VI and VII) and second, the actual problem of portfolio selection, which is the main problem dealt with in this section. The choice of a portfolio is a complex problem and has received the attention of various authors.¹¹ In our view Markowitz's exposition is perhaps the most important in this field, and most of the opinions expressed in this section have been strongly influenced by Markowitz's analysis.

In the previous section we have already pointed out that diversification has definite advantages, the most important being the risk position of the individual, since diversification tends to bring the risk level of the portfolio as a whole below the risk level of each security incorporated in the portfolio. Each security presents the individual with a different return-risk (or mean-variance) combination, and all the securities combined will then give the mean-variance of the portfolio. The important point is that the individual will not be concerned only with the relative position of each constituent security, but the portfolio as a whole, and the expected return-risk position of the entire portfolio is the important magnitude.

The securities constituting the whole portfolio are each subject to different financial and other risks, their prices are influenced to a greater or lesser degree by different forces, and the rate of return on each underlying security will tend to differ over time. Some securities will yield a fixed return and ensure some stability of income in the portfolio, whereas the return on other securities will be variable and uncertain and therefore unpredictable. With the risk differentials between the differentiated securities, with a given

11. Markowitz, H.M., Portfolio Selection: Efficient Diversification of Investments, John Wiley and Sons, Inc., New York, 1959. Tobin, J., "The Theory of Portfolio Selection" in Hahn, F.H. and Brechling, F.P.R., editors, The Theory of Interest Rates, Macmillan & Co. Ltd., London, 1965. Chase, S.B. (Jr.), Asset Prices in Economic Analysis, Hicks, J.R., Critical Essays in Monetary Theory. Weston, J.F. and Beranek, W., "Programming Investment Portfolio Construction" reprinted in Lerner, E.M., editor, Readings in Financial Analysis and Investment Management. Clarkson, G.P. and Meltzer, A.H., "Portfolio Selection: A Heuristic Approach", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments: Selected Readings.

wealth, and subjective taste for risk or risk-aversion, the individual must decide on the composition of his financial asset portfolio, including money and near-money balances held as a store of value to give what is commonly called an efficient portfolio,¹² the latter meaning that the individual will attempt to maximize his return from the portfolio as a whole and to minimise the risks attached to security investments.¹³

The individual must then decide on the proportions or weight of each security in his portfolio and how to change these proportions over time in the light of new knowledge concerning changing prices, growth rates, rates of return, risks, and thus changing expectations. We have already pointed out in chapter VI that we must allow for variable expectations and the formation of new expectations at different points of time, and that the decision to hold a given security is not a once-for-all decision.

The theory of portfolio belongs to 'expectational dynamics' or comparative statics and equilibrium at a point of time is again applicable. An efficient portfolio at one date may not be efficient at another date. Portfolio equilibrium is a stock equilibrium and corresponds to the market day equilibrium we have discussed in chapter VI. In dealing with portfolio theory we are concerned with the relatively liquid side of the balance sheet of the individual, which can be fairly quickly adjusted by substituting one security for another, or substituting securities for money and near-money balances and vice versa. This stock equilibrium implies that individuals are at their best or optimum positions regarding yields at a point of time, as governed by and appropriate to their expectations, with allowance for risk.

Each individual, after he has decided more or less carefully on the nature and the extent of the risks he is prepared to assume, will decide on the amount of capital (or wealth) he is prepared to commit to security investments. He will try to select a group of securities (or a mix of securities) which will maximize his expected total net real return or maximize the utility function of his portfolio. The objective of the individual will be to achieve the

12. See Markowitz, H., Portfolio Selection, pp. 51-52.

13. We will return to this aspect in due course, since this is one of the central points in portfolio selection.

maximum prospective total net real return or net yield from his portfolio commensurate with the emphasis he is placing on income-risk and capital-risk, and other factors such as predictability, liquidity, relative prices, asset values, times cover, price-earnings ratios, and so forth.

In a dynamic situation risks will change, and so will expectations. Risks will be revalued and expectations and multiperiod plans will be revised, new situations will arise, and the portfolio will be subject to changes in the light of new knowledge and new expectations. Individuals will always be on the lookout for opportunities of substituting at the margin. A security of which the expected total net real return is low or expected to decline may be sold and another security bearing a higher return or an expected higher total net real return may be purchased, depending on the relative risks. In a world of risk and uncertainty, the better investment is not necessarily the one giving the highest current yield and the portfolio giving maximum return is not necessarily the one with minimum variance. The individual will have to formulate a long-run investment programme which is flexible enough to accommodate any changes in ratios of return and changes in risk differentials. Joel Dean pointed out that portfolio selection and management has a lot in common with capital-budgeting, for in both cases we need, "... (a) application of economic theory at several vital points; (b) knowledge of financial mathematics, ... (c) economic forecasting; (d) techniques for projecting the amount and timing of outlays and receipts; and (e) techniques of control through comparison of actualities with projections."¹⁴

In portfolio selection the problem is also complicated by the fact that two securities yielding the same return may still not be equally suitable for incorporation in a diversified portfolio. The data and knowledge available to the individual and the methods or techniques used in forecasting become important. The individual is sometimes faced with mutually exclusive proposals. One security cannot be considered in isolation and the impact of one security on the whole financial asset portfolio and its composition must be considered.

14. Dean, J., "Measuring the Productivity of Capital", reprinted in Solomon, Ezra, editor, The Management of Corporate Capital, p.22.

The problem of portfolio selection is an instance of decision-making in an uncertain world. The problem still remains that economists find it difficult to describe rational behaviour and decision-making in an uncertain world where due consideration must be given to risk, the taste for risk, and the taste for investment. The individual will also have to decide whether he is prepared to change the composition of his portfolio frequently, and to what extent. Each shift will involve costs on the sale and purchase, and frequent shifts may not be worthwhile. The costs of shifting or switching must, however, be considered in relation to potential loss of income (or return), or increase in risk, if the shift is not made. Each shift involves a new decision at a point of time, and the decision-dates may be close together or far apart, depending on the individual, that is his accumulation horizon or target dates, and other accumulation strategies.

In his own mind the individual may be capital-conscious or income-conscious. One cannot deny that this will have some influence on the composition of the portfolio, but it will be wrong for us to assume that either the capital-conscious or the income-conscious investor will have sufficient knowledge to enable him to maximize capital gains (or limit losses), or, in the case of the income-conscious investor to maximize income. So, whether the investor is income-conscious or capital-conscious, the outcome or possible future pay-offs will be subject to a high degree of uncertainty. The risks of changes in the rate of interest, or inflation and deflation, or changes in the rate of growth will affect both the income-conscious and capital-conscious investors, but to different degrees, depending on the composition of the portfolio.

An investment portfolio will contain securities of different apparent and expected yields, and different degrees of liquidity, and with different degrees of risk attached to them. Subjectively the individual may also feel that although a given security may only make a smaller contribution to his income in the form of interest or dividends, and his wealth in the form of capital gains, he may still include this security in his portfolio, because he may subjectively feel that the prospective yield stream is fairly certain and predictable.

The individual may hold a portfolio which will not yield the

maximum return in terms of dividend and capital gains, but taking account of risk-factors, subjective risk-aversion, and uncertainty, the composition of the portfolio, at a point of time, must be considered as the best from the individual's subjective point of view.

Diversification need not lead to the best combination of securities from the point of view of yield, but from the point of view of spreading risks, the portfolio may have considerable merit. Income (yield stream), although important, is not the only factor influencing the choice of securities for the purposes of portfolio selection, but the ultimate aims and objectives of the individual and his legal position (institutions and intermediaries)¹⁵ are important factors.

Before an individual decides either to buy or sell a given security or groups of securities, he will first of all carefully consider his entire investment programme in the light of known facts, and then decide to buy or sell on the basis of his expectations of various possible situations which may arise in the future and how they will affect the distribution of his wealth among various differentiated securities, giving some weight to general economic conditions and expected changes in these conditions, together with all other risk-factors. There is most decidedly no other way of explaining large portfolios or diversification than by looking into the principles underlying risk-spreading, and how expected future changes in all possible factors related to stock exchange investment may change in the future creating new situations and new risks.

It should also be pointed out that it is not merely a matter of the composition of financial assets in portfolios, but the nature and composition of liabilities may also play an important role in the strategy an individual will adopt in the management of his financial affairs.¹⁶ In a system of debits and credits individuals will find themselves in different debt-wealth or asset-income positions. These positions are subject to change over time and play an important role in investment strategy. According to Gurley and Shaw, for example, "An unforeseen change in the price level on either the market for goods or the market for primary securities implies windfall rewards or

15. See chapter XII.

16. Hicks for example, distinguished between Funds and Financiers.

(See Hicks, J.R., Critical Essays in Monetary Theory, p.47.)

The liabilities of the Fund are 'asleep' and those of the Financier not. For a discussion of Funds and Financiers see chapter XII.

"penalties for decisions based on anticipation of different price levels. Investors who have reached a desired relation of debt burden to real wealth and its yield are thrown off balance. Savers who have reached a desired relation of financial assets to income are compelled to reassess their financial plans and their preferred rates of financial accumulation. The ultimate penalties for misjudging contours of aggregative growth are bankruptcy for debtors and destruction of saved net worth for creditors."¹⁷

1. The E-V Hypothesis

In his article in the Journal of Finance, vol. 7, no. 1, March, 1952,¹⁸ Markowitz rejected the general rule (held by a large number of economists) that the individual does or should maximize the discounted expected return, as this approach fails to explain investment behaviour and in particular portfolio diversification. If we accepted the rule that the individual's aim is to maximize the discounted expected return, all funds will be placed in that given security which gives the greatest discounted value, that is the security with the highest expected return. This does not explain diversification.

Markowitz based his model on what he referred to as the 'expected returns - variance of return rule'. In terms of this rule there will be an efficient portfolio which gives both a maximum expected return and minimum variance,¹⁹ although diversification cannot eliminate all variance. The general rule is further that the individual can only obtain an increase in the rate of return by taking on more variance, and conversely, he can reduce variance by giving up some expected return.

In order to present his expected returns - variance of return rule, Markowitz assumed static probability beliefs. He included three securities in his model, and used non-linear programming procedures or techniques. In his book²⁰ he further expounded his techniques and model on efficient portfolios.

17. Gurley, J.B. and Shaw, E.S., Money in a Theory of Finance, pp. 117-118.

18. Markowitz, H.M., "Portfolio Selection", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments.

19. This aspect will be dealt with below.

20. Markowitz, H.M., Portfolio Selection: Efficient Diversification of Investments.

In his model Markowitz allowed for expected returns as well as the variation from average results. His model is based on the fact that individuals hold certain expectations regarding the expected returns and prices of securities, and he expressed the expectations in terms of a subjective probability. To explain diversification he utilised the 'beliefs about expected prices and their variances'.

First of all Markowitz showed that when past performances of securities are used as inputs, then the output of the analysis will be portfolios which performed well in the past. When forecasts (or expected future returns and prices) are used as inputs, then the output of the analysis may result in better or worse portfolios.

In calculating the return on a given security for a given year capital gains and losses are accounted for. The returns for one year can be calculated by utilising the formula,

$$\frac{(\text{closing price, 1966}) - (\text{closing price, 1965}) + (\text{dividends, 1966})}{(\text{closing price, 1965})},$$

for example, $\frac{500 \text{ cents} - 400 \text{ cents} + 10 \text{ cents}}{400}$

$$= \frac{110 \text{ cents}}{400}$$

$$= .275 \text{ or } 27.5 \text{ per cent for every R1 invested.}$$

The average return for a portfolio containing a number of securities can be calculated in the same way, except that weights must be given to the proportion of the total funds invested in a given security.

Before Markowitz's model can be fully understood, it is necessary to define standard deviation, variance, co-variance, and mean return.

The standard deviation is a root-mean-square, or to put it in other words, it is the square root of the sum of the squares of the individual deviations from the arithmetic mean, divided by their number. The standard deviation is a measure of variability.

The variance of the sum or differences of a number of independent variables is equivalent to the sum of their variances. The average squared deviation is called the variance of the numbers. The standard

deviation is the square root of the average squared deviations, in other words, the standard deviation is the square root of the variance.

The mean is really an ordinary average. In the context of this section the mean will be considered as a weighted average of possible outcomes with probabilities or frequencies used as weights.

We must also take account of correlation co-efficients which measure the extent to which two series of numbers tend to move up and down together. If they move up and down in perfect unison, then the correlation co-efficient is 1, and if they are completely uncorrelated the correlation co-efficient = 0. The co-variance is a measure of the extent to which two sets of numbers tend to move up or down together. In the case of a portfolio of securities we are concerned with the averaging together of reasonably highly correlated outcomes, with the result that diversification is not exceptionally powerful, that is, only a small reduction in variability will result from an increase in the number of securities contained in the portfolio.

The standard deviation of the whole portfolio is determined by the standard deviation of each individual security, the correlation between each pair of securities, and the amount or proportion of funds invested in each security. Given the above, the standard deviation of the whole portfolio can be calculated. The higher the correlations among security returns, the greater the standard deviation of the portfolio and vice versa. In the case of an efficient portfolio, according to Markowitz, it will be impossible for the individual to obtain an increase in average return without increasing the standard deviation, or alternatively, it would be impossible to decrease the standard deviation without decreasing the average return.

When a portfolio is chosen it must be borne in mind that future returns on securities are uncertain and that the expected returns on each security contained in the portfolio will differ, as will the variance of returns for each security. The individual, in his choice of the portfolio, can attempt to minimise the variance for a given expected return, or to maximize the return from a given variance, in other words, a given group of securities must be combined so that for a given level of risk, the return is maximized, or alternatively, for a given level of return, the risk is minimised. It should then also be borne in mind that the portfolio with the highest expected outcome of

return is not necessarily the one with the least uncertainty of such outcome. A portfolio with a high expected return may be subject to an unacceptably high degree of uncertainty, and the portfolio with the least uncertainty may have an unacceptably small likely return.²¹ The strategy adopted by a given individual will also depend upon whether he is a risk-averter or a risk-lover.

In the model E is the expected return from the portfolio as a whole and V the variance. From the above we want to establish the minimum V associated with a given maximum E , or a given E with different levels of V . An increase in V represents an increase in risk. Each security contained in the portfolio will give the investor a different return - risk combination, or in other words, a different mean-variance combination. An efficient portfolio is one which will give the maximum return - minimum risk, that is, a large E and small V combination; he will try to maximize the mean return and to minimise the variance of return in proportioning his funds.

Let us first take a given security, and calculate the variance, standard deviation and expected return with different probability estimates of realising such a return.

<u>Expected Returns from ABC Ltd. for the years 1967-1970</u>					
(1) Probability	(2) Expected Return (R)	(3) (1)x(2) (R)	(4) (R-R)	(5) (R-R) ²	(6) (1)x(5)
0.6	10%	6%	1%	1	0.6
0.2	12%	2.4%	3%	9	1.8
0.1	5%	.5%	-4%	16	1.6
0.1	1%	.1%	-8%	64	6.4
				$\bar{R}=9.0\%$	$\sigma^2=10.4$
					$\sigma = 3.23\%$

In the above case the variance, σ^2 , of the returns from the expected or mean return is shown, namely 10.4, and the standard deviation, σ , which is 3.23%, of the returns.

The above principle can now be applied to more securities.

21. See Markowitz, H.M., Portfolio Selection, p. 6.

Security	Mean Returns μ	Variance of Returns σ^2	Correlation co-efficients(r) ²²
(1)	$\mu_1 = .08$	$\sigma_1^2 = 1$	$r_{12} = 0.090$
(2)	$\mu_2 = .06$	$\sigma_2^2 = 1$	$r_{23} = 0$
(3)	$\mu_3 = .04$	$\sigma_3^2 = 1$	$r_{13} = 0$

Let X_1 , X_2 , and X_3 represent the fraction of the portfolio invested in securities 1, 2 and 3. Therefore, $X_1 + X_2 + X_3 = 1$. 1 then represents total funds, say R10,000.

The expected return on the portfolio as a whole, (consisting of 3 securities in this case), will be

$E = X_1 \mu_1 + X_2 \mu_2 + X_3 \mu_3$, where E is the expected returns from 3 securities. E is then a weighted expected return of the whole portfolio. The weights are the amounts invested in each security. The expected yield on the whole portfolio is the expected yield of security 1 multiplied by the proportion of funds invested in security 1, plus the expected yield from security 2 multiplied by the proportion of funds invested in security 2, and so on for any number of securities. If $\mu_1 = .08$, $\mu_2 = .06$, $\mu_3 = .04$, and $X_1 = .3$, $X_2 = .5$, $X_3 = .2$,²³ then

$$E = .08(.3) + .06(.5) + .04(.2)$$

$$= .062 \text{ or } 6.2 \text{ per cent.}$$

If we substitute $(1 - X_1 - X_2)$ for X_3 , (that is $X_3 = 1 - X_1 - X_2$), we obtain $E = X_1 \mu_1 + X_2 \mu_2 + (1 - X_1 - X_2) \mu_3$

$$= X_1 (\mu_1 - \mu_3) + X_2 (\mu_2 - \mu_3) + \mu_3,$$

22. To reduce risk r must be less than one. ²The r's of 0.090, 0, 0 are assumed. For simplicity we assume $\sigma_1^2=1$, $\sigma_2^2=1$ and $\sigma_3^2=1$.

23. $X_1 + X_2 + X_3$ must add up to 1, and represents R10,000. In our example R3,000, R5,000 and R2,000 are put into securities 1, 2 and 3 respectively. Any other combination is also possible, provided it adds up to 1.

which gives the expected return on the portfolio, which is

$$\begin{aligned} E &= X_1(.04) + X_2(.02) + .04. \quad \text{With the given values for} \\ X_1 \text{ and } X_2 \text{ the expected return will be } &(.3)(.04) + (.5)(.02) + .04 \\ &= 6.2 \text{ per cent.} \end{aligned}$$

$$E \text{ can also be written as } .062 = .04X_1 + .02X_2 + .040$$

$$= .04(.3) + .02(.5) + .040$$

All portfolios with an expected return E of .062 must satisfy the above equations.

For X_1 and X_2 the portfolio must satisfy the following equation:-

$$\begin{aligned} .022 &= .04X_1 + .02X_2 \\ &= .04(.3) + .02(.5) \\ &= .012 + .010 \end{aligned}$$

From the above we construct iso-mean lines, which are lines showing the expected returns from combinations of X_1 , X_2 and X_3 in the portfolio. These E lines will show the various combinations of securities which will yield a given expected or desired return, or the μ values taken from our table above, as well as the proportions invested in each security.

The variance for the portfolio containing securities X_1 , X_2 and X_3 must then be found, and the V ellipses or isovariance lines constructed, which is defined to be the set of all points (portfolios) with a given variance of return. The variance can be written in a different form. The basic equation is

$$V = X_1^2 \sigma_1^2 + 2X_1X_2 \sigma_{12} + 2X_1X_3 \sigma_{13} + X_2^2 \sigma_2^2 + 2X_2X_3 \sigma_{23} + X_3^2 \sigma_3^2,$$

where V = variance

σ_{12} = co-variance of returns from securities 1 and 2.

σ_{13} = co-variance of returns from securities 1 and 3.

σ_{23} = co-variance of returns from securities 2 and 3.

The numerical relationships of the co-variances can be calculated from the following relationships:-

$$\sigma_{12} = r_{12} \sigma_1 \sigma_2$$

$$\sigma_{13} = r_{13} \sigma_1 \sigma_3$$

$$\sigma_{23} = r_{23} \sigma_2 \sigma_3$$

$r_{12} = 0.090$, $r_{23} = 0$, and $r_{13} = 0$. Substituting these values in the above equation we obtain:-

$$V = X_1^2 + 0.180X_1X_2 + X_2^2 + X_3^2$$

We calculate V by substituting $1 - X_1 - X_2$ for X_3 , that is, $X_3 = 1 - X_1 - X_2$.

Then

$$V = 1 - 2X_1 + 2X_1^2 + 2.180X_1X_2 - 2X_2 + 2X_2^2 \text{ (Equation A)}$$

We can take the partial derivative with respect to X_1 , and then the partial derivative with respect to X_2 , and set each equal to 0. Then

$$\frac{\partial V}{\partial X_1} = 4X_1 + 2.180X_2 - 2 = 0$$

$$\frac{\partial V}{\partial X_2} = 4X_2 + 2.180X_1 - 2 = 0$$

Solving the two equations simultaneously, we get a value of 0.3236 for each of X_1 and X_2 . Inserting this value in equation A above, we find $V = 0.353$, which is the minimum value of V. The formula for the variance (for 3 securities) is

$$\begin{aligned} V = & X_1^2(\sigma_{11} - 2\sigma_{13} + \sigma_{33}) + X_2^2(\sigma_{22} - 2\sigma_{23} + \sigma_{33}) \\ & + 2X_1X_2(\sigma_{12} - \sigma_{13} - \sigma_{23} + \sigma_{33}) + 2X_1(\sigma_{13} - \sigma_{33}) \\ & + 2X_2(\sigma_{23} - \sigma_{33}) + \sigma_{33}. \end{aligned}$$

This expresses V in terms of X_1 and X_2 .

The iso-mean lines are parallel lines, and the centre of the system of ellipses represents the minimum variance or V. As we move away from the centre point, V increases, and thus the risk, but E will change as well.

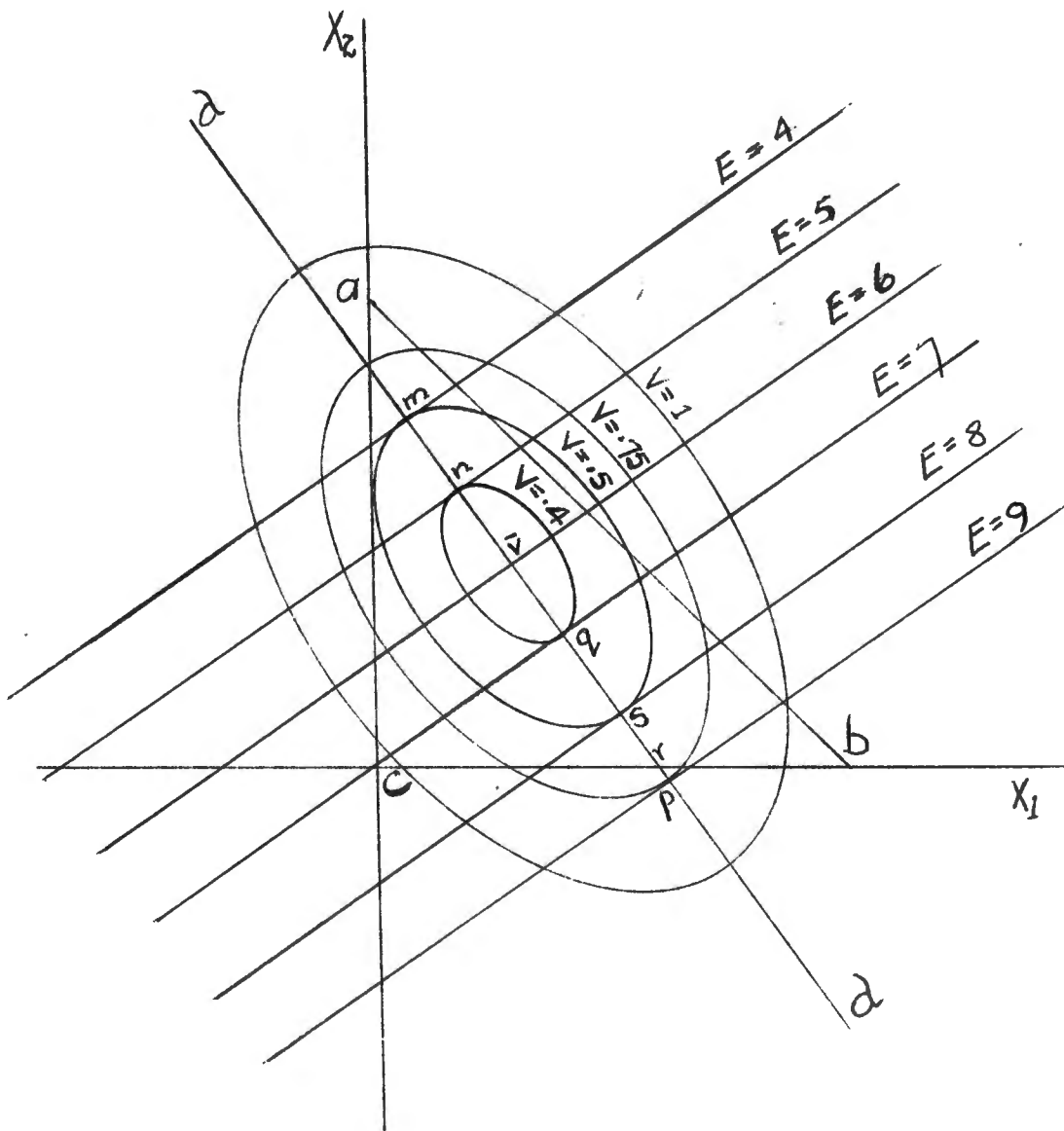
Let us take a hypothetical example first. The minimum

variance can be obtained in only one way, but any given variance can be obtained in a number of ways by combining securities 1, 2 and 3 in different proportions. Point $\bar{v}$ represents the minimum variance of the portfolio. This is obtained with X_1 in security 1, and X_2 in security 2, and $1 - X_1 - X_2$ in security 3.

The diagram below is based on Markowitz's diagram.²⁴

FIGURE 9

Efficient Portfolios and the Critical Line



24. See Markowitz, H.M., Portfolio Selection, p.138.

The triangle abc represents the attainable sets of portfolios. The lines $E = 4$, $E = 5$, $E = 6$, $E = 7$, and $E = 8$ are loci points representing portfolios with expected return of 4%, 5%, 6%, 7% and 8% respectively. $V = 1.00$, $V = .75$, $V = .50$, $V = .40$ are iso-variance ellipses. When we move along the E line ($E = 4$) from left to right, (giving the same expected return on every point), we find that this line intersects the iso-variance lines $V = 1.00$, $V = .75$, but is tangent to $V = .50$ at point m , which for this given return is the smallest variance. Similarly, the point with the smallest variance for any other iso-mean line is that point where this line is tangent to an iso-variance curve, that is point n has a smaller variance ($V = .40$) than any other on the line $E = 5$; the point $\bar{v}$ has a smaller variance than any other on the line $E = 6$; the point q has a smaller variance ($V = .40$) than any other point on the line $E = 7$; and the point s has a smaller variance ($V = .50$) than any other point on the line $E = 8$. The line dd is the locus of all tangencies between iso-mean (E) lines and iso-variance ellipses; it is therefore the locus of all points which minimise variance among portfolios with the same expected return.

The points m , n , $\bar{v}$, q , and s are on the critical line, and at these points variance is minimised for some expected return. The portfolio represented by point $\bar{v}$ is considered an efficient portfolio, because it has a smaller variance than any other portfolio, that is, no other portfolio can have a greater expected return with the same or smaller variance, and no other portfolio can have a smaller variance with the same or greater expected return. The portfolios represented by points m and n are both inferior to $\bar{v}$, for both offer a smaller expected return with greater variance. Points q and r also represent efficient portfolios; the expected return is greater, but the greater return is accompanied by an increase in variance (risk). Any point on the critical line between $\bar{v}$ and r will represent an efficient portfolio. The portfolio represented by point p is neither efficient nor inefficient, but is non-legitimate or unattainable, because it lies outside the triangle abc . Any point between r and b also represents an efficient portfolio. The efficient set of portfolios therefore represents points of best combinations of securities to obtain certain expected returns (E) with minimum V 's.

We may now utilise the above knowledge derived from Markowitz to find efficient portfolios based on the μ values and variance given above in our example. Comparable models have been constructed, but yielding different results.

For the given μ values of securities 1, 2 and 3, namely 8 per cent, 6 per cent and 4 per cent, we can calculate different E's, between 4 and 8 per cent. This can be done with the aid of a linear equation, which is arrived at from our previous equations for E. We have defined

$E = \mu_1 X_1 + \mu_2 X_2 + \mu_3 (1 - X_1 - X_2)$, where $\mu_1 = 8$ per cent, $\mu_2 = 6$ per cent and $\mu_3 = 4$ per cent.

Thus $E = 8X_1 + 6X_2 + 4(1 - X_1 - X_2)$

Then $E = 8X_1 + 6X_2 + 4 - 4X_1 - 4X_2$

Therefore $E = 4 + 4X_1 + 2X_2$.

We can now insert values for X_2 to find X_1 , for given values of E, namely 4, 5, 6, 7 and 8. For example, if we want to find X_1 for various X_2 's for $E = 6$, we use the equation

$$E = 4 + 4X_1 + 2X_2, \text{ that is, } 6 = 4 + 4X_1 + 2X_2 \text{ or}$$

$$- 4X_1 = 4 - 6 + 2X_2$$

$$4X_1 = 6 - 4 - 2X_2$$

$$4X_1 = 2 - 2X_2$$

$$X_1 = \frac{2 - 2X_2}{4}. \quad \text{If we take}$$

$$X_2 = .0, \text{ then } X_1 = \frac{2 - .0}{4} = .5$$

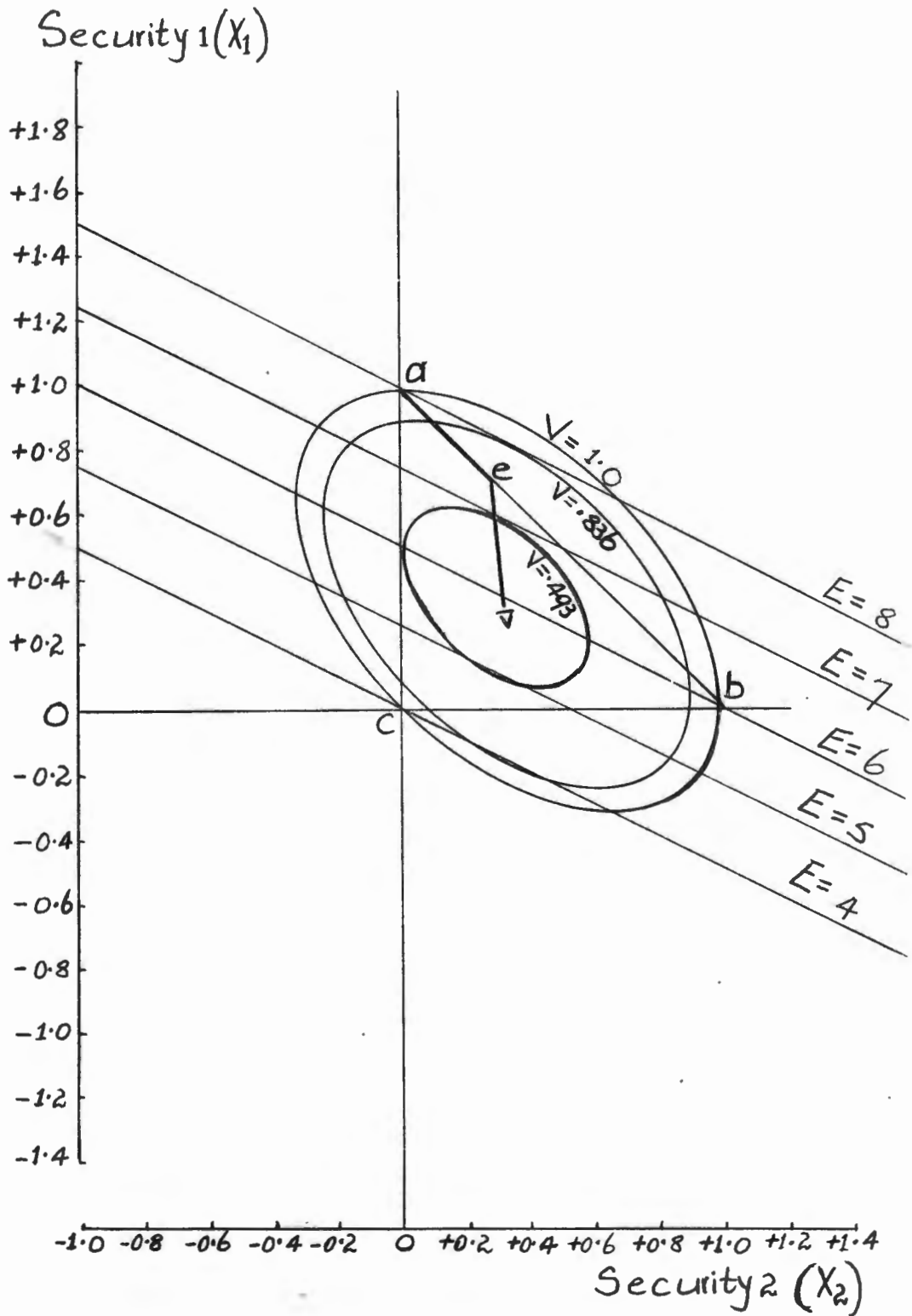
This means that .5 will be invested in security 1, .0 in security 2, and .5 in security 3. This will give a return of 6 per cent. Or if we take $X_2 = .2$, then $X_1 = \frac{2 - 2(.2)}{4}$

$$= .4$$

This means that .4 will be invested in security 1, .2 in security 2 and .4 in security 3, and will also give a return of 6 per cent. To plot an iso-mean line (E line), for $E = 6$ on a diagram, we need to find the corresponding values for X_1 and X_2 on the above basis. The same must be done for all E's, giving the parallel E lines in the figure below. The E lines will then represent all combinations of the three securities that will yield a given expected or desired return.

FIGURE 10

Efficient Portfolios; E-V Hypothesis



On the vertical axis we measure the proportion of funds (X_1) invested in security 1, and on the horizontal axis we measure the funds placed in security 2, that is, X_2 . The balance of the funds will be in security 3, all adding up to 1, or R10,000. Let us take a point with co-ordinates + 0.6 and + 0.2. This means that 0.6 of the fund or R6,000 is in security 2, 0.2 or R2,000 in security 1, and 0.2 or R2,000 in security 3. It will be noted that this point lies within the triangle abc, which is the attainable set, or legitimate portfolio combinations which are all possible. If we take a point with the co-ordinates + 0.8 and + 0.6, we have 1.4 or R8,000 in security 2 and R6,000 in security 1, or a total of R14,000, which is in excess of the portfolio fund and unattainable. Any point outside the triangle is unattainable. The area bounded by the triangle abc, therefore, represents the set of portfolios with combinations of the three securities which add up to 1 or R10,000. No security can be assigned a negative weight.

The positions of the E lines are determined by the μ values which we have assumed. For example, $E = 8$ goes through point a, where the whole fund is invested in security 1, and nothing in securities 2 and 3. The μ value for security 1 is 8 per cent. The iso-mean line $E = 4$ goes through point c, where the whole fund is invested in security 3, and nothing in securities 1 and 2. The μ value for security 3 is 4 per cent. The iso-mean line $E = 6$ goes through point b, where $X_2 = 1$, and the whole fund is invested in security 2, and nothing in securities 1 and 3. The μ value for security 2 is 6 per cent. It will be noted that the portfolio at point a is the only attainable portfolio on the $E = 8$ line, since all other points on this line fall outside the attainable set. In the same fashion portfolio c is the only one attainable on the $E = 4$ line. A number of combinations which will yield 5 per cent, 6 per cent, and 7 per cent respectively can be found, namely where any point on the respective iso-mean lines falls within the attainable sets abc.²⁵ Take, for example, the point with the co-ordinates + 0.2 and + 0.65 on the iso-mean line $E = 7$. This implies that R2,000 will be invested in security 2, R6,500 (0.65) in security 1, and R1,500 (or 0.15) in security 3. The return on this combination

25. The same would apply to E's of 5.5, 6.5 and 7.5 per cent.

must be 7 per cent.²⁶

It will be noted from figure 10 that the iso-mean lines (E lines shift upwards for an increase in E. The μ of security 1 has been taken to be the highest, and as we move upwards, we invest more and more in security 1, with a maximum of 1.0 (or R10,000), giving an E of 8 per cent, and less in securities 2 and 3 combined, and hence the increased E. The increased E is, however, only obtained by an increase in V, and therefore, an increase in risk.²⁷

A portfolio with a minimum V within the attainable set abc, with reference to a given E-line (iso-mean line), will be the point of tangency between that E-line and a V ellipse. Such a point of tangency is shown in the above figure, where the ellipse $V = .493$ is tangent to $E = 7$.

In the above figure the thick line $\bar{V}ea$ represents an efficient set of portfolios, with $\bar{V}$ the minimum variance of .353. Any point on the $\bar{V}ea$ line will represent an efficient portfolio. The points on $\bar{V}e$ represent efficient attainable portfolios starting with the minimum V, and consist of points of tangency between increasing V ellipses and E lines; the points on ea also represent efficient attainable portfolios, with increasing V and E.

The line $E = 7$, on which $X_2 = 1.5 - 2X_1$, is found to touch the ellipse with $V = .493$ at $X_1 = .597$, $X_2 = .306$ approximately. This combination of .306 and .597 in securities 2 and 1 respectively gives an attainable portfolio of R3060 in security 2, R5970 in security 1 and R970 in security 3 with an E of 7 per cent and V of .493. Now take the coordinates $X_2 = +0.1$ and $X_1 = +0.9$ of a point on the straight line ea , giving a portfolio of R9,000 in security 1, R1,000 in security 2 and nil in security 3. Here E is found to be 7.8 but V has increased to .836. The portfolio with a minimum V, that is $V = .353$, which is represented in the figure by $\bar{V}$, will yield 5.94 per cent, with R3,236 in security 1, R3,236 in security 2 and R3,528 in security 3, that is

26. This can be tested with the following formula (already given):-

$$\begin{aligned} E &= X_1\mu_1 + X_2\mu_2 + X_3\mu_3 \\ &= .65(.08) + .2(.06) + .15(.04) \\ &= 7 \text{ per cent} \end{aligned}$$

27. The isovariance ellipses have not been plotted exactly on the diagram above.

$$\begin{aligned} E &= X_1 \mu_1 + X_2 \mu_2 + X_3 \mu_3 \\ &= .3236(.08) + .3236(.06) + .3528(.04) \\ &= 5.94 \text{ per cent.} \end{aligned}$$

Thus a portfolio with an E of 7.8 and $V = .84$ represents a portfolio with an increased return accompanied by an increase in V or risk. Both these portfolios are efficient, and we cannot say which one of the two the individual will choose. If he is a risk-lover, he may choose the latter one, and a risk-avertter the former. The explanation above, in terms of E and V, cannot provide the answer to an optimum portfolio, or an answer to which of the attainable, efficient portfolios will be chosen. All we have explained is that each point on the $\bar{V}$ ea line represents an efficient portfolio, namely the maximum E that can be attained with a given level of risk(V), or the minimum risk (V) that can be obtained with a given E. The actual choice must be explained by utilising utility (indifference curve or risk-return preferences) analysis which will be discussed at a later stage in the present chapter. Markowitz's E-V hypothesis does serve the purpose of showing that, if expected return and risk of combinations of securities are technically (or mathematically) formalised in terms of the mean value and variance of the possible outcomes of the returns from it, the individual will diversify his portfolio in an attempt to maximize E at respective levels of risk.

Another advantage of the E-V hypothesis is that it can be computerised for a combination of hundreds of securities. We feel that the above analysis can be applied to different categories of investments. Security 1 may be taken to stand for a combination of ordinary shares, security 2 for a combination of fixed-interest securities, and security 3 for money and near-money balances.

The problem, however, remains complex. Whenever a new security is purchased and added to the portfolio, or whenever a security is sold out, either wholly or partially, both the expected return and variance of the portfolio will change.

In their article Clarkson and Meltzer adopted what is known as the heuristic approach.²⁸ They pointed out that a positive theory of

28. See Clarkson, G.P. and Meltzer, A.H. "Portfolio Selection: A Heuristic Approach", reprinted in Wu, H.K. and Zakon, A.J., editors, Elements of Investments: Selected Readings, pp.313-326.

portfolio selection is non-existent. A heuristic model of portfolio selection is normally written as a computer programme, and simulates the procedures used to select particular portfolios. The individual is still the decision-maker, but our simulation asks the computer programme to select a portfolio based on data and knowledge available to the individual. (Simulation is really an imaginary model processed and fed into a computer to get an answer.) "When the rules for processing information (or heuristics) yield results consistent with those obtained by human subjects, the model is said to have 'simulated' the decision process; the set of heuristics (or simulation model) has 'predicted' the behavior of the subject."²⁹ Through a series of tests, the model can be designed closely to approximate the behaviour of the subject. It is still accepted that it is a problem of decision-making under uncertainty, but it is assumed that thinking processes can be isolated and identified and that they can be represented or translated into a set of statements and rules which can be transformed or coded into a computer programme. A model is constructed and tested against a wide variety of observed behaviour, and if the human subject and the computer use similar processes, the computer has successfully simulated the behaviour of the humans, and the computer programme is then sufficient to account for the observed behaviour of the human subject.

Any individual confronted with the task of selecting a portfolio out of a very large number of securities will have at his disposal all the relevant data and information about the companies and the market performance of the share. In selecting his portfolio he will go through a large number of thought processes, taking into account a large number of known facts. The basic rules which lead to a decision to purchase certain securities to be contained in the portfolio and a programme built on the verbalised thought processes. Not all aspects entailed in selecting the portfolio have been incorporated into the programme. Aspects which were emphasised are the objectives or goals of the investor, the number of percentages to be invested in fixed-interest stock, debentures, preference shares and ordinary shares, the selection of suitable industries, and the selection of specific companies. All these aspects are programmed and computerised, and optimal portfolios

29. See Clarkson, G.P. and Meltzer, A.H., Op. cit., p. 314.

selected. In Markowitz, as well as Clarkson and Meltzer, the relationships and procedures by which information about securities is transformed into conclusions about portfolios are formalised.

2. The Utility Maxim

The individual's taste for investment in stock exchange securities will be determined by factors such as his existing wealth, a wealth-effect which he may experience, risk-aversion, his utility functions, and the uncertainty of the return from his investments. (By investing in stock exchange securities, the individual expects a wealth-effect.) The individual who is experiencing or has experienced a wealth-effect may, of course, do several things, that is, he may buy more securities (re-invest), consume more, or keep more money and near-money balances.

Past investment decisions are constantly reviewed in the light of new knowledge, new risks, new tastes, with the result that the shape of the individual's preference curves may also change over time. As far as stock exchange investment is concerned there is no such thing as a once and for all investment (or decision), as we have already pointed out. The composition or structure of a portfolio will therefore be largely based on risk-return preferences and the taste for investment. Lenders (or creditors) select a diversified portfolio of financial assets with the aim of maximizing the utility function of such a portfolio, depending also on such factors as risk-aversion, taste for risk, taste for investment, debt-wealth and income-asset position. Therefore, in choosing between various alternatives, the individual will choose the alternative with the highest expected utility.

In terms of the utility analysis the individual attaches certain utilities to the possible outcomes, and where he is faced with uncertain alternatives he will choose the one with the greatest expected value of utility. Utility analysis has been used frequently as a framework to explain rational human behaviour.

In the previous section, when discussing Markowitz, we have taken the arithmetic mean (E) to signify the magnitude of the expected return, and the variance (V) was a measure of the risk surrounding the projections of the expected return. Use was also made of probability notions. From chapter VI we know that Shackle and Knight were particularly critical of the use of probability notions in explaining

the behaviour of the uncertain investor.

In explaining the demand for and supply of assets and the establishment of equilibrium, Chase for example, used the tools of consumption analysis (with the necessary modifications) used by Hicks in his Value and Capital, namely the indifference or utility curve analysis. The tools of consumption analysis (even if modified) as applied to asset markets, particularly financial asset markets, may not be entirely satisfactory, for the reason that indifference analysis as applied to consumption depends on tastes which must be taken as given by the economists and does not involve any economic questions, whereas the decision to hold financial assets, (or bundles of financial assets), particularly financial assets with varying yields, prices, risks and different degrees of liquidity involves pertinent economic questions. An answer must be found for the question of why individuals prefer to hold certain combinations of financial assets at certain times. The utility derived from a financial asset is locked up in the expectation that the asset may add to the individual's income and wealth and he will carefully weigh the possible contributions of alternative financial asset holdings, always bearing in mind that one financial asset is not a perfect substitute for another. A diversified portfolio is held to reduce the dispersion of the expected contributions from the assets.

The shape of the utility curves (indifference curves) will be influenced by the individual's attitude towards risk. In utility analysis, the certainty-equivalent approach again fails to explain diversification, since the utility or indifference curves will be straight lines. The utility curves will be straight lines for the risk-neutral individual. A straight line utility curve implies constant marginal utility of return over its entire range, and a security is chosen on the basis of expectation of return alone.

For the conservative investor, or risk-averter, the utility or indifference curves will be convex, showing diminishing marginal utility of return. He must be compensated by a higher expected rate of return for taking on more risk. The risk-lover will be faced with a concave utility or indifference curve for every asset, because he prefers dispersion, and the concave curves reflect "...the desirability of the increased marginal dispersion of one asset as its proportion in the bundle is increased."³⁰ Such a curve shows increasing marginal

30. Chase, S.B. (Jr.), Asset Prices in Economic Analysis, p.68.

utility of return. Such an individual may hold only one asset on which he expects the maximum return. There is no tangency of the budget constraint to an indifference curve and he considers financial assets to be perfect substitutes.

The amount an individual will hold of any asset will be shown by the tangency of his budget constraint (wealth) with an indifference curve, with all other assets lumped together on the other hand. He will allocate the funds at his disposal in such a manner that the ratio of the discounted marginal contribution to price is the same for all the assets he holds. The objective of portfolio selection and management is then actually to equalise marginal expected rates of return on all financial asset holdings in a diversified portfolio. Such a portfolio will also include money and near-money balances, since the return on such balances is not zero.³¹

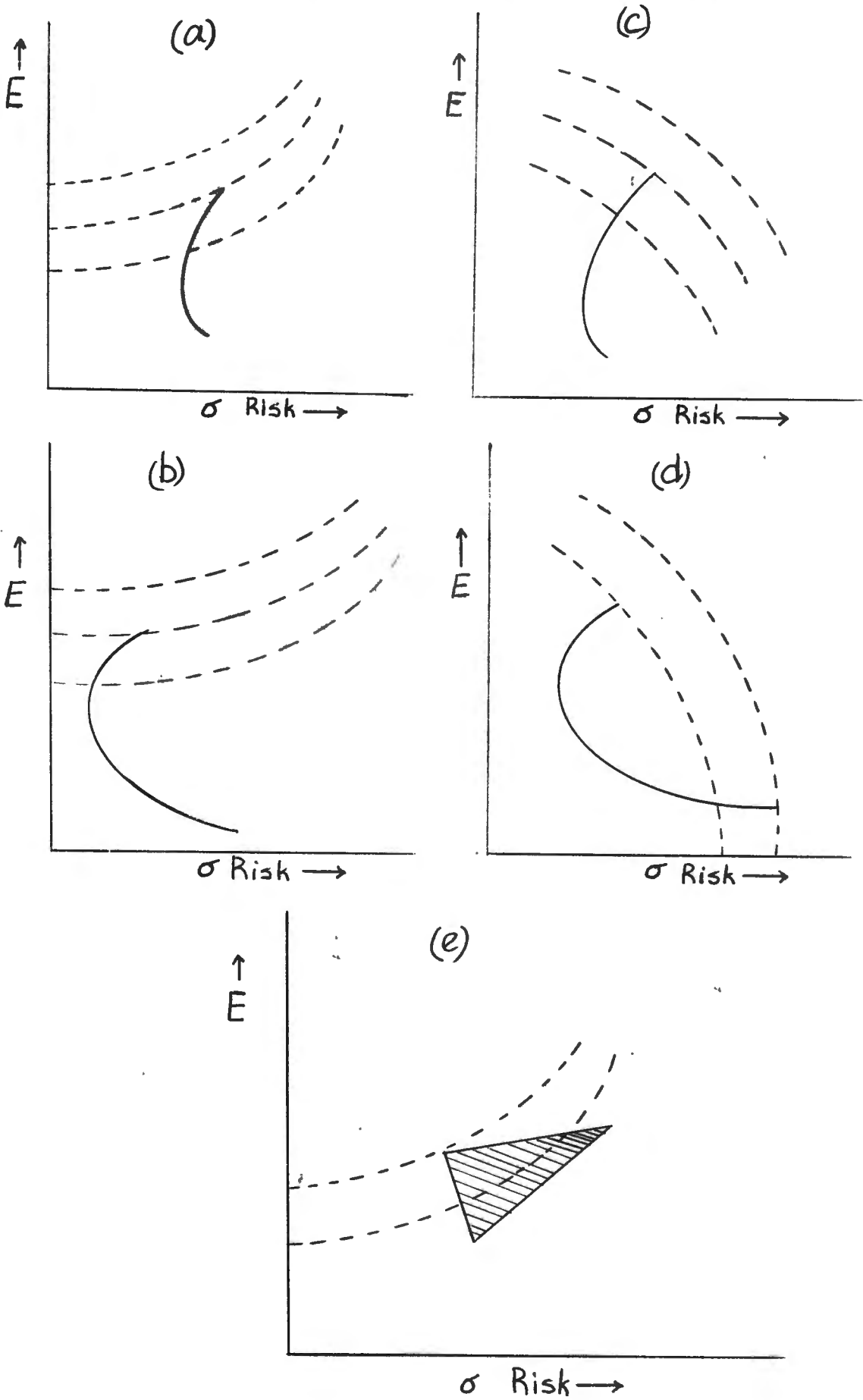
Tobin³² illustrated the types of portfolio choices graphically. Preferences are again described by a set of utility curves, measuring expected return on the y-axis and risk (which can be measured either by the standard deviation or variance) on the x-axis. The individual will then choose the attainable combination that lies on the highest indifference or utility curve, that is, the curve that promises the highest expectation of utility. According to Tobin the individual can choose one of the extreme points of the set of attainable combinations, or some other intermediate point. The extreme points really represent undiversified portfolios elected by risk-lovers, because diversification cannot add to the chances of exceptional gain which they expect from a given asset. An intermediate point represents a diversified portfolio, and is a point of tangency between an indifference or utility curve and the efficient opportunity locus. Tobin summarised his argument in a few graphs, which are reproduced below. The first five diagrams illustrate choices of extreme points by risk-aversers and risk-lovers. The sixth diagram shows the choice of an intermediate point by a risk-averter. The combinations of risk and expected return constitute the opportunities available to the individual.

31. Also see Hicks, J.R., Critical Essays in Monetary Theory, p.117.

32. Tobin, J., "The Theory of Portfolio Selection", in Hahn, F.H. and Brechling, F.P.R., editors, The Theory of Interest Rates, pp.3-51.

FIGURE 11

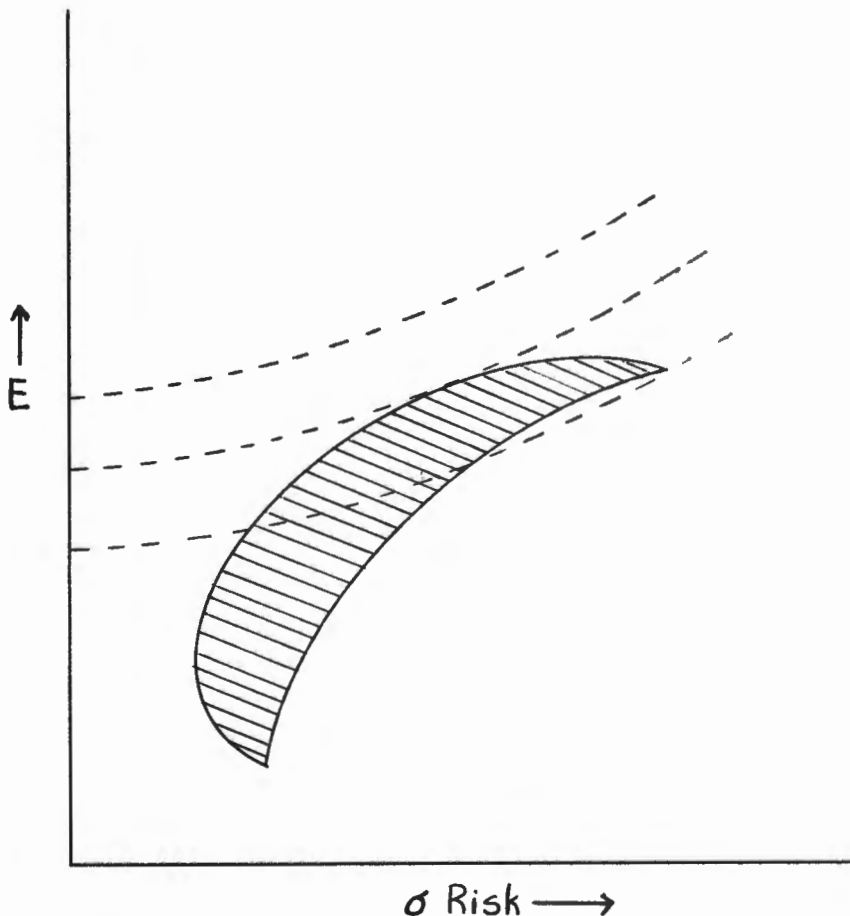
Choices of extreme Points by Risk-lovers and Risk-aversers



In figure 11 (a) maximum risk and return is chosen by a risk-avertter. In figure 11 (b) maximum return and maximum risk on efficient locus is chosen by a risk-avertter. The choice of maximum risk and return by a risk-lover is depicted in figure 11 (c). Figure 11 (d) shows the situation where maximum risk is chosen by a risk-lover. The choice of minimum risk by a risk-avertter is illustrated in figure 11 (e). It will, however, seldom happen that a risk-avertter will choose an extreme point represented by an undiversified portfolio or a sequence of undiversified portfolios. These extreme points illustrated in figure 11 above do not represent tangencies between an indifference curve and the opportunity locus.

FIGURE 12

Choice of an Intermediate Point by a Risk-avertter

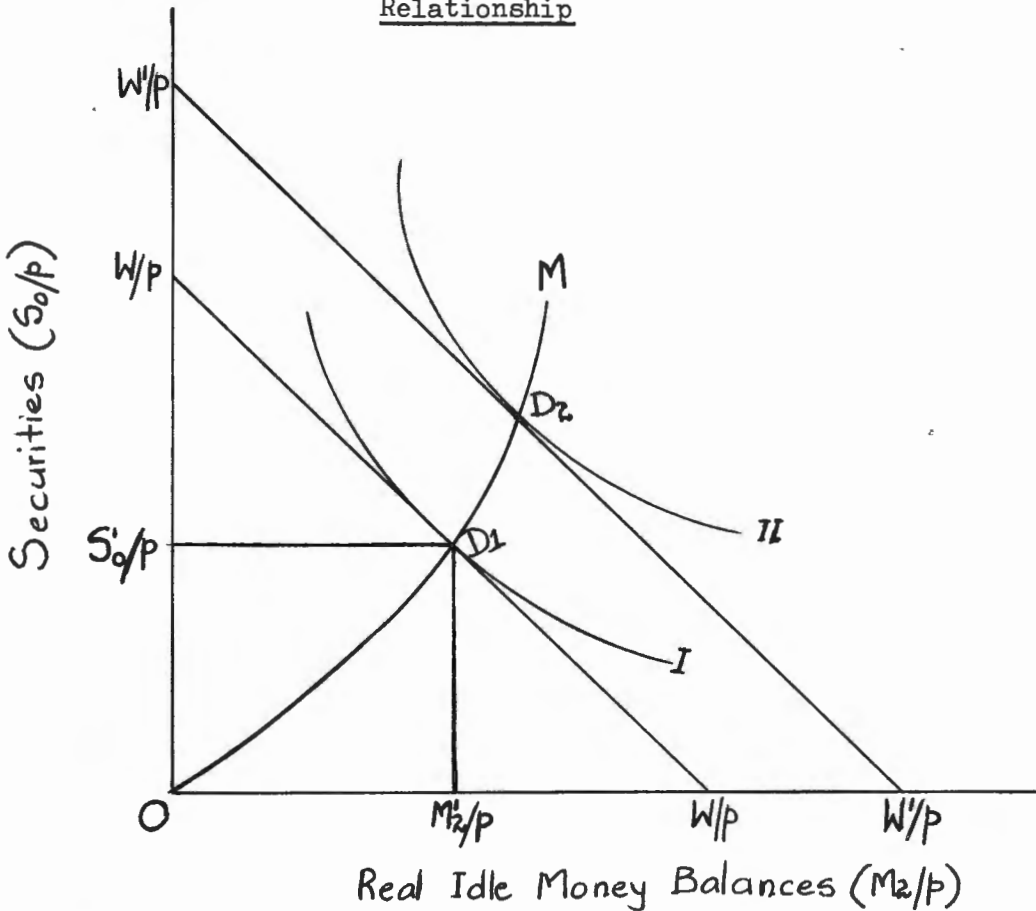


The choice of an intermediate point, as illustrated in figure 12 above represents the choice of a diversified portfolio by a risk-avertter. The point chosen is a tangency between an indifference curve and the efficient opportunity locus. At this point of tangency the risk-avertter is maximizing his utility from a diversified portfolio.

The utility maxim is normally explained with the familiar downward sloping equal utility curves and a budget-constraint. For simplicity, we shall assume two types of assets, namely, stock exchange securities on the one hand and real idle money balances on the other. (The real idle money balances may be considered as being held under the precautionary motive.) This is illustrated in figure 13 below.

FIGURE 13

The Indifference-Curve Equilibrium and Wealth-Investment Relationship



The budget constraint is assumed to be based on a given wealth, given the real value of securities and the stock of idle balances, that is, $W/p = S_0/p + M_2/p$, where S_0/p and M_2/p are the given quantities of securities and idle balances, both in real terms. We measure the real value of securities on the y-axis and real idle balances on the x-axis.

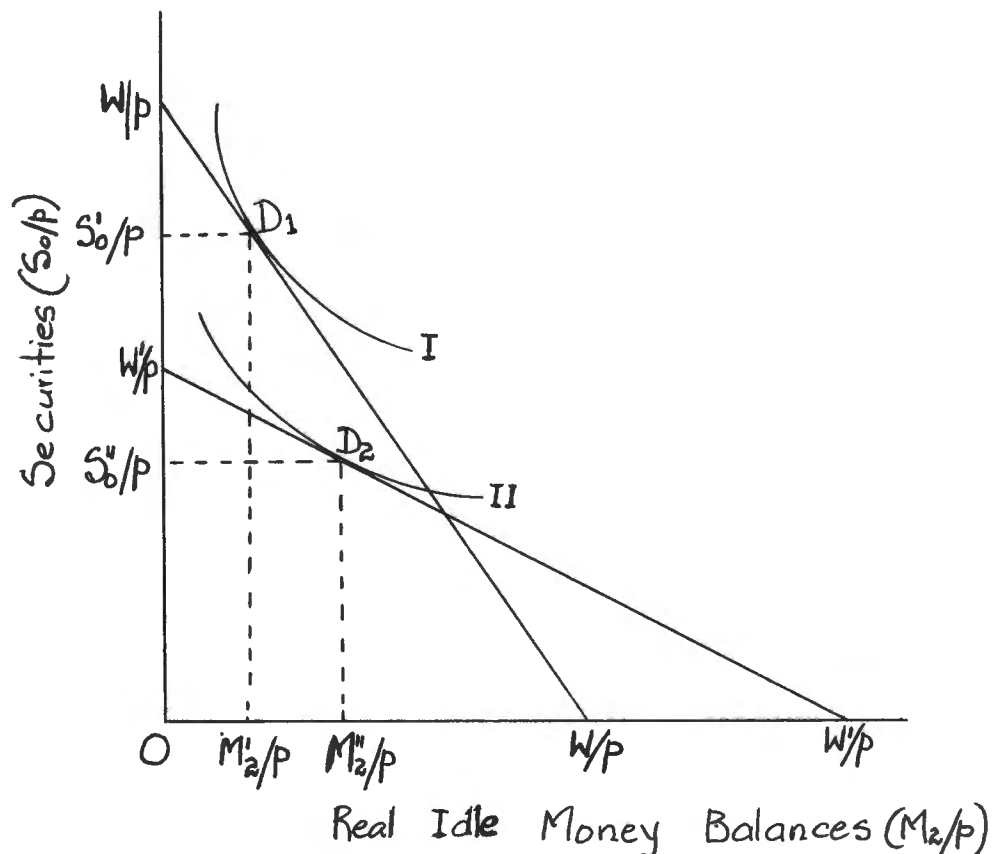
The individual is in equilibrium at point D_1 by holding his wealth W/p in S_0/p securities and M_2/p in real money balances. His budget line is tangent to the highest attainable indifference curve. The individual's real wealth has considerable influence on his demand for securities and money and near-money balances. With an increase in

wealth, the wealth-line (budget constraint) W/p , will shift parallel to itself away from the origin to W'/p . OM represents the individual's wealth-investment curve, which may be linear or non-linear, depending on whether he increases his holdings of real money balances proportionately or not with increases in his wealth. The marginal rate of substitution may shift in favour of stock exchange securities or it may shift in favour of real idle balances. If the increased wealth induces him to assume more risk, he may increase his holdings of stock exchange securities proportionately more for an increase in wealth from W/p to W'/p . His new equilibrium will then be D_2 .

For any change in the price of securities the slope of the budget-constraint will change, and a new equilibrium attained. An increase in the price of securities will add to the individual's wealth in real terms, but he may be able to finance only a smaller holding of securities due to the increase in prices. The result is that we have a positive wealth-effect but a negative price-effect on the holding of securities, with the latter the stronger of the two, as shown in figure 14 below.

FIGURE 14

The Effect of an Increase in the Price of Securities on Desired Holdings of Securities and Idle Money Balances

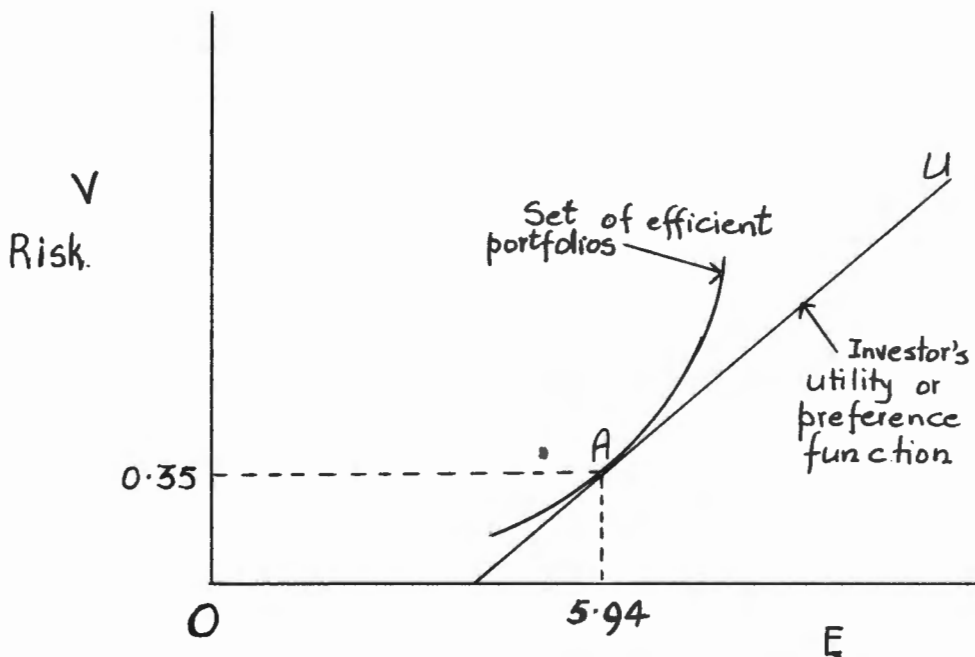


In the above case the individual will hold more real money balances and less securities in his new equilibrium D_2 .

In the previous section we have shown that any point on the line V_{ea} (figure 10) will represent an efficient portfolio, but that the analysis did not show which portfolio the individual would choose. All we did was to demonstrate that a maximum return could be earned for a given variance (risk), or the minimum variance (risk) the individual could obtain for a given return. For the selection of the final portfolio we must bring in some utility function, or subjective risk-return preference, and superimpose on this the efficient portfolio frontier. Any point on the utility curve will represent a combination of return (E) with a certain variance (risk). From the point of view of the individual the optimum portfolio will then be at the point of tangency between the efficient portfolio frontier and the individual's subjective risk-return preference curve. The choice of a risk-averter is shown in figure 15 below.

FIGURE 15

Choice of a Risk-averter in terms of Risk-Return Preference
Function



The portfolio maximizing utility will be the tangency at point A, with say, $V = 0.35$ and $E = 5.94$ per cent, as we have shown in figure 10. The risk-return preference function for a risk-lover would be different. A risk-lover, given the same set of efficient portfolios,

will choose a portfolio with a higher E-V combination. The point of tangency will be to the right of A, that is, he will be moving towards point a on the line $\bar{V}ea$ in figure 10, that is, he will keep on marginally adding funds to security 1 up to point a, accompanied by an increase in V.

A portfolio giving a return of 6.06 per cent with $V = 0.357$ will contain three securities as previously explained in figure 10. Let us assume two of them to be ordinary shares, and one to be a savings deposit. The return on the latter investment is certain, whereas the resultant yields on each of the two ordinary shares are uncertain. We may then utilise Hicks' idea of a marginal advantage to explain the apportionment of a given wealth over the three securities.³³ The wealth must be divided between the three securities to give the best total prospect.

An additional rand invested in security 1 will bring about a marginal expected advantage which measures the gain in utility in respect of the whole portfolio. As more and more of the given wealth is invested in security 1, the return of which is uncertain, the law of diminishing marginal advantage will come into play. The marginal advantage curve for security 1 will therefore slope downwards.

The slopes of the marginal advantage curve for each of securities 1, 2 and 3 will be a function of two factors, namely first, the degree of uncertainty that is attributed to the prospective yield on each security, and second, the degree of risk-aversion itself. If there was no risk-aversion the marginal advantage curves would be horizontal straight lines. The higher the degree of risk-aversion the steeper the slope of the marginal advantage curve for a given security. Let us assume the individual is then absolutely certain about the return on 'security' 3, which is a savings deposit, and that he feels more uncertain about the return on security 1 than on security 2. The expected return on security 1 is however higher than on security 2.³⁴ We may graphically

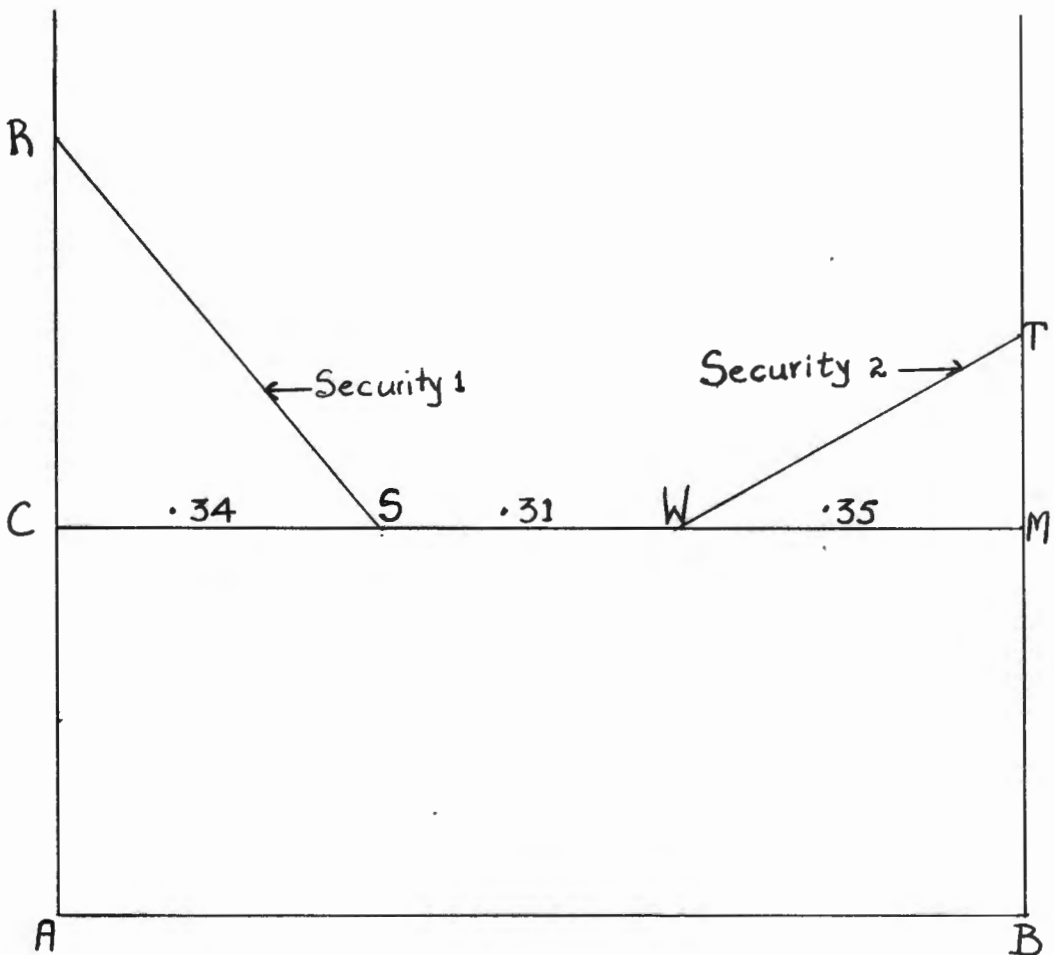
33. See Hicks, J.R., Critical Essays in Monetary Theory, pp.19-31.

34. In our E-V analysis we have assumed the μ values for the securities to be 8 per cent, 6 per cent and 4 per cent on securities 1, 2 and 3 respectively.

depict the possible apportionment of wealth between the three securities for a risk-lover and a risk-averter.

FIGURE 16

Apportionment of Funds by a Risk-Averter in terms of Hicks'
Marginal Advantage Curves



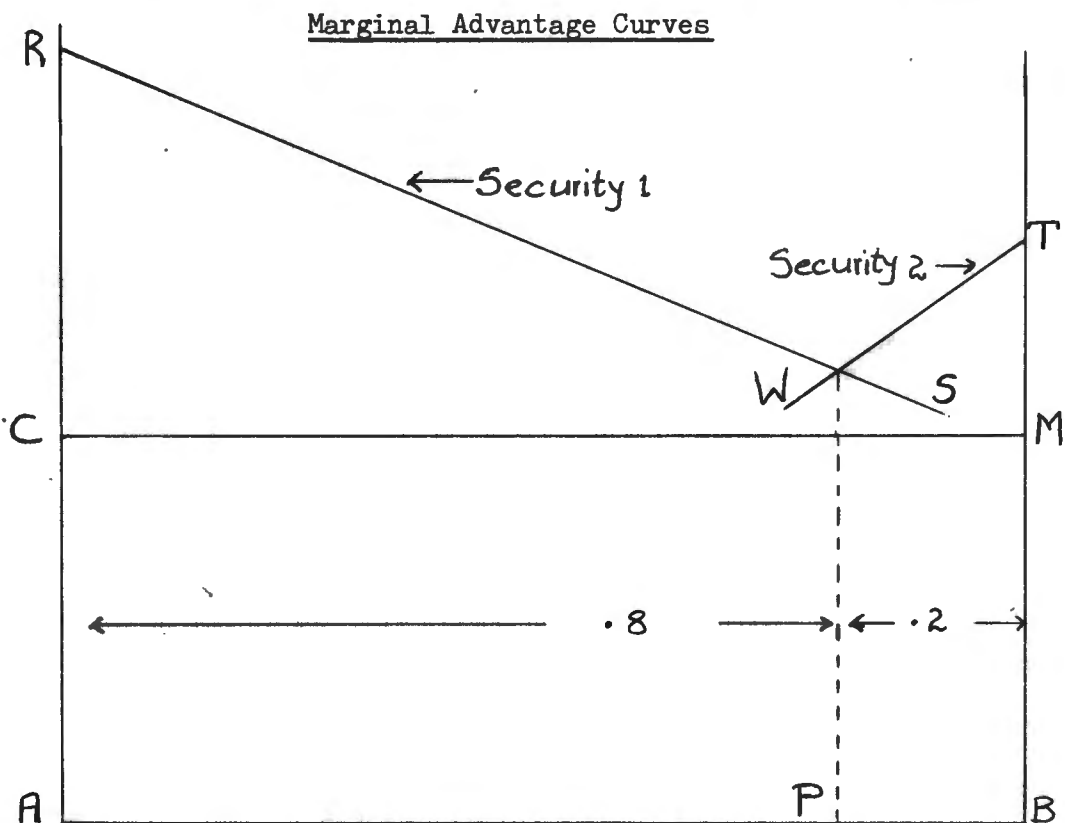
The above diagram shows the apportionment of funds between the 3 securities in the case of a risk-averter. The total funds (AB) invested in the 3 securities add up to 1 or R10,000. The investor will invest R3,400 (CS) in security 1, R3,500 (WM) in security 2, and R3,100 (SW) he will keep in a savings account. From the diagram it will be observed that $CR > MT$ and that the slope of the marginal advantage curve RS is greater than the slope of the marginal advantage curve TW. The individual is more confident about his expected return on security 2; therefore he invested fractionally more in that security. The slope of the marginal advantage curve will in this sense determine the amount of funds allocated to a given security. The fraction of the funds (.31) kept on savings deposit is represented by the

horizontal straight line SW. The above portfolio will give a return of 6.06 per cent and a variance of .357 on our calculations in the previous section.

The risk-lover, given the same three securities, will probably apportion his funds differently. He will be willing to assume increased risk (V) in the expectation of a higher return on his 3 security portfolio. His 'risk-aversion' will be reflected in marginal advantage curves which are not as steep. To increase his return on his whole portfolio he will invest proportionately more in security 1 and less in securities 2 and 3, accompanied by an increase in V. Again the slope of the marginal advantage curve of a given security will determine the funds allocated to that security.

FIGURE 17

Apportionment of Funds by a Risk-Lover in terms of Hicks'



In the above diagram the investment in security 3 dropped out because of the fall in risk-aversion - the individual is a risk-lover. Nothing will be invested in 'security' 3, R8,000 (.8) will be invested in security 1, and R2,000 (.2) in security 2. The portfolio will yield an expected return of 7.6 per cent. It is obvious that the marginal advantage curve RS in figure 16 has a much steeper slope for the risk-avorter than for the risk-lover. We are of the opinion that the

utility maximum must be used in explaining portfolio selection.

D. Conclusions

Before he selects a portfolio, the individual will carefully consider the internal and external risks which he has to assume. Risk cannot be easily cardinally measured, but the individual will still subjectively assess the degree of risk attached to any course of action. The strategy the individual will adopt depends on whether he is a risk-avorter or a risk-lover. The multiperiod financial asset accumulation plans of the individual will be strongly influenced by his attitudes toward risk. The allocation of his wealth between various alternatives will therefore be influenced by his risk attitudes. The composition of the financial asset portfolio for each individual will be different.

The individual will diversify his financial asset portfolio in an effort to minimise the impact of a single decision or judgment on his financial position. In order to diversify properly, the returns and relative price changes of the constituent securities should not be highly correlated. The more highly correlated the returns and relative price movements of the constituent securities, the less powerful is diversification. Diversification also has certain limitations.

The individual will try to maximize the utility function of his portfolio. His utility functions will, however, shift from time to time due to changes in risks and expectations. Portfolio equilibrium is a stock equilibrium and corresponds to the market day equilibrium which we have discussed in chapter VI.

We have discussed Markowitz's E-V hypothesis. In this case each security presents the individual with a different return-risk (mean-variance) combination. All the constituent securities together will then give the mean-variance of the whole portfolio, which is the important magnitude required. The individual can only obtain an increase in expected return by assuming more risk, that is an increase in variance. Or alternatively, the individual can obtain a decrease in risk, (V) but only by giving up some expected return. The E-V hypothesis cannot provide the answer to exactly which portfolio in the efficient set will be chosen. The actual choice must be explained by utilising utility analysis.

In terms of the utility maxim the individual will attach

certain utilities to the possible outcomes. The shape of the indifference curves will be influenced by the individual's attitudes toward risk. The risk-averter will be faced with a convex curve showing diminishing marginal utility of return. The risk-lover will be faced with a concave curve.

The equilibrium position of the individual and the choice of a particular portfolio can then be explained in terms of equal utility curves and a budget-constraint. Given the set of efficient portfolios in terms of the E-V hypothesis, we have shown, with the aid of a return-risk preference or utility curve, that the individual will choose a specific portfolio. The portfolio chosen will depend on whether the individual is a risk-averter or a risk-lover.

In our view Hicks' exposition in terms of marginal advantage curves appears to be sensible. The reason for this is that the slope of the marginal advantage curve really reflects two important factors, namely, the uncertainty of the expected yield of a given security and the degree of risk-aversion itself. We have in a sense integrated Hicks' analysis with our E-V model.

We may conclude that we support the expected utility maxim in discussing the problem of portfolio selection, whilst not rejecting the mean and variance (E-V) as criteria of portfolio selection.

PART THREE

CHAPTER IX

MARKET PRACTICES AND TECHNIQUES

A. Introduction

In an organised stock exchange a number of practices and techniques are usually found, mainly to facilitate trade and stock exchange procedures and techniques, for example, carry arrangements (margin accounts) for creditworthy clients, option transactions, pyramiding, averaging, short selling, and so forth. In this chapter some of these practices and techniques will be described and discussed.

B. Carry Accounts or Margin Trading

Margin buying is merely a special arrangement whereby credit is extended to an individual by a broker within the legal framework (The Stock Exchanges Control Act, 1947, as amended), and in terms of the Rules and Regulations of the Johannesburg Stock Exchange. When a broker carries an individual, that is when the latter trades on the margin, it simply means that the individual trades on account. Margin trading actually refers to margin buying and to short selling, both of which are taking place on the Johannesburg Stock Exchange.

In terms of section 13 of the Stock Exchanges Control Act, any person must, not later than thirty days after the date of purchase, pay the stockbroker any amounts due in respect of stocks and shares purchased, except in the case of time transactions. Alternatively, the individual must deposit with the stockbroker "...such stocks or shares as (either alone or together with any stocks or shares so bought which may be held by the stockbroker in respect of the amount owing to him by the purchaser in pursuance of the purchase) may be necessary to provide the minimum cover in respect of the said amount..."¹ In terms of section 13 (1) (c), an individual, if "...indebted to the stockbroker in respect of any transaction in connection with stocks or shares previously entered into on his behalf after the commencement of this Act, must deposit with the stockbroker such stocks and shares as (either alone or together with any stocks or shares so bought or any other stocks

1. The Stock Exchanges Control Act, 1947, as amended, section 13(1) (b).

or shares which may be held by the stockbroker in respect of the amount owing to him by the purchaser in pursuance of the purchase or which may be so held in respect of such debt) may be necessary to provide the minimum cover in respect of the aggregate of the said amount and of such debt." Cash delivery takes place in the next settlement period. For purposes of calculating the amount owing (or the debt), any amount due to the purchaser in the respect of a sale of stocks or shares which have not yet been delivered, may not be taken into account, (section 13 (2)). If a stockbroker sells any stocks or shares on behalf of any individual, that individual must, not later than thirty days after the sale, either deliver or cede to the stockbroker the stocks or shares sold, or he should deposit with the stockbroker the amount for which any such stocks and shares have been sold, or the minimum cover in respect of that amount, if the stocks and shares have not yet been delivered or ceded, (section 13 (3) (a) and (b).) If any individual fails to comply with the above at least seven days before the expiration of the relevant period, and if he still fails to do so after written notice by the stockbroker of his obligation has been given, the stockbroker is entitled to sell (for the account of such individual), sufficient of the stocks and shares held by him on behalf of that individual, to reduce the debt "...to an amount in respect of which any such stocks or shares not sold by the stockbroker, provide the minimum cover..." (section 13 (5) (a).) With reference to section 13 (3) (a) and (b), the stockbroker will buy, for the account of that individual, any such stocks and shares which have not been delivered or ceded, or for which no amount or minimum cover has been deposited. Rules 121, 124, 125, and 127 of the Johannesburg Stock Exchange cover the same ground as section 13 of the Act.

The minimum cover, with reference to any amount (or debt), means listed securities on the Johannesburg Stock Exchange which have a current market value of not less than that amount. In the case of government stock, municipal stock, and stocks and shares issued by certain statutory bodies, the value of the stocks shall be deemed to be ninety per cent, and the value of any other listed stocks and shares fifty per cent of the amount they would realise at the buyers' price quoted before the date on which the cover is provided.

An individual who regularly buys and sells will usually operate such an account, settling the differences between purchases and sales.

An individual buying shares in this manner (on margin) can for any given purchase either (1) pay the full consideration in cash (2) provide minimum cover for the whole amount or (3) pay the amount due partially in cash and provide minimum cover for the remainder. Thus, if fifty per cent of the purchase consideration is paid in cash (or ten per cent in the case of government stock) there is no need for the stockbroker to sell any stocks or shares to reduce the debt to an amount in respect of which the remaining stocks and shares will provide the minimum cover. The scrip left with the broker, (all scrip in respect of a given transaction) after fifty per cent of the purchase consideration has been paid in cash, is sufficient to provide the minimum cover for the amount owing. This means that the broker will have readily realisable stocks and shares with a market value in excess of the amount owing to him. The excess of the market value of the stocks and shares pledged as collateral over the individual's debt is the margin.

The broker usually charges interest, in excess of the prevailing bank lending rate, and payable monthly on the outstanding amount of the carry account. Some broking firms in Johannesburg do not cater for margin trading, owing to the risks involved. The broker will decide whether he is prepared to carry a given individual and this depends on his creditworthiness, the volume of business, the amounts involved, the type of security involved, the investment merits of the security (price stability and so forth), and the value (or amount) of the collateral the individual can pledge. The broker will normally call upon the individual to sign and lodge a pledge form which clearly specifies the conditions under which all carrying will be conducted.

No stockbroker can alienate or pledge any stocks or shares which have been deposited with him as collateral, unless the individual who deposited such stocks and shares has given written permission. The individual must also see to it that the broker issues a receipt or note to the effect that the stocks and/or shares have been deposited, clearly indicating the purpose for which the scrip was deposited, and a careful description of the stocks and shares must be given for purposes of identification.²

The margin can be readily calculated at short intervals, since the market prices of the stocks and shares pledged as collateral are

2. See rule 163 of the Rules of the Johannesburg Stock Exchange.

determined in the market and known. The margin is thus not simply a cash amount deposited by the individual but is a variable, also depending on the market value of the collateral.

The usual transactions recorded in such a carry account are as follows (excluding transactions involving government and other stocks, for which the margin is different, as already indicated). On the debit side of the account:-

- (1) The cost of the shares, including brokerage, stamps, basic handling fee and marketable securities tax.
- (2) The interest on the debit balance.
- (3) The withdrawal of cash by the individual.

On the credit side of the account the following are recorded:-

- (1) The net proceeds of sales.
- (2) The deposit of cash.
- (3) Dividends and interest received by the broker (on behalf of the individual) whilst he is in possession of the securities pledged as collateral.

The following example may suffice to explain the computation of the margin:-

Account - Mr. J. Smith

DR		CR
Purchase 20,000 A.B.C. @ 50 c	R10,000	Deposits of Cash R18,000
Purchase 2,000 P.B. @ 100 c	2,000	
Purchase 12,000 X.Z. @ 200 c	24,000	Sale 10,000 T.P @ 20 c 2,000

The above account reflects a debit balance of R16,000. It is assumed that all shares purchased are pledged as collateral.

The margin is computed by using the following formulae:-

$$(1) \quad M = \frac{V - D}{V}$$

where M = margin

V = value of collateral

D = debit balance

or

$$(2) \quad M = \frac{E}{V} ,$$

where E = equity (that is, value of collateral - debit balance)

V = value of collateral.

In the above example the percentage margin will then be as follows:-

$$\begin{aligned} M &= \frac{36,000 - 16,000}{36,000} \times 100 \\ &= 55.5 \text{ per cent.} \end{aligned}$$

In this case the individual can withdraw R2,000 in cash, or he can purchase additional shares worth R4,000, without depositing more cash, that is on a 50 per cent margin, provided that these additional shares are pledged. The cash withdrawal or the purchase of additional shares will leave the adjusted margin on 50 per cent. Any increase in the value of the collateral will also enable the individual to buy more shares without a further cash outlay. However, should the market value of the shares pledged remain constant (as given), or rise, the client will have an adequate margin to comply with the Act and Rules. However, should the value of the collateral drop by only R4,000, the margin will decrease to 50 per cent, which is the minimum cover permissible.

From the above it is obvious that the margin can shrink considerably for any fall in the market value of the collateral, since the debit balance is fixed (or static). This involves a risk for the broker and from the point of view of the individual can lead to forced selling in a declining market, when he can least afford to sell. Should the margin fall below 50 per cent the broker must call for an additional cash deposit or the individual can deposit additional listed securities as collateral, or both.

In a falling market in general, or declining prices even for a particular given security, the individual should keep a close record of all his trading commitments. This is in any event necessary if he trades in securities of which the prices are highly volatile. The individual should at all costs prevent the broker from selling out the shares to prevent a loss, since the decline in the market value of the collateral may only be temporary, and such a sell-out will only result in capital losses. Trading on a thin margin can be a costly business and is dangerous. These dangers are not inherent in a cash

transaction, particularly if the purchaser can afford to hold the shares during temporary adverse market conditions. The disadvantages, with particular reference to the element of risk, may even outweigh the advantages of additional profit possibilities. The ease with which thin margins can be wiped out and the cumulative effect in an already falling market has been conclusively demonstrated on the Johannesburg Stock Exchange, where share prices (in general) fell by between 15 and 20 per cent in one day (15th March, 1961) over the Commonwealth issue. Some individuals were forced to provide more collateral, and some forced selling took place which aggravated the market decline. The same applied to the New York Stock Exchange in 1929 and during the recession in May, 1962.

It may also conceivably happen that speculators (or short-term traders) indulge in excessive trading (or overtrade) in a bull market. With expectations tending to converge, such trading may result in excessive price rises, which may later turn out to have been ill-founded. This may happen to buyers purchasing shares at the height of a boom on thin margins.

One advantage normally mentioned in respect of margin trading is that an individual can, for a given cash outlay, buy more shares than he would have been able to do in an outright cash purchase. In a bull market this would mean an increased profit rate on the initial cash outlay. With a minimum cover of 50 per cent the individual can buy double the number of shares at a given price, and the additional transaction costs (including interest on the debit balance) can be considered as an offset against the additional expected or realised capital gain and/or dividends received. In a bull market it will thus pay speculators to trade on the margin as long as brokers are willing to carry them. Shares subject to activity volatility, even if price fluctuations are narrow, may be popular with margin traders, where profit is a function, not so much of price differentials, but of the volume of turnover. However, the opposite may also be true. An even more lucrative situation would be where expectations tend to converge in a bull market, and certain shares, or a given share, may enjoy an active market, as well as upward price movements. Where this latter situation prevails, margin trading and the expected profit rate on the increased volume of purchases, may compensate for the additional risk and costs involved.

Dice and Eiteman stated that there can be no social or economic objections to margin trading.³ Borrowing for stock exchange trading purposes is in principle the same as borrowing to conduct any other kind of business enterprise. However, if there were any close correlation between the volume of purchases and the rise in the price level of securities, excessive margin buying may be criticised on the grounds that security prices may become unduly inflated. To what extent this can be empirically tested is a question we are not in a position to answer. Our own contention is that security prices may rise excessively, whether the volume of purchases is large or small, as long as expectations converge. Leffler defended margin buying on various grounds. The criticisms levelled at margin trading, apart from creating unduly inflated prices and stock exchange booms, and which are mentioned mainly by Leffler,⁴ are the following:-

- (1) it may divert credit or absorb credit which is needed for other business or productive enterprise,
- (2) bank credit is created in excessive amounts for brokers' loans, which may strain or endanger the banking system,
- (3) margin traders do not subscribe to new issues; they concentrate on already listed and seasoned issues, and therefore do not play a role in allocating funds into industry,
- (4) it does not improve the overall continuity of the market, since margin traders concentrate on only a few issues,
- (5) margin trading was sometimes carried on by the uninformed and unskilled speculators, with inadequate margins,
- (6) Any price decline, which may result in forced selling and the snowball effect this may have on prices, only adds to market instability.

The above criticisms are to some extent interrelated. With respect to the absorption of credit, nothing need be added here, as this point has already been dealt with in chapter VI where it has been pointed out that this fallacy has been disposed of by Machlup and Sayers. Brokers' loans, to finance carry accounts, will constitute only a minute fraction of total bank credit created.

3. Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition, p. 159.

4. See Leffler, G.L., The Stock Market, p.274.

In general one may conclude that the disadvantages or dangers of margin trading are normally exaggerated. The individual must, however, acquaint himself with the procedure and risks of such trading.

C. Options

1. Introduction

The need for medium-term and long-term speculation on the stock exchange was mentioned in chapter VI. The facilities provided for option dealing on the Johannesburg Stock Exchange are but another mechanism for a specialised kind of forward trading by which buyers and sellers can express their expectations of future events regarding a particular share on the market by entering into certain option contracts. Option prices form part of the market knowledge which is transmitted to actual and potential buyers and sellers. It forms part of the market mechanism through which expectations are brought into consistency on intertemporal markets, permitting forward trading.

Option trading is normally associated with speculation, and bull and bear attitudes, behaviour, and activities, all of which are well-known and used in all security markets. However, if expectations regarding future share price movements did not diverge, there would be no market for options.

On the Johannesburg Stock Exchange we distinguish between the double option and the single option, the former hardly ever being used in practice. The single option can again be divided into what is known as a call option and a put option.

A call option is a contract, giving the giver (or holder) the right to purchase, or not to purchase, at his own choice, a given number of shares, say 2,000 at a given price, say, 850 cents as stated in the contract, over a given period of time as stated in the contract. In other words, the taker (or maker or writer) of a call will contract to deliver to the giver, at the giver's request, the number of shares contracted for, at the price fixed between them. The giver has the right to exercise his option or to let it lapse in which case he forfeits the option money paid. A giver is the purchaser of an option, and he has to pay option money for the privilege. A taker is the seller or writer of an option, and he receives the option money paid by the giver. The option money, or the premium, as it is sometimes referred to, is the money price paid for either a call or put option.

The striking price is the price agreed upon.⁵ From the above definition, it is then clear that a call option refers to a contract where the holder of such a contract intends to buy a given number of shares at a fixed price.

A put option is actually the opposite of a call option, and refers to a sale transaction. A put option can be defined as a contract, also in negotiable form, whereby the giver (or holder) will be given the right to sell, or not to sell, at his own option, a given number of shares, say 2,000, at a fixed price (striking price) as stated in the contract, over a given period of time as stated in the contract, to the taker. In this case the maker of the put contracts to deliver, if the giver so requests, a certain number of shares at a fixed price. Again, the giver has the right to exercise his option or to let it lapse, in which case he forfeits the option money paid to the taker (or writer). In terms of rule 118 (iv) of the Rules of the Johannesburg Stock Exchange, a transaction that has been executed on the condition that it is a 'sellers option time bargain' must be settled in the seventh settlement period after the contract is made. The seller may request for settlement to be brought forward to the second settlement after the contract is made and the buyer will not have the right to object.

The double option is a combination of the call and put option. On the New York Stock Exchange, we find, according to Dice and Eiteman, four main types of options or privileges, namely the put, call, spread, and straddle. The put and call options are the same as on the Johannesburg Stock Exchange, and the straddle is apparently the same as our double option. They defined a spread as follows - "A spread is a type of privilege that combines in one contract both the put and call. To illustrate, suppose that such a contract gives the bearer the right to sell John Doe 100 shares of U.S. Steel common at \$64 per share or to buy a 100 shares at \$70. A trader who buys this contract is sure to profit, no matter whether the price of U.S. Steel goes up or down, provided it goes sufficiently above \$70 on the advance or below \$64 on the decline to pay for the costs of the privilege, the tax, and the

5. In the United States of America the contract price (striking price) is normally the market price, except on 30 day options. Options can be contracted for points away from market price on the New York Stock Exchange, but not on the Johannesburg Stock Exchange.

broker's commission, and to provide a margin of profit. For example, if U.S. Steel advances to 73, there will be a profit to the buyer of the privilege or, on the other hand, if it declines to 61 a gain will be registered."⁶

A straddle on the other hand is slightly different. "A straddle differs from a spread in that a straddle allows both the put and the call to be exercised at the same price, while a spread specifies one price for the call and another for the put, with an appreciable margin between the two prices. With a straddle in his possession, a trader will realize a profit if the price of his stock advances or declines more than the cost of the contract plus commission and tax."⁷

The double option combines the advantages of the single call and put. The double option is, of course, more expensive, but should the price of the given share move sufficiently within the specified period, (normally 30,60,90, 120 days or 6 months or even annually), the giver will exercise his option and a gain be registered.

It is normally accepted that option transactions are mainly confined to active shares on the market, or shares of which the price is volatile, or expected to move over a wide margin during the time specified in the contract. The more the market's expectations converge with that of the option buyer, resulting in considerable price fluctuations, either upward or downward, the more likely the possibility of profit for the option buyer during the life of the option. The option money paid is, of course, substantially less than the striking price agreed upon in the option contract and the advantage of entering into an option contract, as opposed to an outright purchase of the particular security, is that the giver's commitment or liability could be limited to the amount of the option money given. Should the giver decide not to exercise his privilege, his net loss is limited to the option money specifically given. This loss may be relatively small in relation to the capital loss which might have accrued in the case of an outright purchase or sale. Option contracts can be traded in, and gains and losses can be made on them. In this sense an option contract is a security in itself.

6. Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition ,p.246.

7. Loc. cit.

2. The Reasons for Entering into Option Contracts

Stock exchange traders normally enter into option contracts for various reasons. Broadly speaking, the motives are two in nature, namely, the speculative motive and the insurance motive, the latter being an attempt to protect a certain market position and to limit risks of loss which may occur as a result of unexpected changes in the market. Option dealing has undoubtedly a lot to do with attitudes towards risk and risk-aversion. Cootner, for example, contended that "If options are priced such that they offer consistent opportunities for profit to either buyer or seller, it can imply that such buyers and sellers either have consistently erred in their expectations about the future, or that they have attitudes toward risk which make them willing to buy or sell such options at prices different from their mathematical expectation."⁸ Boness' findings showed that the buyers of call and put options behave and act as if they believed in certain turning points in share prices.⁹ Boness pointed out that the activities of option buyers, if we take account of the negative expectation (loss) involved, are based on attitudes towards risk, tax positions, and the market imperfections. For him some utility must be attached to the purchase of an option, "...since it can be shown that, on the basis merely of mathematical expectations of outcomes, the purchase of an option is an 'inferior act' against the alternatives of buying stock or doing nothing."¹⁰

The individual cannot eliminate the risk of loss completely by entering into these contracts, because, as we have said before, these contracts are but another way or method through which traders can express their expectations of the future prices of a given share, and like all price expectations, these can also be unfulfilled. Options and the stop-loss order more or less serve the same purpose in this respect, namely that it is a device to curtail losses and to protect profits, although the uses of an option are wider. The writer of options expects that the price of the share will not move against him

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8. Cootner, P.H., "The Statistical Analysis of Option Prices", in Cootner, P.H., editor, The Random Character of Stock Market Prices, p.374.
 9. Boness, A.J., "Some Evidence of the Profitability of Trading in Put and Call Options", in Cootner, P.H., editor, The Random Character of Stock Market Prices,
 10. Boness, A.J., op. cit., p.483.

by more than the option money received per share. The option monies received over a period of time constitute his profits.

(a) The Reasons for Entering into a Call Contract

The call option will be entered into when the individual expects to make a profit on a share of which he expects the price to rise well above the fixed or striking price during the period stated in the contract. The price per share must, of course, rise by considerably more than the call option money paid per share before a reasonable gross profit is realised. Furthermore, there is no linear function between changes in market prices and the profitability of options. The individual can then enter the market, by making use of the call option to serve a double purpose, namely to enter the market at a low cost and also to enter the market at a future date. Say, for example, the individual (in this case, a speculator), expects that A.B.C. Ltd. will rise 100 cents in the next 120 days. He will then enter into a call contract, and his immediate cash outlay will be only his option money paid to the taker or writer. Suppose A.B.C. Ltd., is currently selling at 500 cents. To secure a call option for 120 days will cost him, say, 40 cents, with the striking price fixed at 500 cents. In the event of the price moving sideways over the next 120 days and no gain being really registered, he will not exercise his call option, and thus forfeit only his option money. Should his expectations be realised and the price of A.B.C. Ltd. moves to 600 cents, he will exercise his call option and call for the shares at 500 cents. He has thus entered the market at a low price and cost. His profit per share, after he has exercised the option and sold the shares at 600 cents, will be approximately 48 cents, that is the price differential, less broker's commission, marketable securities tax, basic handling fees and all other expenses. The individual has also entered the market at a future date by entering into a 120 day contract. An outright purchase of A.B.C. Ltd., selling at 500 cents, on a margin of 50 per cent would have cost him 250 cents per share plus all dealing expenses.

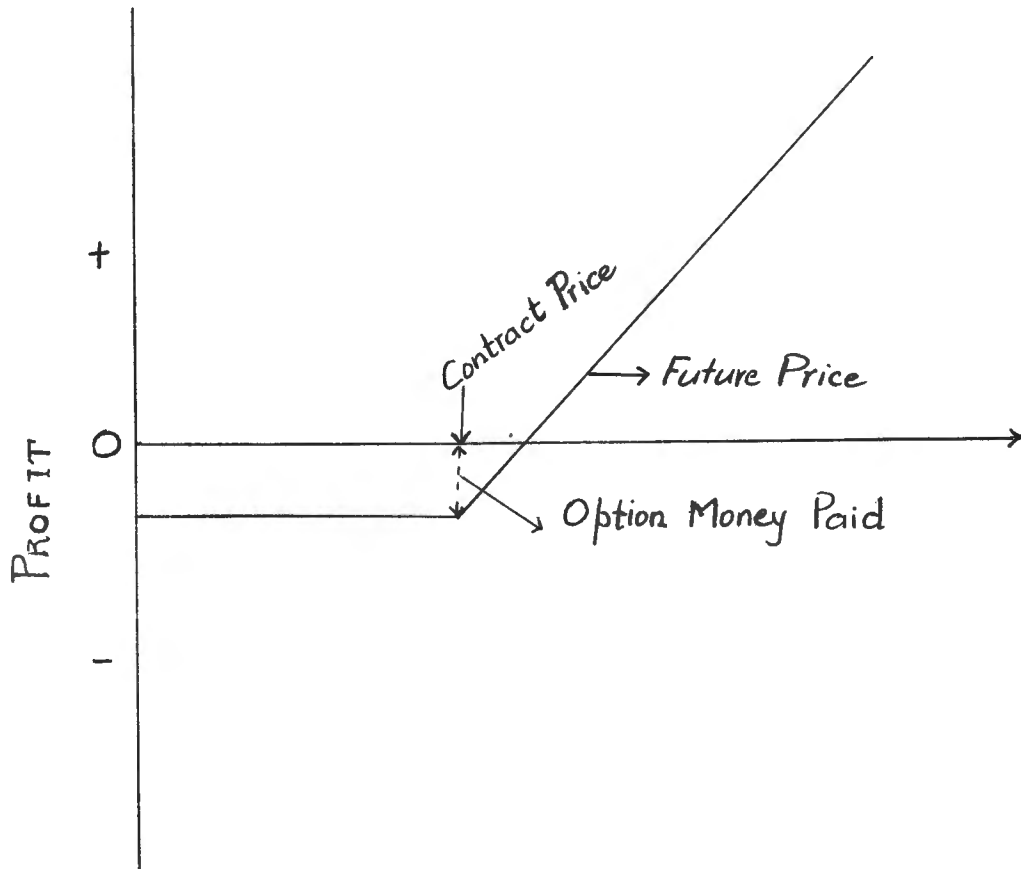
Another reason for entering into a call contract is to protect a profit on a time-transaction or a short-sale. Say, an individual has sold 100 shares short at 500 cents. Any decline in the price below 500 cents will then give him a gross paper profit. The price declines to say, 450 cents, giving a gross paper profit of 50 cents per share. The individual expects the price to decline further, but he is

not at all certain that this will in actual fact be the next movement. He can protect this profit by entering into a call contract, say for 30 days, at say, 460 cents. Should the price decline to 430-420 cents he will sell his shares and realise a profit, but ignore the call. Should the price rise to 460 cents, he will sell at 460 cents, and also cover at 460 cents, protecting his profit.

The call option position, from the points of view of the buyer and the writer of the call, has been very clearly explained diagrammatically by Kruizenga in the following two graphs.¹¹

FIGURE 18

Buyer of Call



11. Kruizenga, R.J., "Introduction to the Option Contract", in Cootner, P.H., editor, The Random Character of Stock Market Prices, p.383.

FIGURE 19

Writer of Call

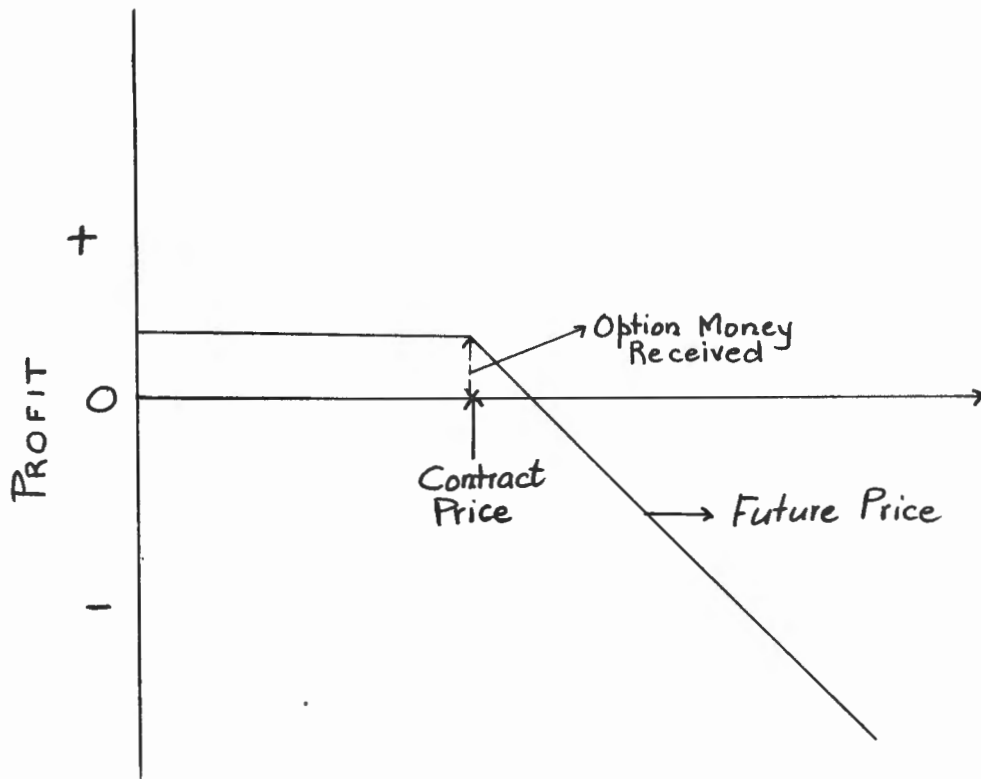


Figure 18 shows the position of the buyer of the call, showing that he will gain, after the break-even point, for every rise in price. Figure 19 shows the position of the writer of the call, which is the opposite of that of the buyer of the call. Where the holder (giver) stands to gain from future price rises, the writer stands to lose, after the break-even point. The writer will receive his option money, but he loses the difference between the market price and the contract or striking price. In this case his losses may be substantial during a period of rapidly rising prices, because the holder (giver) will invariably exercise his option, whereas his profit is limited to the option money received should the option not be exercised. The writer (taker) of the contract assumes risk, that is, a small risk of a considerable loss, or on the other hand, large probabilities of small gains.

During a period of rapidly declining prices, individuals may sell shares, but immediately enter into call contracts to come back into the market again at a lower level.

Brokers who write call options on the Johannesburg Stock Exchange may actually buy a given issue and the call price quoted on the issue will include the expected profit margin.

(b) Reasons for Put Options

The put option can be used to protect a profit on a long position in the market. Say an individual purchased shares outright, taking a bullish view of the future price movements. Should his expectations be realised and the price rises to a profitable selling level on a particular date, he may be uncertain about the price movement over the next 30, 60, 90, 120 days, 6 months or year. He may, however, protect his position (or paper profit), by contracting for a put. Should the price continue to rise for the life of the put contract, the individual will disregard the put and realise his profit on his long market position. However, should the price decline during the life of the put, he will fall back on this hedge and sell the shares to the taker or writer of the option at the striking price. In the above case the individual contracted for a put to protect himself against a sudden market reversal. Very few individuals, however, will buy a put when holding a long-position.

Kruizenga explained the put position as follows:-¹²

12. Kruizenga, R.J., "Introduction to the Option Contract", in Cootner, P.H., editor, The Random Character of Stock Market Prices, p.385.

FIGURE 20

Buyer of Put

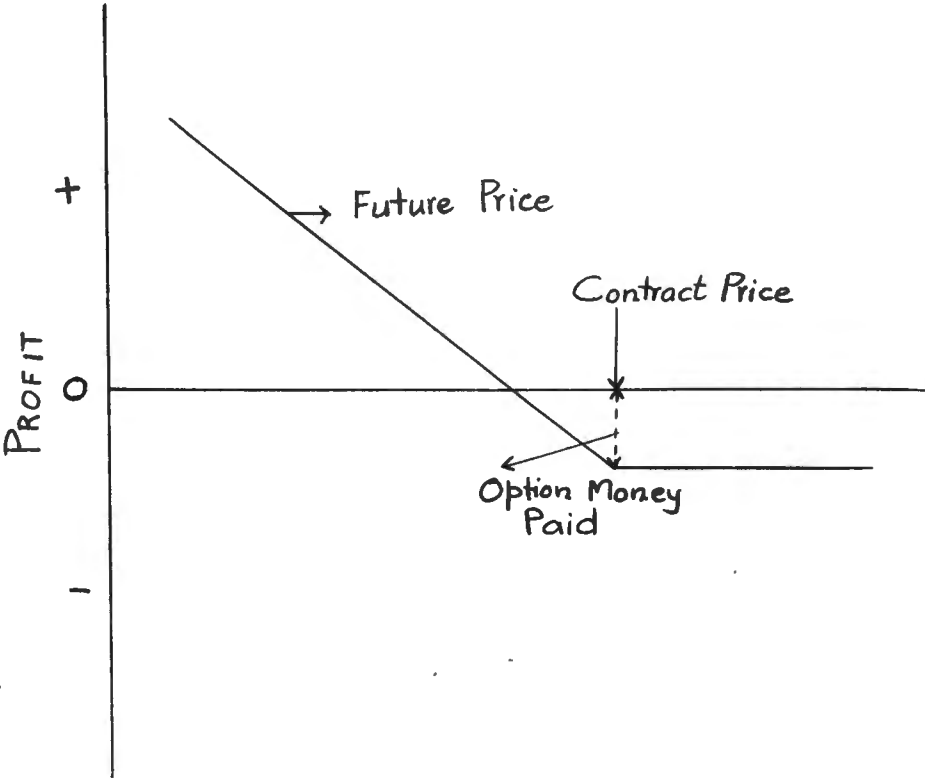
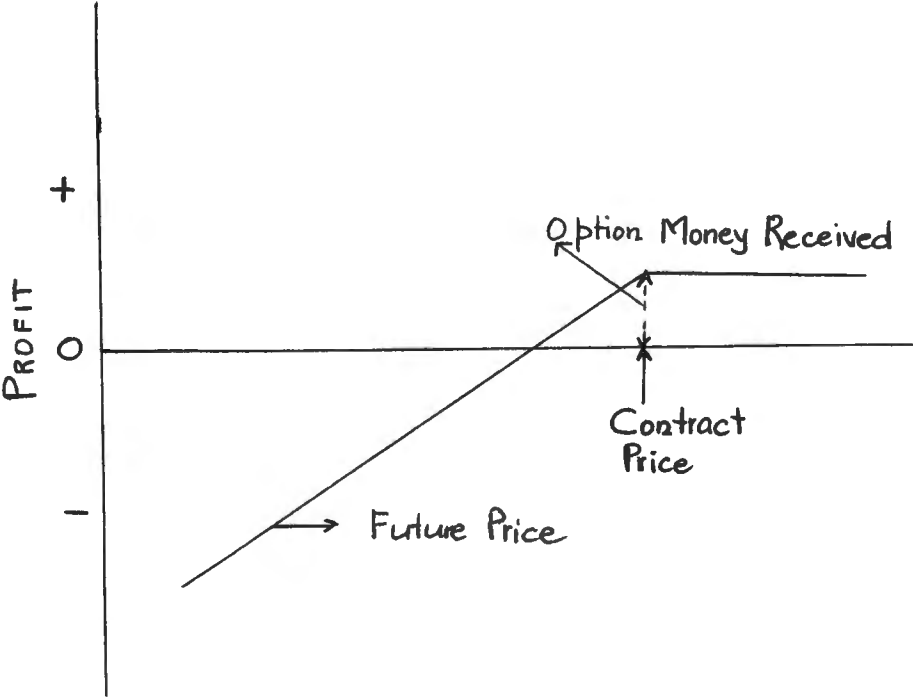


FIGURE 21

Writer of Put



The buyer (or giver) of a put will gain from any decrease in price in excess of the option money paid. Should the price increase, the option will not be exercised and the loss is limited to the option money paid. The writer of the option (or taker) is roughly in the opposite position. His only gain is, however, the option money received and any increase or decrease in the share price will result in a loss.

3. The Price of Options

The price of an option is mainly influenced by the degree of fluctuations in the price of the share, that is, the greater the difference between the highs and lows over a short period of time, the higher the price of the option, because the greater the possibility of a profit. If the price of a share moves slowly or sideways for long periods of time it is not an attractive proposition from the point of view of the option trader. Another important factor is, of course, the general level of activity on the market, that is, whether the market is generally very active or depressed. In a boom period, when the market is active and prices probably very volatile, (upwards), call options will be more expensive than in an inactive market. In a dull, inactive market, call options will tend to be cheaper, but put options will tend to be more expensive. In a market where prices are moving upwards (that is a bull trend), there is little inducement for the trader to enter into or exercise a put option, but it is likely that there will be a steady demand for call options and these options are likely to be exercised. The result of this is that puts will be quoted cheaper, while calls will be more expensive.

The price of an option is also influenced by the nature and marketability of the given share and the current conditions pertaining to the share. Furthermore, the period of the option has some significance. The price of the option tends to increase with the period of the option. Any dividends received on the shares under option reduce the option money paid. The price of the option is also a function of the dividend rate of the given share.

The value of an option is really a function of the price of the given security. The price of the security is a function of expectations and the behaviour of bulls and bears in relation to calls and puts is therefore a matter of expectations. These option

transactions may form part of an investment or speculation programme. The relationship between the price of the security, the value of the option and expected price movements are important to the trader. Cootner contended that "If both the buyer and the seller of such options could estimate, without error, the parameters of the distribution of stock prices, and if they each hoped to maximize their mathematical expectation of wealth, options would be so priced as to leave each without profit from repeated transactions."¹³ The point is, however, that profits and losses on option transactions will be found in the real world as the parameters of the distribution of stock prices are usually estimated with degrees of error and diverging expectations cannot all be right. The magnitude of future price changes cannot be predicted since such price changes are of a random nature, as we have pointed out in chapter VII.

4. Returns on or Profitability of Puts and Calls

Kruizenga¹⁴ and Boness¹⁵ both investigated the profitability of trading in puts and calls over different periods. Kruizenga's investigations were based on prices submitted to the Securities and Exchange Commission for the period 1948 to 1956. He concluded that option dealing is only marginally profitable. Boness' investigations covered the period 1957-1960 and his conclusion was that option dealing during this period proved rather unprofitable.

It has been pointed out that option writers (or takers) face considerable risks, particularly with regard to any adverse price movements. To compensate for the risks, some expectation of a gain must be involved, which, in the case of the option writer is the option money received. (He is roughly in the same position as an insurer.) Option writers "...ought at least to be recovering the actuarial costs of the risks they assume. Hence, option buyers must be paying more than the actuarial value of their options because the premiums they pay

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13. Cootner, P.H., "The Statistical Analysis of Option Prices" in, Cootner, P.H., editor, The Random Character of Stock Market Prices, p.373.
 14. Kruizenga, R.J., "Profit Returns from Purchasing Puts and Calls", in Cootner, P.H., editor, The Random Character of Stock Market Prices, pp.392-411.
 15. Boness, A.J., "Some Evidence on the Profitability of Trading in Put and Call Options", in Cootner P.H., editor, The Random Character of Stock Market Prices, pp.475-496.

must cover in addition to the actuarial costs such 'friction' costs as the option dealer's margin, etc., which are not negligible."¹⁶ In this sense buyers pay more for options than what they are really worth. Kruizenga pointed out that the above a priori reasoning and presumptions are not easily confirmed and substantiated by empirical studies.

Kruizenga compared option quotations (nominal) with share price movements, based on an average of eight shares and also a comparison for U.S. Steel, taking account of dividends as such dividends affect the rate of profit in option trading. The period used by Kruizenga covered 51⁴ weeks, 50 and 90 day periods. Furthermore he calculated only gross profits, ignoring brokerage and all other costs. He calculated the frequency distribution of the gain ratios, from which he worked out the average gains, the standard deviation of the gains, and the actuarial values of the 90-day puts and calls. From his calculations, for the period as a whole, comparing the actuarial values with average option costs to buyers he concluded that "...nominal quotations for 90-day calls tended to be slightly undervalued in terms of what they were worth on the basis of stock movements... Nominal quotations for 90-day puts on the other hand were very much over-priced in terms of their actuarial value."¹⁷ He also concluded that the option monies paid (premiums) for 90-day options did not accurately reflect the historical share price movements during the 10 year period covered. Generally, buyers of calls during the period surveyed could have made profits. Kruizenga also found that on a whole 6 months call options were more profitable than 90-day options, and taking account of dividends, call options were more profitable than put options. We have not carried out a similar study for option transactions in South Africa, but we shall not be surprised if option dealing also proves to be only marginally profitable over a long period.

D. Stop-loss Order

1. Introduction

The stop-loss order is simply a special order given to the broker whereby the individual attempts to protect a certain market position reached against the uncertainties of market fluctuations. The stop-

16. Kruizenga, R.J., "Profit Returns from Purchasing Puts and Calls" in Cootner, P.H., editor, The Random Character of Stock Market Prices, p.392.

17. Ibid., p.401.

loss order is thus just another technique or method employed to limit losses and to protect gains, both on the bull and bear sides in a market where prices are volatile. The stop-loss order is initially different from an ordinary market order in the sense that a definite price is stipulated, but the order becomes a market order and will be executed when the specified price is reached. In the case of an order to buy, the price specified will be somewhat above the ruling market price, while the price specified on an order to sell will be slightly below the ruling market price. The price specified or stipulated on the stop-loss order must be continuously adjusted according to changing prices on the stock exchange, in order to keep some small margin above or below the market as the case may be. The reasons for this will become clear in the discussions below.

Some authors on stock exchange practice maintained that the stop-loss order has certain disadvantages as compared to options as a method of protecting a market position. In the first place, with reference to the Johannesburg Stock Exchange, it must be pointed out that some brokers do not accept such orders and others discourage such orders. Secondly, there is no guarantee that the order will be executed at the definite price specified. This may conceivably happen in a very active market when brokers are exceptionally busy. During such active periods, for example, the gold boom of 1946 or the activity engendered by the devaluation in 1949, brokers are not inclined to accept stop-loss orders. Thirdly, the individual may be stopped out at a certain price to his own disadvantage, since the price may continue to rise or fall after the execution of the stop. To avoid this the individual must continuously specify new prices, particularly during a period of considerable price volatility. In the case of an order to buy, the individual must purchase the shares outright, putting up at least 50 per cent margin, whereas in the case of a call option the individual only need put up the option money or premium. However, the advantage of the stop-loss order is that the cost of option money is avoided.

2. General Uses of the Stop-loss Order¹⁸

The stop-loss order to sell will be given in order to limit a

18. See Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition, pp. 190-199, and Leffler, G.L., The Stock Market, pp. 146-149.

loss on the bull side of the market and to protect a profit on the bull side of the market. The stop-loss order to buy will be utilised to limit a loss on the bear side of the market and to protect a profit on the bear side of the market.

(a) To Limit (or prevent) a loss on the bull side of the market

The above use of the stop-loss order is usually considered as a preventive use. An individual expects a certain share to advance in price and he buys 500 shares at the current market price of 600 cents, putting up 300 cents margin. To prevent excessive losses, which he may not be in a position to take, in the event of an adverse price movement (contrary to his expectation), he will place a stop-loss order to sell with his broker, at a definite price somewhat below the price paid, say, at 580 cents. Should the price move contrary to his expectation and decline to 580 cents (or slightly below) the stop-order becomes a market order and will be executed. The individual will therefore be stopped out at 580 cents. His loss will be limited to 20 cents per share plus his dealing expenses and interest on his original purchase and the dealing expenses on his subsequent sale. Depending on the further price decline, he may decide to re-enter the market in an effort to retrieve his losses on the first transaction.

Let us assume the price falls to 530 cents and that the individual feels reasonably confident that this is a very temporary decline and expects the price to advance again in due course. He again purchases at 530 cents plus dealing expenses. Any increase in price above, say 580 cents should wipe out the loss of 20 cents per share plus the dealing expenses on three transactions. Another advantage of placing the stop-order in the first instance is the saving, after the sale, of some portion on his margin account.

The above are the advantages of the stop-order in limiting a loss. If we, however, assume that the price only declined to a lower limit of 575 cents and immediately (the same day or the very next day) again recovered to, say, 600 or 605 cents, he would not have incurred the loss of 20 cents per share plus all expenses. For this very reason stock exchange traders would avoid the use of the stop-loss order to limit a loss on the long side of the market.

(b) To Limit (or prevent) a loss on the bear side of the market

Although this is also a preventive use, the stop-loss given in this case will be an order to buy. An individual expects the price of a certain share to decline in due course and he decides to sell 500 shares short or on a time-transaction at 680 cents. To limit a loss in the event of a price movement contrary to his expectations, he will place a stop-loss order to buy, at a price above the price at which he sold short, say 695 cents. His loss, when stopped out at 695 cents, will amount to 15 cents per share plus all his dealing expenses on the sale and purchase. A heavier loss might have accrued if he was not stopped out at 695 cents, in the event of the price having actually risen to, say, 730 cents at or during the time it was necessary for him to cover. He can again sell short at 730 cents, if he feels that the movement over the next few days or weeks will be down again. Any decline below, say, 700 cents would again represent a profit.

Dice and Eiteman correctly pointed out that "Here, as on the long side of the market, is always the contingency of being stopped out at the turning point of the market price."¹⁹ The stop-order has certain advantages, but if the individual is continuously stopped out at the wrong points, he will only incur losses plus dealing expenses. If a speculator continuously misjudges price movements stop-orders can only limit his losses.

(c) To protect a gain (existing profit) on the bull side of the market

The use of the stop-order, as used in the above case, is in the nature of a protective use. An individual purchases 500 shares at 600 cents, providing a 50 per cent margin. His expectations were realised and the price actually moved to 650 cents. He will show a paper profit of 50 cents per share less all dealing expenses. He may feel uncertain as to the next move and expects the 650 cents to be very near the upper turning point or upper limit, as the price may also move sideways for some period. To protect himself against a sudden market reversal, he will place a stop-order to sell at 645 cents, that is, slightly below the current market price. Should the price decline to 645 cents, the stop-order will become a market order and he will be stopped out at 645 cents. His profit will be 45 cents per share minus the dealing expenses on the purchase and sale. The price

19. Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition, p.191.

could have declined to say, 600 cents, wiping out the entire profit. On the other hand, the price can move upwards, above 650 cents, to say 655, 660, 665, and so forth. In this case he will simply move his stop up, always slightly below the current market price, until he may decide to realise his profit at the current market price. However, by placing the stop he may realise a profit which may be near an upper turning point,²⁰ and in this way he protects an existing profit on the bull side of the market.

(d) To protect a gain (existing profit) on the bear side of the market

This is also a protective use, but here the stop-order will be an order to buy and will be placed above the current market price. Say an individual has sold short 500 shares at 700 cents because he confidently expected a sharp decline. The price then actually declines to 650 cents, giving him a gross paper profit of 50 cents per share. The next move may be up or down and he may feel uncertain as to the next movement. He will place a stop-order to buy at, say 660 cents to protect some portion of his currently existing paper profit. Should the price increase to 660 cents, his broker will cover for him. His profit will then amount to 40 cents per share minus the dealing expenses on both the sale and the purchase. On the other hand, the price may continue to decline even further, in which case he will move the stop down with the market price, until he must eventually cover and realise his profit.

The above is a brief outline of the general uses of a stop-order. Dice and Eiteman, however, correctly pointed out that the proper use of the stop-order really depends on the methods of operation. The conditions under which the use of a stop-order is justified are relative to the type of trading that is being done.²¹ In this connection they distinguished between the normal three methods of operation, namely, (1) the day-to-day trader, (2) the short-swing trader, and (3) the long-swing trader.

In the case of (1) the individual will trade on day-to-day fluctuations. The profit margins are usually narrow (small) and the size of profits depends upon the volume of turnover. This type of

20. This is theoretically possible if the stop-order is just below the current market price.

21. Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition, pp.192-197.

trader is, thus, primarily interested in fluctuations of prices in the course of one day and from day-to-day. In the case of (2) the individual will trade on wider profit margins than the individual in (1), and the profits are also realised over longer periods, say, ranging from several weeks (say 2 - 3 weeks) to a couple of months (even up to say 9 - 10 months) or say 200 - 250 days. This individual will be in and out of the market far less frequently than the one in (1), or as Dice and Eiteman stipulated say, four to six times per year on the average. For his purposes he will also concentrate on issues which are volatile and of which prices move over reasonable margins, on which reasonable average profits can be realised. In the case of (3) the individual is more interested in the longer-term prospects of an issue. He will probably buy a certain share or shares when the market as a whole is rather depressed for various reasons, or when the issue as such is depressed or 'temporary undervalued' by the market, and hold the share (or shares) until a period of general boom on the stock exchange. He may hold the shares for anything from one to three years. This kind of individual is primarily concerned with highs and lows during the period of his interest in the given share or shares. He is not at all concerned with minor, temporary, short-term fluctuations. Large capital gains are envisaged on each transaction. The behaviour and actions of each kind or type of trader will again be determined by his expectations, objectives, and multiperiod plans.

The day-to-day traders are mainly trading on small, day-to-day fluctuations providing only narrow profit margins, with the result that the net profit on each transaction is more a function of turnover. They are not in a position to take large losses on any particular transaction, as this may wipe out their average profits completely. The use of stop-orders in their case, either to limit or protect existing profits, appears to be justified. According to Dice and Eiteman these traders place a stop-order every time a commitment is made; it is in fact "...one of their cardinal principles."²² to apply the stop-order principles which we have discussed above. They will, of course, keep an extremely close watch on the price movements and adjust their stops accordingly. These traders, of course, operate on both the bull and bear sides of the market.

22. Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition, p.193.

With reference to the short-swing trader, where profit margins are normally wider and where entry into and exit from the market (with reference to a given issue) is less frequent, that is, a couple of times during the year, a different set of conditions will be encountered, except that risks are also assumed, as in the case of the day-to-day trader. Again, the use of the stop-order is convenient and justified. The short-swing trader will be concerned with the highs and lows between which the price moved over the few weeks or months preceding the purchase, (at a low point) and he will carefully study the movements after the purchase, carefully watching the trends, within the range.

However, at the time of his purchase, he will place a stop-order to sell below the previous lows. Such a stop, should the price move below the previous lows, will limit his loss and he may be in a position to buy at a lower price again, should the price decline continue. However, should the price increase, as the trader originally expected, he will move the stop upwards, maintaining a small margin below the market price, protecting against a sudden market reversal and thus, any existing profits. As the price approaches the previous highs he may then move the stop to very close to the market, and should the price then decline, he would be stopped out realising his profits. His next transaction may be a short-sale if he expects the decline to continue and he may again make use of the stop-order. Other times when a stop-order may be used are when a share is overbought and oversold but the trader wants to protect his position in the event of misjudging the price movement. When the share is oversold, the share price may be expected to move upwards, and a purchase when the market is depressed (oversold) may be quite justifiable. To limit losses a stop to sell will be placed below the market price in the event of an adverse price movement. When a share is overbought, with a high current price, the price may be expected to decline, and a short-sale or time-transaction may result in profits. The short-seller will place a stop-order to buy, somewhat above the market price in order to limit losses, should the price rise instead.

In the case of the long-swing trader, the stop-loss order will not be used. He is concerned with wider profit margins over long

periods (1 - 3 years) and he is unconcerned with minor, small price movements.

E. Averaging and Pyramiding²³

The above two techniques will be considered together in one section, although they are two extreme opposites. By averaging the investor or individual attempts to reduce the cost per share and aims at increasing his average selling price. To achieve the above he will always go opposite to the trend in the market in both his buying and selling operations, that is, he will buy shares when the trend is downwards and sell on the incline. In the case of pyramiding, the trader will follow the trend, that is, he will buy when prices are rising and sell on the decline. Pyramiding represents a rather dangerous form of speculation. These methods can be used on both the bull side and bear side of the market and to avoid losses price movements must be watched with utmost care.

1. Averaging

Averaging is also known as scale trading or time diversification, that is, to buy down on a certain scale and to sell on a certain scale on the advance. The scale may, of course, be quite flexible. The individual may decide in advance on a certain scale, always taking into account the dealing expenses.²⁴

The individual will then buy certain quantities of the share on the scale down. For example, a certain share has declined from 1,000 cents to 900 cents and the individual may expect the 900 cents to be

23. See Dice, C.A. and Eiteman, W.J. The Stock Market, 3rd edition, pp.237-243.

24. The following figures will give a rough idea of the amount by which the price of a share must increase before a profit is realised, taking account of dealing expenses, but not the cost of money, i.e. the interest on money in alternative uses:-

<u>Price per share</u>		<u>Increase required to break even</u>
Up to	40c	2c
	40 - 79	3c
	80 - 119	4c
	120 - 159	5c
	160 - 199	6c
	200 - 239	7c
	240 - 279	8c
	280 - 319	9c
	320 - 359	10c
	360 - 399	11c

the bottom. However, he knows that there is the possibility that the price may decline even further. Instead of instructing his broker to buy 400 shares at 900 cents each, he may decide to buy in 4 lots of 100, should the price decline below 900 cents. He instructs his broker to purchase 100 shares at 900 cents each. The price may slump to 850 cents, he again buys 100 shares, another 100 at 800 cents and another 100 at 750 cents. The cost to him (ignoring dealing expenses) would be:-

100 shares at 900 cents	=	R900.00
100 shares at 850 cents	=	850.00
100 shares at 800 cents	=	800.00
100 shares at 750 cents	=	750.00
<u>400</u>	Total cost	= <u>R3,300.00</u>

The average cost per share is 825 cents. (400 shares at 900 cents would have cost R3,600.) The individual then waits for a reversal of the trend, which, of course, may take weeks or months or years. However, suppose a reversal sets in after two months. Say the share improves to 850 cents. He may expect this to be a new high, and decide to sell the 400 shares outright at 850 cents each, which would realise R3,400. The gross profit will only amount to R100 or 3.03 per cent of cost. Instead of selling the 400 shares at 850 cents, he instructs his broker to sell 100 shares at 850 cents, hoping to sell the other 300 on a scale upwards. Let us assume he sells them as follows:- 100 at 880 cents, 100 at 930 cents and 100 at 980 cents. His sales will then realise the following:-

100 shares at 850 cents	=	R850.00
100 shares at 880 cents	=	R880.00
100 shares at 930 cents	=	930.00
100 shares at 980 cents	=	980.00
<u>400</u>		<u>R3,640.00</u>

His average selling price is 910 cents. His profit for the whole operation would amount to R340 or 10.3 per cent of cost. The individual could have traded on margin, reducing his cash outlay well below the total cost. His percentage profit on a cash outlay of, say, R1,700 would then have been 20 per cent. Had he purchased the 400 shares outright at 900 cents and sold outright at 980 cents, his profit would have amounted to R320, or 8.9 per cent. The point is, however, that very few individuals manage to get in consistently at the bottom and out at the top and averaging or scale trading may give, on the average, more consistent results over a long enough period. In the example used, the profit margin would have improved considerably

had he started buying lower down the scale and started selling higher up the scale. To protect his position in the market, he can make use of stop-orders in the averaging process. The type of share best suited for averaging operations would be one that is fairly volatile in price, where the price fluctuates for reasonable periods above or below a certain trend line or mean. Where the price of the share moves upward fairly slowly over a prolonged period, or downward over a prolonged period, averaging would be of little value.

According to Dice and Eiteman²⁵ (with reference to the United States of America) the short-swing trader prefers pyramiding to averaging, the reason for this being that the short-swing trader prefers to go with the trend rather than against it. However, the long-swing trader will find averaging useful as a method of trading. He has the necessary time at his disposal to accumulate the shares, buying on a scale down and selling on a scale up. In buying on a scale down he may find short-term fluctuations, due to the technical position of the market and other short-term market conditions, forcing the price down to his advantage and over a prolonged period he will probably manage to acquire a large number of shares at a relatively low cost per unit. When economic conditions and the market are generally depressed the general public appears to be reluctant to buy and during boom periods on the market, accompanied by a high level of economic activity, prices will tend to be high and people are disinclined to sell. The long-swing trader, whether he makes use of the method of averaging or not, must buy when everybody else is disinclined to buy and he must sell when everybody is disinclined to sell and inclined to buy if he wants to achieve some success in his trading operations.

Very closely linked with the methods of averaging are the various formula-plans which have been devised particularly in the United States of America, for example, 'dollar-averaging', 'constant dollar plan', 'Vasser plan', 'F.I. du Pont Plan', 'Yale Plan', 'Oberlin College Plan', and numerous others.²⁶ It is not our intention to discuss any of these formula plans in detail. Four basic formula plans are worth discussing, namely

25. See Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition, pp.238-239.

26. See Leffler, G., The Stock Market, pp.530-533.

- (1) 'Rand averaging',
- (2) 'constant rand plan',
- (3) ratio-plan and
- (4) variable-ratio plan.

(a) Rand Averaging

In this particular case the individual envisages a constant amount to be invested in ordinary shares during a predetermined period of time, say every year. In this case the amount invested is constant or fixed and the number of shares a variable, whereas in the case of averaging, as we have described it above, the number of shares purchased at each point on the scale was predetermined and the amount invested (at each price) a variable. The basic principle of going against the trend, buying on a scale down and selling on a scale upward, still applies in the case of rand averaging. However, if the individual expects a bull market to be prolonged, he can, of course, buy on a scale upwards, which will enable him to acquire shares at a cost below the market price on the incline. The period during which a certain sum will be invested in a variable number of shares, is a subjective matter and depends on the expectations, objectives, tastes and multiperiod plans of the individual.

To illustrate the method of 'rand averaging', let us assume that an individual has R2,000²⁷ per annum to invest over a three year period in a given share. (In the case of a 'constant-rand-plan' we will assume a diversified portfolio.)

The method followed can then be explained with the following hypothetical example:-

<u>Year</u>	<u>No. of shares purchased</u>	<u>Market price per share (cost)</u>	<u>Amount invested</u>
(1) (1965)	800	250 cents	R2,000
(2) (1966)	1,000	200 cents	2,000
(3) (1967)	666	300 cents	2,000
	<u>2,466</u>	3 <u>750 cents</u>	<u>R6,000</u>
Averages 250 cents			243.3 cents*

* Obtained by dividing R6,000 by 2,466 shares.

27. We may consider a diversified portfolio, but we assume that the individual applies the principle only to one given share in his portfolio, or he may do so in the case of a few issues simultaneously.

The average market price over the period amounted to 250 cents, but the average book cost to the individual was 243.3 cents. Should the price rise to a satisfactory margin above the latter figure profits can be taken. The above plan should be employed over long periods of time.

(b) 'Constant-Rand Plan',²⁸

In this case we have a diversified security portfolio of different securities and a cash fund. The diversified security portfolio will contain ordinary shares, stocks, debentures, preference shares and money and near-money balances. Again the individual will buy on a scale downwards and sell on a scale upwards in an attempt to realise profits.

The basic principle underlying the 'constant-rand-plan' is to maintain the amount of funds tied up in the security portfolio constant, the cash fund thus being a variable. Funds will thus move between the portfolio and the cash fund. Let us assume the individual has R30,000 tied up in his diversified portfolio at a given point of time, say 1st March, 1968. Any increase in the market prices of certain shares, (which is not offset entirely by market price declines of other issues), will result in an increase in the value of the portfolio in excess of the limitation set, forcing him to sell some shares, thus taking a profit, transferring the money to the cash fund or the profits can also be withdrawn and the cash spent on something else. Should the value of the portfolio increase to, say R35,000 on the 1st March 1969 (a year later) he will sell R5,000 worth of shares and realise a profit. (The adjustment can, of course, be made on a quarterly or half-yearly basis as well.) This is again a subjective matter and some flexibility must be allowed for to adapt the policy to changing conditions. If a strong cash fund has been built up, the limitation set on the security portfolio can be increased. This may happen after successful trading over a period of time.

Any decline in the market prices of some shares contained in the portfolio, not wholly offset by increases in the prices of others, will result in the value of the security portfolio falling below the

28. Also referred to as 'constant-Rand fund'.

R30,000 limitation set. This means that the individual must immediately buy more shares, transferring funds from the cash fund to the security portfolio. Say, the value of the portfolio drops to R25,000, then he must buy shares worth R5,000. This implies that the individual has adequate liquid resources in his cash fund to operate on this basis. Operating on this method forces him to buy when prices (in general) are declining and to sell when prices (in general) are rising, thus using the basic principle underlying averaging. The 'constant-rand-plan' or fund is again a useful method of operating for the long-swing trader. This plan is again useful if carried on for a prolonged period, say, over a ten to fifteen year period on the assumption that ordinary share prices will, on the whole, tend to increase in an inflationary world.

(c) The Constant-Ratio Plan

This plan again involves a diversified portfolio of ordinary shares and a cash fund. The object is to maintain a constant ratio between the security portfolio and the cash fund, say, a division of 70 - 30. The value of the portfolio is thus not maintained as in the previous plan, but the ratio between the two variables. The individual will again effect the readjustments at certain pre-determined intervals (or dates).

Rising prices will increase the value of the portfolio and therefore disturb the set ratio of 70 - 30 between the portfolio and cash fund. Shares will be sold to restore the ratio to its original level, thus forcing the individual to sell in a rising market. Conversely, should prices decline, thus decreasing the value of the portfolio and disturbing the ratio, he will be forced to transfer funds from the cash fund to the portfolio. In this case he will be forced to buy shares on a falling market. As long as he is making profits the portfolio will grow.

(d) The Variable-Ratio Plan

In this case the portfolio is divided into two equal components that is, ordinary shares and high-grade fixed interest securities. The plan is then a variable share-stock plan based on either a normal price level at a given point of time, or on median share prices, the latter may be a moving average over a prolonged period of time, or it may be based on some index. Let us assume that the median or normal

level (based on, say, the Financial Mail Industrial index - or for any other if the individual is dealing in those shares) is 110. At this level 50 per cent of the portfolio is in ordinary shares and 50 per cent in fixed-interest securities. The individual will arrange his purchases and sales in such a manner as to maintain certain ratios between ordinary shares and fixed-interest securities, for example, should the index (or level of the market) rise 10 per cent (or any other predetermined percentage) above the median or normal level, shares will be sold, thus disturbing the 50-50 ratio. Should the index (or market level) fall by 10 per cent, shares will be purchased, thus changing the ratio.

The basic assumption is, of course, that the market level or index will fluctuate above and below the computed median or normal market level decided upon. Again the individual will buy when prices (in general) are falling and sell when they are rising. The following hypothetical table will serve to illustrate the percentage ratios which may be maintained. The share ratio is increased for every fall below 110 and decreased for every rise above 110.

Median or index level (or level of the market	<u>Ratio to be maintained percentage</u>	
	In shares	Fixed-interest securities
140	20	80
130	30	70
120	40	60
110 (normal)	50	50
100	60	40
90	70	30
80	80	20

Individuals trading on formula plans are considered to be fairly conservative in their investment methods, whereas those who pyramid may be considered more adventurous.

2. Pyramiding

The pyramid is considered as a dangerous form of speculation and is best avoided by the unskilled and inexperienced. Chances of considerable gains are possible, but so are the chances for large losses. A prerequisite for successful pyramiding is the existence of reasonable margin requirements. The margin requirements in this country would give fair chances of using this method of operating with some degree of success.

According to Dice and Eiteman, the individual operating on this method must first of all construct a proper plan of action and he must have the courage and patience to carry the plan through, he must properly protect himself against the large losses which are quite possible, and he must obtain the services of a first-class broker or broking firm.²⁹

Any small decline in the share price or share prices will lead to margin calls which the individual may not be able to comply with, in which case he is wiped out and his profits disappear. To make profits by pyramiding the price must be volatile upwards. The paper profits accruing after every rise in price are utilised to acquire more shares, instead of depositing more cash. The increased value of the collateral is then adequate to maintain the 50 per cent margin required in terms of the Act. The purchasing is then done on a scale upwards. The plan may take some time to execute fully.

A simple type of pyramid will work in this way:- The individual will start off with a given number of shares, purchased at a given price, and by putting up 50 per cent margin. Should the price of the share increase, a certain number of shares will be purchased, without any further cash outlays. Let us assume he buys 1,000 shares at 100 cents each, costing him R1,000. With a 50 per cent margin, the cash outlay will amount to R500. It is also assumed that he can buy odd-lots quite easily. Where he can only buy in 100's the example given below will be slightly modified. In the first example we shall assume that the individual decided to buy 15 additional shares for every 2 cents rise in price. The increasing margin will to some extent protect him against additional margin calls for a slight decline in price.

29. See Dice, C.A. and Eiteman, W.J., The Stock Market, 3rd edition, p.240.

Example 1: Odd-lots

Price (cents increase)	Total Shares held	Market value of collateral (to nearest R)	(Margin) debit balance as percentage of value
0	1,000	R1,000	50.0
2	1,015	1,035	50.2
4	1,030	1,071	50.4
6	1,045	1,108	50.6
8	1,060	1,145	50.8
10	1,075	1,183	51.0
12	1,090	1,221	51.2
14	1,105	1,260	51.4
16	1,120	1,299	51.5
18	1,135	1,339	51.6
20	1,150	1,380	51.7
30	1,225	1,593	52.2
40	1,300	1,820	52.6

On the above pyramid his cash outlay will amount to R500 and his actual debit balance to R863.00 at the time of liquidation at a price of 140 cents. At 140 cents the shares will realise R1,820. The total funds invested will be R1,363 (R500 cash plus R863 debit balance). His gross profit will, therefore, amount to R457, which is a 91.4 per cent gross return on a cash outlay of R500 and 33.5 per cent on the total funds invested.

Let us take another example of a pyramid. The individual buys 100 shares for every 20 cents increase in price, and another 100 shares on which he pays 50 per cent in cash, and 50 per cent is added to the debit balance, together with the cost of the first 100 shares. He thus acquires 200 shares for every 20 cent rise in price plus an additional cash outlay. He starts his pyramid with 1,000 shares costing R1.00 each.

Example II

Points rise (cents per share)	Total shares held	Value of shares	Debit balance	Total cash outlay	Margin- per cent
0	1,000	R1,000	R 500	R500	50.0
20	1,200	1,440	680	560	52.8
40	1,400	1,960	890	630	54.6
60	1,600	2,560	1,130	710	55.9
80	1,800	3,240	1,400	800	56.8
100	2,000	4,000	1,700	900	57.5
120	2,200	4,840	2,030	1,010	58.1
140	2,400	5,760	2,390	1,130	58.5

On the above pyramid the cash outlay will amount to R1,130. On

liquidating the pyramid the shares will realise R5,760. The total costs amount to R3,520. The profit is R2,240.

Both the short-swing and long-swing operators can use the pyramid. If expectations are not frustrated, the profits can build up over a reasonably short space of time, provided that the price moves sufficiently upward at reasonably short intervals of time.

The individual making use of the pyramid faces the risks of large losses, as previously pointed out. To limit his losses, and to protect his profits, he can make use of stop-loss orders, as previously described. However, in the case of pyramiding, the individual will probably leave a wider margin between the current market price and the stop-price, the latter price being the lower of the two prices.

When pyramiding the average price is an important consideration, as the individual will actually be buying on a planned scale upwards. If the market is still rising, the stop can be placed at the average cost, if the latter is sufficiently below the current market price. If the individual expects that the market has reached the new high, and that the market is ready for a decline, the stop may be placed very close to the market. If this high is reached over a considerable period of time, the pyramid could just as well be liquidated and the profits realised.

F. Short Selling³⁰

In the United States of America the Security and Exchange Commission defined a short-sale as follows:- "The term 'short sale' means any sale of a security which the seller does not own or any sale which is consummated by the delivery of a security borrowed by, or for the account of, the seller."³¹ The seller must therefore borrow scrip to effect delivery to the buyer in the next settlement period.

Brokers on the Johannesburg Stock Exchange normally discourage the practice of short selling. However, the individual, at the time

30. We distinguish between short selling and the ordinary time-transactions on the Johannesburg Stock Exchange, the latter meaning that settlement will take place in an elected settlement period.

31. Leffler, G., The Stock Market, p.282

of the transaction may not inform his broker to the effect that he is selling short. He may borrow the scrip for delivery from a source unknown to the broker.

The short sale (proper) will involve a few steps, that is, the actual sale of shares which the seller does not own, the borrowing of the scrip to effect delivery to the buyer, covering at a later stage at a lower price in which case a profit will be realised, or at a higher price, in which case a loss will be suffered, and then the return of the scrip borrowed.

The short seller must, therefore, at some stage cover his short sale in order to return the scrip borrowed, the latter being the last step in the transaction. He must thus be in a position to borrow scrip to effect delivery. The broker may assist his client in obtaining the scrip for delivery. The lender may charge some rate of interest for the service rendered, that is, it is lent at a premium. From the point of view of the borrower this cost, together with the dealing costs on both the sale and the purchase, must be deducted from the gross profit to give the net profit. A substantial price differential between the selling price and the cover-in price is required before a reasonable net profit is realised.

The short seller will base his actions on his expectations of future price movements in an intertemporal market. Again, if expectations did not diverge at a point of time, the short seller would not be able to find a willing buyer. Short selling is a feature of most intertemporal, speculative markets, where some price volatility is present. Short selling also facilitates arbitrage transactions. The motive is again profit maximization, and since the sale (at as high a price as is attainable at the time) precedes the purchase (at as low a price as possible), short selling is a feature of a bear position in a share. An individual will only short sell a given issue on a particular date if he expects the price to decline, so as to enable him to cover at a lower price and thus realise a profit. Should his expectations turn out to be wrong, a loss will be suffered. The short seller must be patient for he is not likely to realise a reasonable profit within a day or two unless some panic selling is taking place in the issue. He may have to wait for a few weeks before the price decline gives him a good profit margin. The short seller is a speculator trying to maximize profit on turnover and the difference

between selling price and buying price. A speculator indulging in short selling must make as careful a study of the share price and its market movements as an individual buying shares for capital appreciation. A short seller should avoid selling short when the issue is already oversold, because in such a condition many willing buyers will meet few willing sellers, and the price may actually move up instead of down. The short seller should not sell short if the price is approaching previous lows, as the lower turning point may be near. The time to sell short is when the price has been rising over a substantial period and is expected to reach an upper turning point in due course. Timing is again of utmost importance.

The minimum cover requirement for short selling is also covered by section 13 of the Stock Exchanges Control Act. The only difference is that the margin in the case of a purchase is 50 per cent, whereas in the case of a short sale it is double the amount, that is double the requirement. Two formulae, giving the same answer, may be used to calculate the margin.

They are as follows:-

$$(1) \quad M = \left(\frac{Y + I}{V} \right) - 100, \text{ or}$$

$$(2) \quad M = \frac{Y + I - V}{V}$$

where M = the margin (percentage)
Y = net proceeds of sale
I = initial margin (if he deposits cash)
V = value of shares.

For example, a short seller sells 1,000 shares short at 100 cents each, putting up a 100 per cent cash margin, that is, R1,000. Ignoring dealing expenses and any premium on scrip borrowed, the margin will be:-

$$\begin{aligned} M &= \left(\frac{R1,000 + 1,000}{1,000} \right) - 100 \\ &= 100 \text{ per cent.} \end{aligned}$$

Alternatively, the market value of scrip lodged must be 200 per cent of the proceeds of the sale. Should the price of the shares decline, the margin will increase. (This is opposite to a bull position, where a price decline will lead to margin calls.) For example, should the price decline to 60 cents, the margin will be as

follows:-

$$\begin{aligned} M &= \frac{R1,000 + 1,000}{600} - 100 \\ &= 233 \text{ per cent.} \end{aligned}$$

An increase in price will decrease the margin and additional margin calls will be made. For example, should the price increase to 120 cents, the margin will fall to 67 per cent.

$$\begin{aligned} M &= \left(\frac{R1,000 + 1,000}{1,200} \right) - 100 \\ &= 67 \text{ per cent.} \end{aligned}$$

The margin will be inadequate in this case, since a 100 per cent minimum cover is required. A small increase in price may wipe the margin out completely. Using the same examples as above, and using formula (2) the same answers will be obtained.

The short sale has been severely criticised on moral and economic grounds, and it is not our purpose to discuss again the controversial matters relating to the moral issues involved. The moral issues revolve around the question of whether it is correct (or ethical) to sell something which one does not own, or to sell borrowed property, for personal profit. One can think of many other business transactions analogous to the above which are not considered morally wrong, for example, commercial banks lending out short-term deposits or current account deposits which do not belong to them at a rate of interest. It has also been pointed out that it is as moral to sell something which you do not possess at a point of time as it is to buy something which you cannot pay for at a point of time, that is, a speculative bull transaction on carry-account, or a typical hire-purchase transaction for a car, washing-machine or radiogram. Both a bear short-selling or a bull buying with the hope of selling at a higher price, and thus making a capital gain, act on their expectations of future price movements, and both must have some confidence in their respective views.

The question must rather be seen in the light of the effect of short selling on the price of a given share or on a number of shares in general. If this test is applied we find that short selling (like speculation in general, which was discussed in chapter VI) can aggravate or even-out price fluctuations, depending on the extent to

which expectations diverge or converge with reference to a given share. It is then sometimes argued that short selling, by aggravating price declines, destroys the value of other people's property, that is, the money value of their financial asset portfolios.

Studies undertaken in America revealed that the short seller will sell after the price has already started to decline and he may cover after the decline has been checked. No firm empirical evidence can be put forward that the short seller will check excessive price rises or extreme fluctuations caused by bull operations, or that his activities will force prices down more rapidly and to lower levels, or that his purchases (covering) will add support to the market and thus check the decline. We cannot conclusively state that short sellers are destructive and destroy values, or whether they are market stabilisers. Dice and Eiteman, however, contended that short selling "...tends to be exactly the opposite of a corrective force."³²

A bull is a speculator and so is the short seller, and we have already pointed out that speculation can stabilise prices when certain conditions hold, or can aggravate price fluctuations. We are still of the opinion that it is a matter of converging and diverging expectations. If bull sentiment prevails with reference to a given share, the bear speculator has no chance of reaping a profit by selling short or to turn the price trend down by his activities or check a rise. If bear sentiment prevails with reference to a given share, bulls have little chance of making profits, or of checking the decline. It is a matter of whether bulls or bears predominate, or to what extent they cancel each other out, and this is a matter of diverging or converging expectations. The more expectations diverge, the more stable the price may be.

Furthermore, it is claimed that short selling adds to the continuity of the market, that is, it increases the number of willing buyers and willing sellers. It is then claimed that others in the market can buy when he is selling and sell when he is buying. Our own view is that for a proper continuous securities market to exist, expectations must diverge, and a continuous market is one where bulls and bears contribute equally to such continuity.

32. Dice, C.A. and Eiteman, W.J., The Stock Market, 4th edition, p.309.

G. Manipulation

1. Introduction

Manipulation, with reference to the stock exchange, is the creation of an artificial or a fictitious price for a given share, whereby an individual or group of individuals hope to make a capital gain either on the bull side or bear side of the market. The artificial price created would tend not to reflect a true price in terms of the demand and supply conditions, as governed by expectations, under 'normal' conditions, but the price may then be completely unrelated to the financial position of the company. In our view, manipulation is the creation of artificial expectations which cannot be fulfilled. When shares are subject to manipulation the stock exchange fails to fulfil its economic function. Manipulation is frowned upon and considered as unethical and an undesirable market practice.

On the bull side of the market, the main objective of the manipulators is, of course, to create a higher price for the share than the price at which the share was purchased and then to off-load on whoever is willing to buy at the artificial higher price. The bear manipulators again hope to gain by forcing prices down to artificially low levels.

Manipulation was normally carried on by pools (bull pools and bear pools), either for a rise or fall in price respectively. Syndicates were also formed. Each member of the pool will then contribute to the fund and will share in profits and must carry a share of the losses. Should a member of the stock exchange act as a member or manager of a pool, he will, of course, be either suspended or expelled.

2. Methods of Manipulation

Although manipulative practices are reasonably well controlled, it may be useful to mention the methods used.

(a) Wash Sales

By using the above method, the objective is to create artificial activity in the share, particularly on the demand side by fictitious or fake transactions, where no real change in ownership is effected. The manipulating pool members will buy from and sell to each other,

via brokers, the shares and the money thus remaining the property of the pool. The transactions, however, create market activity, which may be accompanied by a rising price over a reasonable short space of time, say, a couple of weeks or months. If the price has risen sufficiently, the pool will sell to outsiders and thus make a capital gain.

In terms of rule 157 of the Rules of the Johannesburg Stock Exchange, no fictitious transactions will be allowed, and any member of the stock exchange contravening the said rule will be expelled or suspended.

(b) Spreading of False Information

This is a method which can be used by both bull and bear manipulators with equal success. It is really the spreading of unfounded (or false) information, tips and rumours, with the objective of creating public interest in the share, on the bull side of the market. The manipulators will buy a share at a given price and then spread rumours which are bound to attract buyers, in which case the price may be bid up, and the manipulators will unload on the buying public at an artificially and unjustifiably high price. The false rumours can be about any possible aspect concerning the company which may induce the buying public to view the earning prospects of the company in a better light, or rumours of increased dividends and possible mergers and take-overs. Bears can spread news of financial strain, reduced earnings and cuts in dividends, and so forth.

Again members of the stock exchange cannot wilfully take part in such activities. In the present Rules and Act, manipulation is inadequately dealt with. However, we feel that legislation to cover this should be enacted.

(c) Corners

We must distinguish between a natural corner³³ and a manipulated corner. Whether a natural corner or manipulated corner exists the result is the same, namely, that control of the share has become concentrated and shares cannot be obtained for delivery to close any outstanding transactions except at prices and/or terms arbitrarily

33. A natural corner has nothing to do with manipulation as such, but is only mentioned briefly in this section.

dictated by the individual or groups of individuals. A natural corner is then said to be the result of events which the individual did not purposely preconceive, but developed from uncalculated events. A manipulated corner is usually deliberately planned.

A market corner is sometimes associated with short selling. An individual or group of individuals have such control over the share that short sellers cannot cover to enable them to return borrowed scrip, except at arbitrary prices and/or terms dictated by the controlling group.

A manipulated corner can be brought about by the following steps. First, the group will accumulate the available supply of the scrip. Secondly, by ingenious methods, they will stimulate a large short interest in the share and then lend scrip for delivery. A stage may then be reached that more shares have been bought than actually exist. The manipulators will then refuse to lend more scrip and will call for the scrip that has been lent. The short sellers must then cover, and buy, but few shares are offered, with the result that the price will be bid up. The short sellers must break their contracts, and/or take losses.

In terms of rule 132 bis (i) to (iii), the rules provide for certain powers (vested in the Stock Exchange Committee) to deal with corners.

In terms of rule 132 bis (i) the Committee may "...postpone the time for delivery and payment in terms of any bargain or bargains outstanding and may from time to time further postpone such time or may postpone such time indefinitely until further action by the Committee; the Committee may also subject to the provisions of the said Act³⁴ suspend the listing of such stocks or shares for such period as it deems fit and may extend the period of such suspension from time to time." In terms of rule 132 bis (ii) the Committee may "...close all or any outstanding bargains entered into in respect of such stocks or shares and all differences shall be settled on a price to be fixed by the Committee". Rule 132 bis (iii) states that the above rules in respect of corners will be binding on members and their principals.

34. The Stock Exchange Control Act, 1947, as amended.

In the United States of America corners are considered only of historical interest as they are not likely to occur under present day trading conditions. The examples of corners cited by Leffler also date back to the 19th century and the 1920's.³⁵

3. Conditions Favouring Manipulation

Dice, Eiteman, and Dice mentioned some conditions in the market which will operate in favour of manipulative activities, for example, a major advance in prices, a major decline in prices, an easy credit situation, a large floating supply of stock, a hidden value, and the technical position of the market.³⁶ Efforts to manipulate the price of a given share may meet with little success if the above conditions are not present.

(a) A Major Advance in the Market

The manipulators for a rise will not go against the trend of the market for a long period. Converging expectations, which will tend to drive the price up supported by the methods employed by the manipulators, can only aid them. The manipulators will try to stimulate public interest by any of the methods described above, and if they succeed in influencing expectations in such a manner that expectations tend to converge, resulting in wide price fluctuations, the manipulators can unload on the buying public at exaggerated prices at adequate profit margins.

(b) A Major Decline in the Market

Manipulators on the short side of the market will also row with the tide, and will gain if expectations converge and bear sentiment far outweighs the bull sentiment. The general public may tend to sell when prices are declining, thus causing further declines. Margins may also be called resulting in forced selling, thus breaking the price further. The process of a decline will again be stimulated by the manipulators by various methods, until they can reap a satisfactory profit.

(c) Easy Credit

Command over large sums of money is a prerequisite for

35, Leffler, G.L., The Stock Market, pp.314-320.

36. Dice, C.A., Eiteman, W.J. and Dice, D.K., The Stock Market, 4th edition, pp.546-548.

manipulation on the long side. Unutilised overdraft facilities, to supplement the liquid resources of the manipulators may be useful. Credit facilities to other buyers must also be easily obtainable. During a period of tight money and high rates of interest, the bull pool or syndicate may find it difficult to raise sufficient funds to finance their operations. Tight money and credit rationing will aid the bear manipulators in their operations.

(d) A Large Floating Supply of Stock

This simply means that a large volume of turnover, without any sharp rise in price, must prevail. As long as expectations diverge and an adequate supply is available, the pool can accumulate without moving the price against themselves to any significant extent. When supply is limited, meaning that there are few willing sellers, any increase in demand (coming from the pool accumulating) will result in sharply rising prices. On the long side of the market, with converging expectations, where many willing buyers meet few willing sellers, the manipulators will find it difficult to accumulate at reasonable prices, or without the price moving too much against themselves. If a large volume can be accumulated, adequate profit can still be made, even on a small profit margin. The pool will have to unload slowly, or else they may again move the price against themselves. Timing is again an important factor. They should unload when there are still many willing buyers.

(e) Hidden Value

The argument is that any mystery connected with the financial position of the company, either related to the assets, earning power, dividend policy and so forth would serve as an additional weapon in the hands of the manipulators. Publicity can then be given to false favourable or unfavourable aspects, for example, new mineral discoveries or inventions which may affect the future earning power. Prices of the share may then either rise or fall according to the type of information disseminated.

(f) The Technical Position of the Market

When the market is ready for a rally due to technical factors, that is, the technical position is strong due to an oversold condition, the manipulators for a rise may find this condition working in their favour. There are few willing sellers and many willing buyers.

The bear pool would prefer a weak technical position due to an overbought condition, when the market is ready for a decline. There are many willing sellers, but hardly any buying support.

The Stock Exchange Committee has formed a sub-committee, called the Undue Price Fluctuations Committee which must keep an eye on any undue price fluctuations, particularly when manipulation is expected, and trading in such shares will then immediately be suspended. The control provided by the Rules and the Stock Exchanges Control Act, 1947, as amended has limited manipulative practices to a large extent.

H. Summary

In this chapter we have described some of the market practices and techniques found on a stock exchange.

The minimum cover for carry accounts is laid down in the Stock Exchanges Control Act and the Rules of the Johannesburg Stock Exchange. The individual trading on margin must, however, be careful not to overtrade and he must realise that margin trading involves additional risk.

In our view options are but another mechanism by which buyers and sellers can express their expectations of future events regarding a particular share on the market. They form part of the market knowledge transmitted to all corners of the market. They are thus part of the market mechanism through which expectations are brought into consistency in an intertemporal market. There are various reasons why individuals enter into option contracts and both bull and bear speculators may use the option contract to protect their market positions. The price of an option is influenced by numerous factors.

The stop-loss order is another technique employed by bulls and bears to protect profits and to limit losses. The stop-loss order will, however, only be used by day-to-day traders and short-swing traders, but not by long-term investors.

Averaging and pyramiding are well-known techniques in America. Pyramiding represents a dangerous form of speculation, but profits may be substantial if the individual is successful. Averaging is a more conservative method of speculation.

Short selling on the Johannesburg Stock Exchange is very limited. Brokers normally discourage this practice. The margin requirements for short selling are double those of an ordinary purchase. The actions of the short seller are also based on his expectations of the future course of events. Whether short-sellers are on the side of market stabilisers or whether they aggravate price declines is still a controversial matter.

Manipulation is a practice frowned upon by the Johannesburg Stock Exchange. Manipulators, however, can only achieve success if certain conditions favour them. We feel that proper legislation to cover manipulation, as well as short selling, should be enacted.

CHAPTER X

BONUS, RIGHTS AND CONVERTIBLE ISSUES

A. Introduction

In chapter II we have dealt with the cost of capital and new issues, and we have also referred to new rights issue. In chapter VI we have dealt with some aspects of share price economies. In this chapter we shall discuss bonus and rights issues from the point of view of the shareholder. Both bonus and rights issues will affect the position of shareholders. A bonus or rights issue may be either to the advantage or disadvantage of the shareholders depending on the relative price movements before and after the bonus or rights issue. The position of shareholders will also be influenced by their claim on earnings and assets as a result of the rights issue. Here we have an instance where an internal financial decision may influence the market price of the share via changing expectations of actual and potential shareholders. The shareholder will not only be interested in the productivity of the project for which the funds are raised by way of the rights issue, but he will also be interested in what the rights will be worth to him.

In South Africa new issues are normally made directly through the stock exchange. Issues may take the form of (1) private placings, (2) stock exchange introductions, (3) tender issues, (4) offers for sale, (5) issues for public subscription and (6) bonus and rights issues. In this chapter we are mainly concerned with the latter and with convertible issues.

Established companies in need of additional funds, either to finance capital stock growth which has already taken place or which is contemplated, or to finance a merger or take-over, or the acquisition of financial assets, or even working capital (partially), sometimes offer additional ordinary shares to existing shareholders voluntarily on a pro rata basis. This also appears to be an economical way of raising additional share capital.

We must distinguish between bonus or capitalisation issues on the one hand, and rights issues on the other hand. The latter may also include some bonus element and may also be referred to as privileged subscriptions. By definition bonus issues are issues of additional shares free of charge to shareholders pro rata to the

shares they already hold.¹ The crux of the matter is that a shareholder's shareholding will increase without an additional direct cash outlay on his part. A rights issue is an issue where the shareholder can, in a given ratio or proportion to his existing holdings, subscribe to a new issue by the company at a given price during a designated period. Issues are always on a pro rata basis, as there is no other way of maintaining each individual shareholder's control, equity, and his claim against assets and profits. An inducement is given to the existing shareholders to subscribe by setting the issue price somewhat below the current market price of the existing shares, with the result that we may say there is some bonus element included in the rights issue. The latter is referred to as a rights issue on bonus terms. The issue price may, of course, be above the par value of the shares, in which case the difference will accrue to the company in the form of share premium.

Whichever kind of issue the company is making, the shareholders are primarily interested in the effect of the issue on their controlling position (voting), expected earnings per share after the issue, the dividend rate, equity, and the market price of the share before and after the new issue.

B. Bonus Issues (Capitalisation Issues)

A free bonus issue, also referred to as a capitalisation issue, normally occurs when a company has built up considerable revenue or capital reserves. The purpose of a free bonus issue or capitalisation issue is to capitalise revenue reserves which have been built up over a period of time. It is simply a book entry, transferring funds from a revenue reserve account to issued ordinary share capital. A free bonus (or free scrip issue) does not affect the company's earning power, as the total capital employed remains unchanged. (The tangible net worth is thus constant.) A capitalisation issue can be made out of share premium account (section 86 quod of the Companies Act) or capital redemption reserves (section 43), or from ploughed-back profits over a number of years, the latter being a scrip-issue or scrip-dividend issue.

The amounts standing to capital and revenue reserves may become

1. See Paish, F.W., Business Finance, p.120

large in relation to the nominal value of the capital issued, as shown in the company's balance sheet. The profits (gross or net), or dividend rate, expressed as a function of the nominal capital will be high, whereas the return on total capital employed (that is including reserves), will be much lower. Bonus issues are then justified on the grounds that the distinction between issued nominal capital and reserves becomes fictitious and unrealistic, if not misleading, particularly with respect to the rate of profit on nominal capital. The assets are also out of relation to nominal issued capital. The reserves will be represented by assets and are not in actual fact available for distribution in the form of dividends. It is claimed that a capitalisation issue will destroy this illusion. In any event owners should not calculate the rate of earnings on nominal issued capital, but on total capital employed. 'Furthermore, the price of the shares on the stock exchange may tend to stand well above par or nominal value. Thus, the dividend yield, expressed as a function or ratio of nominal capital, will be high in relation to the apparent dividend yield. The board of directors may then decide to capitalise some part of the revenue and/or capital reserves and to make a free bonus issue to existing shareholders. According to Paish "Such an action brings the liabilities side of its balance sheet more closely into accordance with reality, by indicating that the reserves represent assets which are an essential part of the business and cannot be distributed as dividends, and at the same time reduces the nominal rate of dividend on the increased capital to a more normal level."²

This action could be regarded as some sort of guarantee to the company's creditors that the reserves will not be distributed to ordinary shareholders in the form of dividends at some future date and therefore adversely affect the creditworthiness of the company. In South Africa this will only apply to revenue reserves, as capital reserves cannot be distributed in the form of dividends. The same result can be obtained by writing up the nominal value of the issued capital, as this will also result in the closing of the gap between the current market price of the shares and their par or issue value.

Paish gave an example where a company may issue a few bonus shares every year. "Occasionally a company which, because of a continuous need of additional capital to finance expansion, wishes

every year to plough back a large proportion of its current earnings, issues annually a relatively small number of bonus shares, representing the profits currently re-invested in the business."³ Of all the listed companies on the Johannesburg Stock Exchange, only International Combustion has employed this method to our knowledge.

This benefit only accrues to ordinary shareholders and not to other classes of securities in the capital structure. Although the retained profits belong to the company in law and not to the ordinary shareholders, the company can only build up substantial revenue reserves by following a niggardly dividend policy, particularly during the early stages of the company's existence. The ordinary shareholders are then sacrificing dividends in order to help the company to finance expansion, and a free bonus issue would then constitute a just reward to these shareholders, (if they have held the shares for long enough). Existing shareholders thus maintain their relative shares in control, equity, and earnings.

In the case of a capitalisation issue the direct cash outlay on the new shares is nil and the bonus element is reckoned as the difference between the market or cost price of the shares already held and the value of the entire new holding, for example, if the cost of the old shares is R500, and the market valuation of the entire new holding is R550, then the bonus element is R50.

It is sometimes maintained that a bonus issue in actual practice does not mean all that much to an ordinary shareholder. He has more shares on which he receives the same dividends, or should he receive more dividends, this benefit may be swamped by a decline in market valuation.

Suppose a company has an issued share capital of R1,200,000, (1,200,000 shares of R1 each) and the net profits amount to 20 per cent of the issued share capital, that is, R240,000 on the average. Of this amount the company distributes, say, R108,000 or 9 per cent of the issued share capital, giving a dividend rate of 9 cents per R1 share. A scrip or free bonus issue is then made to existing shareholders on the basis of 1 new share for every 3 shares already held. The issued share capital will increase to 1,600,000 shares of

3. Paish, F.W., Business Finance, pp.122-123.

R1 each, that is, to maintain at least the current dividend rate of 9 cents per share or 9 per cent on issued share capital will now cost the company R144,000 in dividends. A holder of 1,200 old shares will receive 400 new shares, giving a holding of 1,600 shares. He can sell his 400 new shares and still get 9 per cent or 9 cents per share on his old holding. His loss in dividends will amount to R36, but the cash realised by selling the shares may be considered as 'dividends' which should have been paid to him in the past, if he has been a shareholder for long. A free bonus issue is tantamount to a dividend payment. Whether he gains or not depends on the extent of decrease in the price of the shares, if any, after the bonus issue. In view of the fact that earning power on tangible net worth is not affected by the free scrip issue, there is no reason why the price should fall if the dividend rate per share is to remain unchanged. Assuming the above shares were selling at a dividend yield of 4.5 per cent, or an earnings multiple of approximately 10, the shares would be standing at 200 cents in the market, if prices did not fall. The 400 new shares would then realise R800 in cash,⁴ which may be re-invested on better terms in some other company, if the shareholder so wishes. The shareholder may thus sell his new shares without suffering a diminution in income from his existing holding, provided the dividend rate is maintained.

Should the shareholder sell his bonus shares, he in actual fact sells part of his equity, his voting control will diminish and so will his residual claim in the case of winding-up.

A bonus issue may, however, be more beneficial to shareholders paying a high marginal tax on dividend income than an increased dividend distribution, since a free bonus issue is not subject to tax.

C. Rights Issue

1. General

As we have said above, a rights issue is where shares are offered to existing shareholders in a given ratio to their existing holdings, at a given price, to which they may subscribe during a given period.

4. Whether an element of profit will be included depends on whether or not the market price of his old 1,200 shares falls by more than 67 cents per share. In the long run it may pay the shareholder to retain his new shares for capital appreciation.

To take up his rights a shareholder will have to make a cash payment. The price at which the shares are offered to existing (registered) shareholders will be influenced to some extent by the market price of the shares and thus by the degree of success achieved by the company in the past and by future expectations of earnings, and so forth. However, the price at which the shares are offered to the registered shareholder, will be pitched somewhat below the current market price, to induce shareholders to exercise their rights and for the issue to succeed. The result of this is that, from the shareholder's point of view, the right will have some value, which can be turned into cash if he sells the new shares which he has acquired, or he may sell the rights, if he so wishes. An existing shareholder may consider the difference between the cost of his existing shares and the new shares as some bonus element accruing to him. The size or extent of the bonus accruing to him may also be reckoned in terms of the prevailing market price of the existing shares in his possession. A rights issue on bonus terms may be considered as an increase in dividend, and may also be treated as an indirect share split.

The higher the market price of the existing shares, the greater the bonus element which may be offered on a rights issue and the greater the compensation which may accrue to the existing shareholders even if the market price of the shares should decline after the ex-rights date. The shareholders gain in terms of market valuation, (as long as the price does not fall below the issue or subscription price), as long as the price does not fall below the average price (or book value, from the shareholder's point of view), of his old holding and the new holding. A rights issue is only really valuable to an existing shareholder if a reasonable bonus element is included in the issue. Some rights issues are only of very marginal value to the existing holders, and may even, for all practical purposes be failures.

The shares are issued to registered shareholders on the grounds of being fair to them, namely, to maintain the element of proportionate control and equity on the part of the existing shareholders. When companies are required to offer new issues to registered shareholders on a specified date on a pro rata basis, this legal requirement is referred to as the pre-emptive right. This right then gives the existing shareholders the first opportunity to purchase any new issues of ordinary shares which the company may make.

There are certain conditions which must be fulfilled before a rights issue will succeed. A shareholder will only be induced to take up his proportionate share of the new issue if he feels confident that the additional capital raised by way of the issue will at least proportionately, increase the earning power of the company. There may, of course, be some time lag between the raising of the capital and increased earning power. The bonus element or cash value to the shareholder must be reasonable, in other words, the price differential must be adequate. A high current market price for the existing shares is an advantage. Another factor is that the shares must be widely held for a rights issue to succeed. In most cases, rights issues are also underwritten. The success of an issue will also be influenced by the state of the money and capital market (financial markets) at the time of the issue, which is influenced by the general economic activity and policies prevailing at the time. The relative size of the issue may also have some bearing on the degree of success.

2. Value of Rights

A number of formulae have been put forward to find the theoretical value of a right. A distinction is drawn between cum-rights and ex-rights value, the cum-rights value being the value until the ex-rights date, after which the share will sell ex-rights on the stock exchange. Theoretically it is clear that a rights issue will lead to a downward revision of the market price of the shares of the company, as will be shown below. In actual practice the price of the share need not move down to the theoretical value (ex-rights), but rather something between the previous market price and the theoretical value. In some cases a rights issue may be considered as a bull-point and the price may even increase. The important point is the expected rate of return on the new issue relative to the cost of capital. When the expected rate of return is greater than the cost, the market may be bullish, and a new issue may improve the price-earnings ratio at which the share is selling. In such a case it will be worthwhile to exercise the rights. A new issue may be considered as a sign of new growth potential, particularly if management has indicated that the immediate past dividend rate per share will at least be maintained even if the capital is increased. Prevailing bullish sentiment engendered by optimistic expectations may strengthen the market price and nullify the theoretical downward revision which is necessary for accounting purposes by investment and finance companies.

The opposite may also be true. If bearish sentiment prevails the price may drop below the theoretically calculated value. A rights issue with a considerable bonus element may result in a decline in the market price of the shares on the stock exchange, particularly if the total dividends paid are to remain constant or are expected to remain constant, (that is, a lower dividend rate per share). The greater the bonus element included in the rights issue, the smaller may the additional earnings on the new capital raised be, as compared to the existing capital, and the existing dividend rate may not be maintained. The above depends on the ratio of the issue, that is, 1 for 4, or 1 for 10, and so forth. The number of rights required will be determined by the amount of funds to be raised and the subscription price of the new issue, the latter being largely a function of the current market price. If the company wishes to raise R1,000,000, and the subscription price is R1.00 per share, then 1,000,000 shares must be issued. If the existing issued share capital is 1,000,000 shares, the company will offer one right for one new share. If the subscription price is, say, R4.00 per share, 250,000 shares must be issued. If the existing issued share capital amounts to 1,000,000 shares, 4 rights will be required to purchase one new share. Thus, the number of rights required to purchase one new share is simply the ratio of the existing shares outstanding to the number of shares that will have to be sold to raise the funds required.

The price at which the rights change hands, and the extent to which the price of the share changes, will give management some indication of what the public (the market) thinks of their actions, plans and methods of finance. The price at which the share will sell may be influenced by theoretical calculations made by potential subscribers and speculators, but their expectations of the future course of events (earnings, dividends and prices) will determine the magnitude of price movements, depending on the extent to which expectations tend to converge or diverge.

Rights themselves are transferable on the stock exchange, and the market value of the rights will depend upon the spread between the market price of the shares and the subscription price at which the shares can be taken up or exercised.

3. Calculation of Theoretical Value

The cum-rights value can be calculated by the following formula:-

$$V = \frac{(C - y)}{(n + 1)},$$

- where C = the current quoted market price - rights on (the value of the right still included)
- y = the issue price of the new share. (Subscription price)
- n = the number of shares the shareholder must have registered in his name to enable him to subscribe to one new share of the issue. (The number of rights required to purchase one new share.)
- V = the value of one right.

The price of the share as such is really the current market price minus the value of the right. The above formula is thus really arrived at as follows:-

$$\frac{(C - V) - y}{n} = V$$

- (1) Multiply both sides by n : $C - V - y = Vn$
- (2) Transpose : $C - y = Vn + V$
- (3) Factoring : $C - y = V(n + 1)$
- (4) Divide both sides by (n+1) $\frac{C - y}{n + 1} = V$

Another formula used is:-

$$V = \left(\frac{nC + y}{n+1} - y \right) + n$$

n = the number of shares the shareholder must hold to buy one new share.

C = the market price of one share - rights-on

nC = the market value of his holdings if he held n shares.

nC + y = the total value of shares after subscription

n + 1 = the total number of shares after taking up the new shares

$\frac{nC + y}{n + 1}$ divided by n + 1 is the ex-rights value of a share, and this value minus the subscription price is then the current value of n rights.

Let us assume that a company makes a rights issue of 1 new share for every 4 shares registered in the name of a shareholder. Let us assume that the shareholder already holds 100 shares with a market price

of 440 cents each (rights-on), and that he subscribes to the new issue at 400 cents.

His position will then be as follows:-

100 shares @ 440 cents each (rights-on)	=	R440
25 shares @ 400 cents each	=	100
<u>125 shares</u>		<u>R540</u>

The average price is then 432 cents per share. The theoretical value of one right is 8 cents. The price per share rights-on is 440 cents, and the price, if it drops by the full theoretical value of one right, should fall to 432 cents, which is usually referred to as the equalisation price.

Using formula $V = \frac{(C - y)}{n + 1}$, the calculation is as follows:-

$$\frac{(440 - 400)}{(4+1)}$$

$$= 8 \text{ cents (value of right)}$$

Using the second formula the calculations would be as follows:-

$$\left(\frac{(4 \times 440) + 400}{(4+1)} - 400 \right) \div 4$$

$$= 32 \div 4$$

$$= 8 \text{ cents (value of one right)}$$

Theoretically the market price per share should drop from 440 cents to 432 cents on ex-rights date, calculated as follows:-

$$\frac{(nC + y)}{n+1}$$

$$= \frac{(4 \times 440) + 400}{4 + 1}$$

$$= 432 \text{ cents (value of share ex-rights)}$$

The ex-rights price can also be calculated by the following formula:-

$$E = \left(C \times \frac{n}{n+q} \right) + \left(y \times \frac{q}{n+q} \right), \text{ where}$$

E = ex-rights price

C = market price (rights-on) or pre-issue price

y = subscription price or issue price

n = no. of shares shareholder must hold to buy one new share

q = no. of new shares acquired (1 for every 4 held)

$$\begin{aligned} & (440 \times \frac{4}{4+1}) + (400 \times \frac{1}{4+1}) \\ & = 352 + 80 \\ & = 432 \text{ cents (value of share ex-rights)} \end{aligned}$$

The shareholders who do not take up their rights could sell their rights for a theoretical value of 32 cents each, that is, the difference between the issue price and the ex-rights price. By subscribing for the issue at 400 cents the shareholder obtains shares with a theoretical value (ex-rights) of 432 cents. The rights from 4 shares entitle the shareholder to subscribe to 1 new share at 400 cents, with a prospective (theoretical) ex-rights market price of 432 cents. The value per right inherent in the cum-rights price is 8 cents per share. On 4 shares this would be 32 cents, or in other words, the shareholder receives one right valued at 32 cents for his 4 shares. Theoretically each of the 4 shares declines by 8 cents per share, that is 32 cents, so that he will merely break even. Therefore, if he fails to subscribe, it would mean a loss of 8 cents per share on his existing holding, or 32 cents for every 4 shares, but this is compensated for by selling each right at 32 cents. The above argument is based solely on the assumption that the equilibrium ex-rights price will be 432 cents. As already pointed out this may not be the case in actual practice.

We may do more or less the same calculations by looking at the market's capitalisation of a company and the effect of a rights issue. Let us suppose a company with a simple capital structure (only ordinary shares) has an issued share capital of 1,000,000 shares with a current market price of 440 cents each. The market capitalisation of the company is therefore 1,000,000 x 440 cents which is R4,400,000. A further 250,000 shares are issued at 400 cents, that is a 1 for 4 issue, where 1 right attaches to every 4 shares held. The company's valuation would then be as follows:-

Market capitalisation	R4,400,000
Additional capital received	1,000,000
Total value of company	<u>R5,400,000</u>

Total number of shares issued will now be 1,250,000 and the value per share $\frac{R5,400,000}{1,250,000} = 432 \text{ cents per share.}$

The above position may, however, be different when the capital structure is geared, and more than one class of security exists. Let us assume the above company has also 800,000 6 per cent participating preference shares selling at a price of 150 cents. The position is then as follows:-

Market capitalisation of 800,000 6% Participating preference shares at R1.50 each	R1,200,000
Market capitalisation of ordinary shares - 1,000,000 at R4.40 each	4,400,000
Total market capitalisation	R5,600,000

The rights issue of 250,000 shares at R4.00 is now made pro rata to ordinary shareholders. As a result we assume now that the participating preference shares increase in price to 170 cents as a result of better asset protection and expected higher participation in profit. The position may then be as follows:-

Capitalisation as above	R5,600,000
Additional capital	1,000,000
Total value of company	R6,600,000
Less:- new capitalisation of preference shares at R1.70	1,360,000
	R5,240,000

Total number of ordinary shares 1,250,000. The value of an ordinary share is therefore not 432 cents, but approximately 419 cents. The increase in the price of the participating preference shares took place at the expense of the ordinary shareholders. The value of the right is only 19 cents instead of 32 cents for each 4 shares held.

If the shares of a company are undervalued by the market, a rights issue may not be in the best interest of existing shareholders if the current market valuation is accepted by management. This has been clearly pointed out by Merrett and Sykes in dealing with the cost of capital, and the extent to which old shareholders subscribe to the rights issue.⁵ The market valuation of the share and the cost of the

5. Merrett, A.J. and Sykes, A., The Finance and Analysis of Capital Projects, pp.433-438.

additional capital, and the rate of return on the new investments financed by the rights issued between them then have an influence on the net gains (or net losses) to existing shareholders. The shareholders who sell off their rights can, of course, always re-invest their proceeds somewhere else where they can earn a rate of return. If the company raises the funds in the form of a rights issue on adverse terms, that is, at a high cost to the existing shareholders, because of the undervaluation of the shares on the market, such shareholders may lose by the rights issue. The market's valuation is thus important in this respect, because if the shares are undervalued, the cost will tend to be excessive. It may pay management to postpone the rights issue (the projects that are to be financed), until the market valuation is more realistic. The larger the contemplated rights issue, the more significant the above point becomes. The larger the multiplier at which the shares are selling the lower the cost of a rights issue to existing (old) shareholders. The more depressed the market when the new issue is made the more the dilution in the claim against profits and assets. If the shares are 'correctly' valued, then it may be taken that a rights issue will be in the interest of shareholders on the proviso that the shares rise sufficiently to reflect the expected rate of return on the new issue. If the price does not rise, and the shares remain undervalued, then it may be detrimental to shareholders' interest to make the rights issue, because the price does not reflect future earnings or dividend prospects. This applies even more to the short term shareholders, since such a shareholder would probably have gained more by an increase in dividends and capital appreciation.

Let us assume a company has been in existence for some time. It has 4,000,000 shares of R1 each outstanding, and has ploughed back R1,000,000. The net worth is therefore R5,000,000. Assume further that the net profit after tax amounts to 15 per cent on net worth, that is, R750,000. The company makes a rights issue of 1,000,000 shares, that is a 1 for 4 issue, at a price of R1.25, which represents the book value of the existing 4,000,000 shares. The directors express the expectation that the rate of return on the new R1,250,000 will be 20 per cent. The position is then as follows:-

Profit on old net worth	R750,000
Expected profit on new capital	250,000
Total expected profit	R1,000,000

On the new net worth the rate of profit is then 16 per cent. Assume, however, that the expected rate of return on the new investment is only 10 per cent, then the position will be as follows:-

Profit on old net worth	R750,000
Expected profit on new capital	125,000
Total expected profit	R875,000

On the new net worth the rate of return will amount to 14 per cent. The old shareholders, even if they subscribe, suffer a dilution of the rate of return on their investment from 15 per cent to 14.0 per cent.

The claim against assets can be worked out on similar lines. The book or asset value of the old shares at par

is	R4,000,000
Plus surplus	1,000,000
	R5,000,000

which gives a book value of R1.25 per share. The new shares are issued at, say, R1.20 and not R1.25. The book value after the new issue will be:-

5,000,000 shares at R1 each	R5,000,000
Surplus	1,000,000
Share Premium (on new issue)	200,000
	R6,200,000

which is R1.24 cents per share, or R50,000 for all existing shareholders.

D. Convertible Securities

1. General

Convertible securities are debentures or preference shares which are convertible (or exchangeable) into ordinary shares under certain specified terms and conditions. The option to convert usually rests with the holder of the convertible security, and the issue contract will normally specify the dates between which conversion can take place.

The price at which the shares received are valued is known as the conversion price. The number of shares that will be received is known as the conversion ratio or the given rate at which conversion can take place. The conversion privilege is, therefore, among a number of covenants, a provision included in the issue contract pertaining to a given debenture or preference share.

Companies issue convertible securities for various reasons. One reason is to improve the salability of the issue, because investors will consider the contractual exchange clause as an additional attraction. The rate of interest (coupon rate) on debentures or the fixed dividend rate on preference shares may even be pitched somewhat below the coupon rates of comparable debentures and preference shares. This will then slightly decrease the cost of the capital to the company. The issue of convertible securities may also render future refinancing easier. A convertible debenture is really only a temporary loan and it has the advantage of enabling the company to defer the issue of ordinary shares during a period of adverse market conditions. It may also prevent the dilution of earnings of the ordinary shareholders. The market price of the company's shares may be relatively depressed due to adverse earnings and niggardly dividends at the time the company is hard pressed for additional capital. The issue of convertible securities may then be feasible, particularly if the prospects of improvements in earnings, dividends and the market price of the ordinary shares are reasonable, which will then make conversion desirable. When the whole issue has been converted into ordinary shares, the fixed interest charge will disappear, but so will the tax advantage on the debenture interest.

The effect of convertible issues on dilution of earnings will depend on whether earnings per share will be maintained after conversion. If conversion shares are added to the already existing issued share capital, and if earnings increase less than proportionately, the market price of the ordinary shares may fall and the cost of capital will then be increased. The fall in the market price of the shares is considered dilutionary as a result of conversion.

It is usually contended that investors in convertible securities hedge against inflation and recession. During a recession and slump in earnings the convertible security holders will not convert and they thus retain their senior position. The price of the convertible

security (whether a debenture or preference share) will in any case tend to fall relatively less than the ordinary shares of the company during a recession. The convertible security will retain some investment value on the grounds of its senior position apart from the conversion privilege. An individual (a convinced bear) who is confident that the price of the ordinary shares of the company is about to fall, can sell such shares short and can buy the convertible security of the company as a hedge. Should the price of the ordinary shares fall, he will realise a profit on his short sale, but the loss on the convertible security will tend to be proportionately less and an overall profit is made. Should the price of the ordinary shares rise instead, a loss must be taken on the short sale, but this loss will be reduced by a profit on the convertible security.

During a period of boom and inflation the price of the convertible security will rise with the price of the company's ordinary shares. Capital gains on convertible issues may, therefore, be quite substantial, depending on the extent of the upward price movements of the ordinary shares. It may, however, be better to buy the ordinary shares in the first place, because a substantial premium may be paid for the ordinary shares if they are acquired indirectly via the convertible issue. On the other hand, if the earnings of the company improve, the convertible security holders can participate in earnings growth by converting their holdings into ordinary shares on terms which are favourable to themselves.

2. Price Behaviour

The market value of a convertible security is tied to the market value of the ordinary shares into which they are convertible. The value of the convertible security will tend to equal the aggregate value of the ordinary shares into which they are convertible. However, this will depend on whether the market price per share is greater than or equal to the conversion price.

Let us take the following example. Say, a debenture with a face value of R100 is convertible into ordinary shares over the next three years. The conversion rate may be stated, that is, 50 shares for each R100 debenture, or a specified conversion price of R2 per share over the next three years may be stated. If the conversion rate is given, the conversion price can be calculated, or if the conversion price is given, the conversion rate can be calculated. The

conversion price, however, does not tell us the value of the shares which will be necessary to break even or to make a profit on the conversion. This depends on the market price of the convertible security, the market price of the ordinary shares and the conversion rate. When a company issues a convertible security, the normal practice is to set the conversion price above the market price of the ordinary shares prevailing at the time of the issue, for example, if the market price is R1, the conversion price may be set on R2, which then involves a substantial premium of R1 of the conversion price over the market price of R1 prevailing at the time of the issue. It is obvious that the premium will increase should the market price of the ordinary shares fall after the issue of the convertible security. Should the price rise, the price of the convertible security will also rise.

When we divide the face value of the debenture by the stated conversion price the conversion rate is obtained, that is

$$Y = \frac{X}{P}, \text{ where}$$

Y = conversion rate

X = face value of debenture

P = conversion price

In our example

$$\begin{aligned} Y &= \frac{R100}{R2} \\ &= 50 \text{ shares} \end{aligned}$$

The conversion price, given the stated conversion ratio is found by

$$\begin{aligned} P &= \frac{X}{Y} \\ &= \frac{R100}{50} \\ &= R2 \text{ per share.} \end{aligned}$$

Should the market price of the ordinary shares rise, the price of the debenture will also rise. Should the price of the ordinary shares rise to R3, the price of the debenture should theoretically increase to $(50 \times R3) = R150$. Should the price of the debenture actually increase to R150, this phenomenon is usually referred to as conversion parity. In this case the individual holding the convertible security may be considered to be indifferent to conversion, 'all other things being equal'. Should the market price of the debenture move to R160 for a rise in the price of the ordinary shares to R3, then the value of the convertible security is greater than the aggregate

value of the ordinary shares at the specified conversion rate of 50 shares, and the holders of the convertible security will not convert. Should the price of the ordinary shares move to R3, but the debenture only to R130, the value of the convertible debenture will be less than the aggregate value of the ordinary shares at the given conversion ratio. This may then induce the holders of the convertible debenture to convert into ordinary shares. In this case it is worthwhile to buy the debenture on the open market for R130, and immediately to convert into 50 ordinary shares which can be sold for R150, giving a R20 gross profit. An operator can continue doing this for a while, (probably only a short while), because market forces will tend to drive the convertible debenture price up to the point of conversion parity. The closer the convertible debenture price to the point of conversion parity, the less profitable conversion becomes.

3. Conversion Value

The conversion value at every point of time can be calculated by the formula, assuming the price of the ordinary shares to grow at a constant rate of g ,⁶ that is $R = P_0(1+g)^n Y$, where

R = conversion value at time n

P_0 = the initial value of the ordinary shares at the time of the issue of the convertible security.

g = growth rate of the price of the ordinary shares

Y = conversion rate

The terminal value of the convertible security can also be calculated by the following formula:-

$$R = \frac{P_0}{P} (1+g)^n X,$$

where R = terminal value at time n

P_0 = initial price of ordinary shares

P = conversion price of the shares

g = growth rate of the price of the ordinary shares

X = face value of the convertible security, or par value on redemption.

6. See chapter VII, p.487. The price of the ordinary shares at time $= n$ will be $R_n = P_0(1+g)^n$, where $g = br$. We may also write $R = (P_0 e^{brn}) Y$, or $R = (P_0 e^{gn}) Y$.

There are a few ways open to the company by which conversion can be stimulated.⁷ In the first place the company may, if allowed to do so in terms of the issue contract, call the convertible security for redemption by giving the necessary notice to this effect. This will induce holders to convert provided that the call price is somewhat lower than the value of the convertible security which, if standing at conversion parity, must be equal to the aggregate value of the ordinary shares into which it is convertible. The call price must thus be lower than the aggregate value of the ordinary shares. It may happen that the market price of the ordinary shares carries the convertible security price above the call price, which may then result in the company calling for redemption, which will then force the convertible security holders to convert.

A second method would be to increase the dividend pay-out rate on the ordinary shares, thereby hoping to increase the price of the ordinary shares. An increase in dividend may also result in a further income differential between the two securities. This may induce the convertible security holders to convert.

It appears to be common practice in the United States of America to include an acceleration clause in the terms of issue.⁸ The effect of this clause is that the conversion rate is decreased over a period of years, that is, the conversion price is increased over that period, say R2 per share before 30th June, 1969, then R3 per share until 30th June, 1971, and then R4 until 30th June, 1973. In this case the conversion price is increased at pre-stated intervals. The convertible security holder will then be induced to convert earlier, since an increase in the conversion price will mean smaller profits should he fail to convert early.

E. Summary

Bonus issues are issues to existing shareholders on a pro rata basis and involve no direct cash outlay on their part. It is tantamount to a dividend payment. The purpose of a bonus issue is to bring the liability side of the balance sheet more closely into

7. See Archer, S.H. and D'Ambrosio, C.A., Business Finance: Theory and Management, pp. 440-448.

8. See Eiteman, W.J., Dice, C.A. and Eiteman, D.K., The Stock Market, 4th edition, p. 350.

accordance with reality. It may also be regarded as some guarantee to the company's creditors that the reserves will not be distributed to ordinary shareholders in the form of dividends. In the case of a bonus issue the shareholders retain their relative shares in control, equity, and earnings.

A rights issue is where shares are offered to existing shareholders in a given ratio to their existing holdings, at a given price, to which they may subscribe during a given period. A rights issue will normally include some bonus element in the sense that the subscription price will be below the current market price of the shares. A rights issue can have a bullish or bearish influence on the market price of the share, depending on whether shareholders agree or disagree with the management's financial policy. The expected productivity of the new projects to be financed will be important. The theoretical value of a right and the theoretical ex-rights value of the shares can be calculated with the aid of formulae, but the actual market price may deviate from this theoretical value.

Convertible issues are not very common in South Africa. There are, however, various reasons why companies may issue convertible debentures or preference shares. Such convertible issues also have some attractions to certain individuals. The individual buying a convertible issue is said to be hedging against inflation and recession. In a period of recession the convertible issue will still have some investment value as a fixed-interest, senior security, and its price will fall relatively less than the ordinary shares. In a period of inflation and boom the price of the convertible security will rise with the price of the company's shares. The individual can convert when this is to his advantage. The price of the convertible security will be strongly influenced by the price behaviour of the ordinary shares. The conversion value at every point of time can also be calculated with the aid of certain formulae.

CHAPTER XI

MERGERS AND TAKE-OVER BIDS

A. Introduction

When dealing with business finance the internal and external growth of companies, industrial concentration, the size and structure of companies, mergers, take-over bids, and any other form of combination would constitute a significant part of such analysis. Such analysis will, however, focus considerable attention on the financial and other considerations from the point of view of the acquiring company such as estimating the future income stream, the valuation of the assets, tax considerations, gearing and leverage, the cost of capital, determination of the purchase price, and so forth. Some of these aspects will be briefly dealt with in this chapter. For more detailed and systematic discussions of mergers and take-over bids reference should be made to the publications cited below.¹

A company can grow internally or externally. External growth brought about by some form of combination, particularly take-overs and mergers, has some influence on the rate of growth of assets, sales, earnings, dividend rates and share prices. Hence, mergers and take-overs will always affect the financial and legal positions of shareholders to such an extent, assuming that the companies involved are listed on the stock exchange, both before and after the merger or take-over, that a chapter on these aspects, in a thesis on stock exchange economics, is not superfluous. Any individual interested in stock exchange matters should have some understanding and knowledge

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1. Weston, J.F., The Role of Mergers in the Growth of Large Firms, University of California Press, Berkeley and Los Angeles, 1953. Moon, R.W., Business Mergers and Take-over Bids, Gee and Co. (Publishers) Ltd., London, 1959. Weinberg, M.A., Take-overs and Amalgamations, Sweet and Maxwell London 1963. Bushnell, J.A., Australian Company Mergers 1946-1959, Melbourne University Press, 1961. Penrose, E. The Theory of the Growth of the Firm, Basil Blackwell, Oxford 1959. Collins, N.R. and Preston, L.E., "The Size Structure of the Largest Industrial Firms 1909-1958," American Economic Review, vol. 51, no. 5, December, 1961. Nutter, G.W. "Growth by Merger", Journal of the American Statistical Association, Vol. 49, September, 1954. Stigler, G.J. "Monopoly and Oligopoly by Merger". American Economic Review, Vol. 40, no. 2, May, 1950.

of how take-overs or mergers will influence the investment worth or merits of his investments, as well as his legal position, such as control and other aspects in terms of the Companies Act, 1926, as amended, particularly section 103 bis and ter.²

Both a merger or take-over may either adversely or advantageously affect the shareholder's position, whether he is a member of the acquiring or acquired company. A take-over, for example, may adversely affect the shareholders of the bidding company if the take-over subsequently turns out to be uneconomical, or it may adversely affect the shareholders of the company which is acquired, particularly where minority interests remain. The shareholders of a company which is subject to a take-over bid are well advised to investigate the pros and cons before they accept the offer, and such shareholders should not be in a hurry to accept such an offer. On the other hand, shareholders of all companies involved may gain or benefit considerably from a merger or take-over by changing their relative positions regarding earnings growth, growth in the dividend rate and asset protection. The extent and nature of the benefits accruing will, of course, also depend on the nature and terms of the merger or take-over.

Thus when a take-over or merger is envisaged or investigated a few relevant questions arise, mainly of a legal and financial nature. The main financial problems are the bases of evaluation for the determination of the purchase consideration and the form the settlement must take, that is, the basis of actual payment for the above will affect a shareholder's relative position, before and after the take-over or merger. Both the type of take-over or fusion, the method adopted and the form of settlement must be carefully considered by the shareholder, because these will vitally affect his position of ownership and control, and his residual claim against earnings, profits, surpluses, and assets.

B. Definition of Terms

All the different combinations or fusions that can take place between two or more companies are given different names depending on the basis on which these combinations and fusions take place.

2. See section E of the present chapter.

Sometimes these names are used interchangeably, for example, consolidation and merger. However, the shareholder should have a clear understanding of the different forms of and bases on which combinations or fusions can be brought about and how he will be affected. The only way one can distinguish between these various forms is again by definition.

The definition of a take-over bid is actually very straight forward; it is an offer to the registered shareholders of a particular listed company to purchase their shares at a given price, (but not necessarily for cash), with the object that sufficient shareholders will agree to sell to the bidder to enable the latter to acquire control, directly or indirectly, of the company which is subject to the take-over bid. Moon defined a take-over bid to cover all of the following procedures or methods:- "(i) purchase the company's undertaking; (ii) make a general offer to the shareholders to purchase their shares or sufficient of them to give control; (iii) do a deal with the existing board of directors, whereby they undertake to sell all their shares and to resign their offices; the casual vacancies thus created being filled by the purchaser(s) nominees; or (iv) acquire sufficient shares by purchase on the Stock Exchange or otherwise, to wage a successful battle of proxies with the existing management so that they are dismissed and replaced by the purchaser(s) nominees."³ In the first method the bidder acquires control over the assets directly by becoming the owner, and the settlement will normally be in cash. In the other methods the bidder acquires control over the assets indirectly by obtaining control of the management (board of directors) of the other company. The latter can be achieved by buying a sufficient number of shares for cash to give control, or partly cash and partly an exchange of shares, or on the basis of an exchange of shares only.

Take-overs as such have also been split into four groups. The first is a complete take-over, where the bidding company acquires all assets and liabilities of the other company (or companies). The second is a take-over of assets only, without assuming responsibility for the liabilities. The company subject to the take-over will assume liability for all liabilities in the balance sheet as at a given date. Thirdly, we have take-overs without full ownership, which may include the case where only the ordinary shares are taken over, but no offer is

3. Moon, R.W., Business Mergers and Take-over Bids, p.119.

made to the preference shareholders. Fourthly, only part of the ordinary shares may be acquired, say 51 per cent. Each of the above types of take-over has its own characteristics and effects on the shareholders.

Another term which is often used is amalgamation, but the distinction between a take-over and an amalgamation is more often than not only a matter of degree. In the case of a take-over the direct or indirect control over the assets of the company taken over will pass to the bidder, whereas in an amalgamation the shareholding, after the companies have combined, will spread between the shareholders of the companies on the basis of the rate of exchange of shares in settlement. An amalgamation is thus a fusion (blending) of two or more existing companies into one company, the shareholders of each blending company becoming substantially the shareholders of the acquiring company. An amalgamation comes about through a take-over bid of one company by another, or a bid by a third company for both companies. In the case of an amalgamation, the method of take-over always takes the form of a share-for-share exchange. For example, company A makes an offer to the shareholders of company B on the basis of a 1:1 share exchange. Company B then disappears but company B's shareholders may now hold roughly 50 per cent of the shares of company A after the exchange, provided, of course, that the two companies were roughly the same size. This is an amalgamation. If the offer is, say 1 share in company A for every 8 shares held in company B, (say, company A's shares are roughly priced 8 times higher than those of company B), then we have a take-over proper, even if company B's shareholders get a substantial control in company A.⁴ In both the above cases the operation was brought about by a take-over bid. A take-over bid is thus a technique which is used to effect (1) an amalgamation and (2) a take-over proper. Another small distinction between an amalgamation and a take-over proper is that in the case of an amalgamation both managements agree to the combination, whereas in the case of a take-over proper this may not be so, for example, Hulett's.

In the case of a take-over bid an offer will be made normally to all the ordinary shareholders, who have voting control, at a price which

4. The price of the shares at a point of time is not very useful. The average price over a representative period of time should be considered.

is slightly above the ruling market price on the stock exchange, to induce the current shareholders to part with their present holdings, either for a cash consideration, or partly cash and partly exchange of shares, or exchange of shares only. For the company as a whole the purchase price paid by the bidder will therefore be in excess of the market capitalisation. The existing shareholders are obviously the ones that are not willing to sell at the ruling market price yet a higher offer might induce them to sell, that is, if all the economies and other advantages of the take-over, together with the higher price offered, change their expectations to such an extent that they become willing sellers at the price offered.

We must also distinguish between consolidation and merger. When two or more companies combine or fuse, so as to form one new company (entity), then we have a consolidation. The companies which are blended are voluntarily extinguished, according to a given scheme which is approved by the shareholders, and the assets and liabilities of the constituent companies are transferred to the new company formed. For example, companies A, B, and C combine, lose their separate identities and form a new company D.

When one or two companies combine in such a way that one of the constituent companies survives we have a merger. A merger differs from a consolidation only in the sense that the several companies are fused into an already existing company. The surviving company succeeds to the assets and liabilities of the other company or companies, which then cease to exist. For example, companies A and B, combine with C; A and B will lose their identity and C the already existing, absorbing company retains its identity and continues to use its corporate name in the operation of the expanded business. Whether we have a consolidation or merger the shareholders of all the companies will be affected. In the case of a consolidation, the shareholders of A, B and C may become substantially the shareholders in the new company D. In the case of the merger, the shareholders of A, B, and C will become substantially the shareholders of C. The control and claims each shareholder will retain after the consolidation or merger will depend on the nature of the settlement or basis of exchange offered to the shareholders of A, B, and C in the case of a consolidation, and to the shareholders of A and B in the case of the merger. In the case of a merger and a take-over there may be considerable changes in the shareholders. This is

particularly the case where a company, previously listed, becomes a wholly owned subsidiary of another company. In the holding company method the absorbing company and the subsidiary both retain their identity, although the subsidiary company's management may change completely.

The bidding company (purchaser) may purchase the shares of the selling company whereby the latter company may become a wholly-owned subsidiary of the former. The purchasing company will then become a holding company. Initially the selling company may continue to exist as a separate entity, but a stage may be reached where the subsidiary may be liquidated, and the holding company takes over all the assets on liquidation.

The holding company method is apparently a popular one. "This is apt to be the most widely-used method in practice, judging by the number of mergers which have taken place under the auspices of a holding company scheme. It is so called, because either a new limited company is formed (a non-trading company more often than not) or one of the constituent companies is designated the holding company (thus acting in the dual capacity of trading-cum-holding company)."⁵ There are certain advantages and disadvantages in forming a new company or in using an existing company for the holding company method. In forming a new holding company the capital structure can be kept simple, which may render future financing easier. The disadvantage is that expenses must be incurred to float and capitalise a new company. * The advantage of using an existing company is that such expenses can be saved. Another advantage is that an existing company may have substantial reserves which add to the financial strength and these reserves may also be utilised for various purposes. If an existing company is chosen, the capital structure must preferably be free from gearing, as this may adversely affect future financing.

Pyramiding is also a reasonably well-known technique in South Africa. Mr. K. holds 51 per cent of the shares in company A. Mr. L. holds 51 per cent of the shares in company B. They then agree to form a new company, namely B.A. Ltd., normally a holding company. B.A. Ltd. takes over their shares in company A and company B. Mr. K. and Mr. L. will enter into some voting agreement in respect of their

5. Moon, R.W., Business Mergers and Take-over Bids, p.38.

shareholding in B.A. Ltd. After the formation of the new company they sell 49 per cent of its shares, via the stock exchange, to the public. They therefore achieve two things - (1) they legally control both company A and company B and (2) they get 49 per cent of their investment out in cash, usually including some capital gain. A family can retain control over a company in the same manner.

A reverse take-over bid can also take place. Instead of company A (the bigger company) taking over company B, (the smaller company), the latter company can increase its share capital and with the approval of the controllers of company A, company A is taken over on the basis of an exchange of shares. The shareholders of company A become the majority shareholders in company B and the original shareholders of company B become the minority shareholders in the enlarged capital of company B. In this case it was probably better to make company B the holding company rather than company A for various reasons, the most important being that company A was probably a private company without a stock exchange listing while company B was a public company with a stock exchange listing. Instead of A taking over B, the latter takes over A and the stock exchange listing remains. The unlisted company then becomes the subsidiary. This kind of take-over will then normally be accompanied by an increase in the issued share capital of company B, but with the object of passing control to company A shareholders. An example is the Rave-Anstey take-over.

Another method is simply the sale of assets. A sale of assets, where one company loses its identity, is also referred to as a merger. We may also find only a partial sale of assets, where the selling company does not lose its independent identity, but carries on business as usual - this is not a merger - but simply a purchase and sale of certain assets, for example, the sale and lease-back of certain freehold property. This is also referred to as the redeployment of assets. The selling company will usually make a capital gain and also obtain cash which can be used for other purposes, but the use of the property will be retained by the payment of a rent.

C. The Reasons for and Objectives of Take-over Bids, Mergers and other Forms of Combinations

In chapter VII some attention was focused on the fact that growth shares are still very much in vogue. The object of the following discussion is to focus some attention on the effect of take-overs and mergers on such growth, the reasons for such take-overs and mergers and

the other devices defined above.

Change in the relative size of companies are the result of differential rates of growth of individual companies, either internally or externally. No company is ever static, numerous factors will cause differential rates of growth, for example, technological changes, differences in management skills, competency, aims and foresight and different rates of growth in markets, to mention but a very few. Furthermore, there is a continual change in productive services due to diffusion of knowledge and capital transmutation.

Whether to expand externally through some form of combination, or to expand internally, is a question of expected profitability and the relative costs of achieving an increase in profitability, that is, whether internal or external growth would maximize shareholders' worth, given the circumstances at the time.⁶ Also, internal expansion is not only sometimes more expensive than external expansion, but is usually a slower process. It is, however, difficult to decide whether the growth of a company after it has fused with another should be treated as internal or external growth. It is probably better to treat it as internal growth. The effects of a merger or take-over on the subsequent growth of a company may differ considerably from case to case. Not all mergers may result in growth, for example, two completely uneconomic units may fuse, resulting in the existence of a still stagnating unit. External expansion may not make a considerable difference to the absolute size of large companies but may influence the relative size of companies within an industry and may result in industrial concentration.

There are certain factors limiting internal and external growth. A definite limitation on external growth is that opportunities for fusion in some way or another, on a sound economic basis, are limited. A company cannot simply combine with any other company at random. Two factors are important, namely, the capital required for the merger or

6. Internal growth means all growth except that which comes about through any form of fusion, combination or acquisition of assets and property with and from other firms with formerly independent existence. External growth comes about through all the devices mentioned above. Internal and external growth can, however, be internally or externally financed.

take-over and the existence of economies of scale. It is really a matter of cost and the cost structure, particularly long-run costs. Many costly mistakes and failures have come about through take-overs and mergers. In chapter II we pointed out that the magnitude and form which investment will take will to a large extent depend on capital complementarity. In the case of external growth the company will look for opportunities to fuse with (or acquire) other companies whose activities are complementary to its own and supplement its own activities. If the company wants to diversify its own activities some company in another related industry may be taken over.

We must distinguish between vertical and horizontal integration. If a company acquires additional assets of the same nature, that is, if the two or more companies are engaged in the same or very closely related lines of production, or stages of production, or of distribution and they are brought under the same management, we have horizontal integration, or expansion in a horizontal direction. The company, after acquiring the additional assets, can produce and sell more of its original line of production and may also acquire new and more distribution channels, both of which are growth factors. Horizontal integration may also result in diversification of activities by acquiring a company producing a different product, but which can be easily incorporated under the same management. Most horizontal integrations take place with the object of diversifying activities.

Vertical expansion will also result in some growth. Vertical expansion or vertical integration means that the company takes over or merges with another company in order to incorporate in its own production process goods and services which are essential ingredients in the manufacture or distribution of its original line of production. The result is that the company will increase the range of intermediate products it produces for incorporation in its original product. Vertical integration can be backward or forward. Backward integration is where the company starts producing goods (products and services) it previously purchased from other companies by taking over or merging with such companies. Backward integration usually means that a supplier of some good is taken over. An example of backward integration would be where a steel producer takes over a separate company or companies which previously supplied him with raw materials. A company may integrate forward and start producing goods or acquire distribution channels (or

services) which are closer in the production process to the final consumer. Forward integration normally means that a distributor is taken over. An example of forward integration would be where a manufacturer of a certain line of product might obtain its own distribution outlets and services by fusing with independent companies who previously rendered these services.

Companies may use the above methods of integration separately or may simultaneously, or at various points of time, use both. The method of vertical integration has to some extent been popular, and may result in considerable growth of a given company engaging in this practice. A number of take-overs have been to achieve the economies of vertical integration. Not many companies will move into completely unrelated fields and diversify completely, although some mining finance companies are doing so with a remarkable degree of success, for example, Anglovaal Industries.

The economic reasons for and consequences of take-over bids and any other forms of fusion usually do not differ materially, if at all, with the result that many of the economic objectives of take-overs will also apply to any other form of external expansion. The economies to be reaped are basically the same.

Strictly speaking one should distinguish between certain factors which have led to or which are conducive to take-overs and the objectives (economic reasons) or economies which can be reaped by the bidding concern. (These are probably only matters of degree, and not of kind).

Broadly speaking, the economic significance of the take-over bid is that the bidder thinks (or expects) that he can turn the asset portfolio of the company for which he intends to make a bid (or for which he is bidding) to better advantage than the existing management. The bidder provides a useful check on the existing management in this respect. The existing management cannot recommend their shareholders to refuse the bid without telling them why they think they can do better than the bidder.

Take-over bids are an important case of capital regrouping. In the case of a take-over a change in ownership affects the production process through capital regrouping which may be to national advantage with reference to better utilisation and allocation of resources.

Furthermore, take-overs form part of the process of diffusion or transmission of knowledge to market participants of a company's multiperiod plans and expectations. Expectations of future developments govern take-over and merger activity. A merger or take-over must also fit into the expansion and multiperiod plan structure of the company.

1. Take-overs as a Result of a Niggardly Dividend Policy

Both Kuznets and Rose have mentioned this point of low dividends as a reason for take-overs. Kuznets pointed out that the low level of corporate savings in the United States of America is due to the fact that companies would rather maintain a high dividend rate and retain a small percentage of profits because they fear that they may become subject to a take-over bid.⁷ Rose, referring to the post-war taxation system, also said that some take-over bids resulted from the low level of dividends.⁸ An example in South Africa, where a low dividend rate was probably one of the reasons why shareholders agreed to a take-over, is Hulett's. The objectives of the bidding company in this case are fairly clear. The first condition is, of course, that the company which is subject to the bid must have large liquid resources. (However, a large book entry for retained profits need not mean large cash resources in the case of every company.) However, small or niggardly distributions in the form of dividends may result in the undervaluation of the share on the stock exchange and such a company is vulnerable to a take-over. Shareholders may easily agree to a take-over in such a case, welcoming the opportunity to sell at a higher price than the market price and to realise a tax-free capital gain.

Any reasonable offer may be accepted by the shareholders of the company to be acquired. The bidding company may utilise the cash or liquid resources of the company which is subject to the take-over to increase future dividends. The cash resources, if combined with the resources of the bidding company, may be utilised for further new investment without adversely affecting the dividend rate on the total share capital. Large liquid resources may be an indication of the inability of the management of the company, subject to the bid,

7. Kuznets, S., Capital in the American Economy, pp.98-99.

8. Rose, H.B., The Economic Background to Investment, pp.230-231.

profitably to employ these liquid resources for investment, but in the hands of a new management they may be more profitably utilised to the benefit of the shareholders of the bidding company as well as the shareholders of the company to be acquired. Weinberg also concluded that "In theory, therefore, the take-over bidder who takes advantage of a low market price caused by undue dividend restraint performs a useful function."⁹

The low dividend may, of course, not be due to a deliberate policy of dividend restraint, but simply to the inability of management to earn a reasonable rate of return on the asset portfolio. The company may be at a competitive disadvantage due to size and no dividends may be paid. Some shareholders in smaller companies within an industry may even welcome a take-over before the market valuation of their shares drops because of increasing competition within the industry. A low price, where the share may be selling at a low multiplier, is a definite advantage for the bidding company from the point of view of purchase consideration and the cost of capital.

It is, of course, also true that a company with large liquid resources may not find it profitable or feasible to expand internally, but may look for opportunities for taking over another company with a view to diversifying its own activities. The pros and cons of internal as opposed to external expansion will be thoroughly surveyed and analysed by the company. The company may consider it in the long-run interest of its own shareholders to utilise cash resources to acquire another company instead of increasing the immediate dividends. It has been pointed out that if the resources of a company are properly employed to yield a proper rate of return and the company pays a 'fair' dividend, the company need not become the victim of a take-over, for the bidder may be defeated.

2. Financial Economies

The bidding company can derive some definite financial advantages or economies from a take-over. Most authors on the subject tend to emphasise this aspect. The financial economies to be derived may be varied, but will definitely be one of the factors which will be given considerable weight by a potential bidder before he makes the bid.

9. Weinberg, M.A., Take-overs and Amalgamations, p.20.

The bidding company may find it difficult to expand internally due to a lack of funds which may impair the future competitive position of the company, that is, if a lack of funds results in a relatively slower rate of growth for the company as compared to other companies in the industry. Due to imperfections in the money and capital markets one company may find itself in a disadvantageous position for raising capital at competitive prices.

A take-over or a merger may solve this problem if the company can acquire another company with ample liquid resources which can be fully utilised for further expansion to at least maintain or better, to improve its competitive position. Or, as we have indicated, a company with the necessary liquid resources may take-over another company for the purposes of external expansion and diversification. By increasing the relative size of the company, its competitive position may improve.

Another financial advantage normally mentioned is that a take-over can lead to economies of capital expenditure, not so much in the short-run, but particularly in the long-run. A take-over, merger or consolidation can result in a better utilisation or more economic use of the existing capital assets relative to the capital employed. Two competing companies may become over-optimistic in their future expectations of market and profit trends and may be induced to over-expand, which again may result in excess capacity developing, the under-utilisation of the capital assets and a waste of the money capital tied up in the company. It is felt that this situation is not so likely to develop if the two or more companies were under the same control or management.

Future capital expenditure may be better planned and economies effected. A take-over or merger may directly result in an increase in the company's borrowing powers (creditworthiness) which may enable the company to raise capital in the future by the use of other forms of securities, that is, debentures, or the increased size of the company may enable it to raise fresh capital in the capital market by a new issue of ordinary shares. Increased retained profits may make further internal financing of expansion easier at any point of time in the future. The easier access to the capital market may enable the company to raise capital in the future at more competitive prices or costs. A reduction in costs of finance may be brought about by large-scale financing, reducing the average and marginal costs of raising new

capital.

The desired assets or other facilities for expansion may be acquired more cheaply through external expansion than internal expansion, with a resultant saving brought about in capital outlay. In enumerating the motives and advantages of take-overs and mergers, Weston pointed out that "...the desired facilities may be secured more cheaply by purchasing the stock of an existing company. For a host of possible reasons (some may be found in special circumstances of sellers), the securities of a company may be selling below replacement cost of the firm's assets. Arrangements may be made whereby the stock of such a company may be acquired without causing a precipitous rise in price."¹⁰ Even if the bidding or acquiring company must utilise a large percentage of its own liquid assets or even increase its own share capital to finance such a take-over or merger, it will still have the desired effect of a saving or economic use of funds, even if the short-run benefit may not be so apparent. This is sometimes referred to as acquiring assets at a discount. The acquiring company can, if the take-over or merger drained its own liquid resources, recover some of this partially at least, from the liquid resources of the acquired company(ies). A strong financial motive will also be to acquire working capital from the other company(ies) in a take-over or merger.

If the holding company method (and group method as we know it in South Africa) is used, the subsidiary or operating companies can borrow from the holding company on reasonable terms, or they may deposit surplus funds with the holding company at deposit on call rates. Intercompany lending and borrowing is made easier. Within the group temporary surpluses and deficits can be readily coped with by switching funds between the companies.

A financial saving which may accrue is through the working capital tied up in inventories and/or raw materials and the tools of production. Overstocking of inventories and/or raw materials may be eliminated through better control and co-ordination. Furthermore, economies in general overheads, purchasing, and so forth can be effected.

Taxation is another important consideration. A company with a large assessed tax loss may become subject to a take-over. This is

10. Weston, J., The Role of Mergers in the Growth of Large Firms, p.74.

particularly the case in the field of financial companies.

3. Production Economies

A take-over or merger may result in the better or more economic use of existing real capital assets, or as some economists prefer to call it, technological economies of large-scale operations. The production economies that can be obtained depend to a large extent on the ease with which the productive facilities of the acquired company can be adapted to the new conditions, or be incorporated in the production process of the acquiring company. A take-over can bring together a wide range of manufacturing techniques and facilities possessed by the two or more companies. Large manufacturing companies are more often than not multiproduct companies and there are always the possibilities or opportunities of economies of plant-size and returns to scale or the economies which may be reaped from multiplant operations. The above is an important motive behind some mergers and take-overs. However, internal growth can also give economies of scale and increased market dominance. The extent to which the above can be achieved through external growth in the short-run will be affected by the type of integration - whether it is a horizontal or vertical integration, and whether the latter is backward or forward.

The production economies inherent in vertical and horizontal integration are usually standardisation of the product, the acquisition of a new product, new plant or productive capacity, the utilisation of by-products, large scale purchasing, stabilisation of production by better utilisation of plant and other equipment, lower marginal and average cost of production, diversification of production, and thus risk-spreading, large scale and superior research, and the possibility of introducing automation, computers, and so forth. Some mergers become necessary through technical progress. Modern technology and distribution, and the tendency towards the bigger unit, favour take-overs and mergers.

An advantage mentioned by Weston is that "...new facilities may be acquired more quickly through mergers. New products, new processes, new plants, and new productive organisations can be developed either by the firm itself or purchased. A possible advantage of purchase is that the addition may be achieved with little delay."¹¹

11. Weston, J.F., The Role of Mergers, p.74.

The capital stock can be quickly adjusted to desired levels and in most cases at a discount, that is, where the shares of the company which is subject to the take-over are quoted on the stock exchange at a price well below the economic or replacement value of the underlying assets. If the shares are undervalued by the market, a company may be acquired relatively cheaply. Although these advantages can be acquired in the short-period, the real advantages from the point of view of the company, the shareholders and the community may be felt only in the long-run. The success (or failure) of the merger or take-over must not be judged in the short-run but on the long-run and on more permanent results.

Although risk can be spread by diversifying activity, or by integrating related activities, Weston's warning that uncertainty is still present should be heeded, namely, that "...the desired new product, new process, or new organisation may be developed with less uncertainty of investment loss. The purchased facility may have already demonstrated its revenue-yielding capacity. Innovation usually involves great uncertainty, imitation is less difficult, but to acquire facilities involves the least uncertainty of all. Acquisition activity however, is not completely free from uncertainty - an estimate of the future yield of the asset acquired must be made in order to determine an appropriate purchase price."¹² (The problems of valuation will be dealt with below.)

The motive of the bidder for another company, when production economies is the chief reason for the bid, can be summarised in one idea, namely, that the bidder feels that the assets of the other company are completely under-utilised (in relation to total capital employed), and that a far better return can be obtained by utilising the assets properly by placing the company under a more dynamic and efficient management. A long established company may earn, say, 12 per cent on the balance sheet or historic cost price of its assets (capital employed), but the current value of the assets (particularly property) may be three times as high, with the result that the earnings are only 4 per cent on the current value. A take-over may result in the fuller utilisation of such resources, and a higher rate of return on the true value of the assets may be brought about.

As we have pointed out, when we dealt with the functions of the capital market, scarce resources or capital funds (savings) must be

12. Weston, J.F., The Role of Mergers, p.74.

channelled to the points of highest return in order to obtain the best use of resources. If the existing management is not fully utilising the assets of a company (resulting in excess capacity) and this is reflected in the market price of the shares, then a bidder would be fulfilling an important economic function by taking these assets over, and, by better management, increasing the productivity of the assets. From the point of view of the community a gain is registered by the better utilisation of the re-allocated resources. From the point of view of industrial development take-overs may remove certain rigidities and introduce some degree of flexibility. In the absence of take-overs or any other form of combination some companies will simply stagnate to the detriment of their shareholders.

If one can use the term capital-output ratio in such a way as to have any meaning, one may say that shareholders will gain if the capital-output ratios decline over time, if resources are transferred from less productive uses to more productive ones - from a high capital-output ratio to a low one. Mergers and take-overs can lead to the closing down of redundant plants, only the most efficient being retained.

4. Distribution Economies

The distribution economies that may accrue from a merger or take-over can be considered as the marketing and trade advantages which may be acquired by a company, which would not have accrued through internal expansion, or which would have involved the company in more expense. The distribution economies are many and varied, and will again largely depend upon the nature of the bidding company and the nature of the take-over or merger, namely, whether it is a vertical or horizontal integration.

The extent to which distribution economies can be acquired will also depend on the existing pattern of distribution and the competitive position in the industry, including the demand conditions for the product. According to Bushnell, "The first reason for mergers that occurs to most economists is the monopoly rewards of reducing competition."¹³ Although there is the advantage of acquiring the market of the company taken over, we must distinguish between "...attempts to limit competition from attempts to gain a competitive advantage."¹⁴

13. Bushnell, J.A., Australian Company Mergers, p.26.

14. Ibid., p.77.

He stated that the first kind is an attempt to eliminate competition in the industry, that is, to gain monopoly rewards at the expense of the community, whereas the second kind of merger is only part of the continuous competitive fight. This then takes us right into the field of economic theory and market behaviour, particularly the theory of oligopoly and industrial concentration.

In the first place we must distinguish between bigness per se and relative size,¹⁵ as measured by rate of growth in sales, or rate of growth in assets, with the former the superior measure. With respect to market behaviour and power in the market, the consequences of bigness and fewness may be different. The influence of mergers and take-overs on the relative size of companies may be important. However, there may be quite a few mergers and take-overs within an industry and we may still have a low degree of concentration within the industry. We may have a situation where small changes in concentration may have hardly any influence on the competitive behaviour within the industry, or we may find that small changes in concentration in an industry may have an influence on competitive behaviour. We must be careful not to generalise too much in this respect. In the case of some mergers or take-overs market domination may be the sole motive, but it is not the case in a very large number of mergers or take-overs. Market control or dominance can, however, be achieved easier through mergers and take-overs. Mergers may then lead to a situation of oligopoly, which may again lead to non-competitive price-output policies.

Marketing economies can be obtained by diversification as well. The duplication of selling and distributive organisations may lead to considerable savings. A good example would be the Cuthberts take-over. The assets of Cuthberts were undervalued in the balance sheet, in other words, there was a hidden value. The main object of Goodwear was, however, to obtain the Cuthberts distribution channels at a relatively low cost.

Another good example of a merger with a view to distribution economies was Courtaulds and British Celanese in the United Kingdom.

15. When we deal with bigness, we are concerned with absolute size, but when we deal with relative size, we are interested in industrial concentration. Both may come about through mergers and take-overs. In this respect also see Stigler, G.J.: - "Monopoly and Oligopoly by Merger", American Economic Review, Vol. 40, No. 2, May, 1950.

The explanation for the merger given by the two boards (The Economist, 20th April, 1957) read as follows:- "It would greatly strengthen the ability of both companies to meet competition from imported textiles in the home market, and would also enable them to improve their position in the export markets having regard particularly to the problems and opportunities which are certain to arise if the proposals for the European Common Market and Free Trade Area are completed."

Weston also contended that "...the development of new products and marketing areas may be accomplished through external expansion without the necessity of combating difficult competition in the early stages of development."¹⁶ New distribution channels can be acquired at less expense than by establishing them and usually also with less delay, or as Weston points out "...it must be recognised, finally, that market control may be secured more rapidly and with less effort through acquisitions than by internal expansion. The merger of two large firms may result in market dominance by the resulting firm."¹⁷ Other marketing economies may accrue through collective advertising, the unification of sales forces, transportation economies, the development of foreign markets, and the financial advantages which will result from this.

5. Administrative Economies

In trying to assess the pros and cons of take-overs and mergers, one problem to be considered is the managerial or administrative economies which may accrue. Various authors on mergers and take-overs have pointed out that the shortage of highly qualified managers, or inefficient managements running companies, (with the result that a low return is earned on the capital employed), have resulted in mergers and take-overs. Small units might not be able to afford to employ highly specialised personnel in the fields of finance, marketing, technology and law, and all other branches of specialisation and research, with the result that they may find themselves at a competitive disadvantage through force of circumstances. These disadvantages may outweigh the benefits of closer co-ordination in the organisation which one may find in a relatively smaller unit.

The administrative advantages which may result from a merger or take-over are, according to Guthmann and Dougall, principally the

16. Weston, J.F. The Role of Mergers, pp.74-75.

17. Ibid, p.75.

following:-

- "(a) Greater use of statistical and accounting controls.
- (b) Benefit from intercompany comparisons and exchange of ideas.
- (c) Greater specialisation in administrative departments.
- (d) Use of higher-priced experts because of larger volume of operations to support cost.
- (e) Greater use of research and testing methods.
- (f) Centralization of planning for formerly separate units.
- (g) Lessened labor turnover because of wider variety of job opportunities and better working conditions."¹⁸

All these advantages need not accrue simultaneously, or even at all, but it may be reasonably assumed that most of them will or can be effected in the long-run.

In conclusion one may say that the motives and reasons for take-overs and mergers are complex and that one can hardly establish a general rule or theory which will apply to every case. Each and every one will have to be considered on its own merits, but one will invariably find that the motives behind a take-over or merger can be classified under the major headings of finance, production or operating economies, distribution or marketing economies (including trade advantages), and management economies. Some of these economies will be evident in the short-run, whereas others may only become effective in the long-run. If the price of a given share is chronically depressed, and shows very little growth prospects from the shareholders' point of view, a take-over may rectify the matter. The price of the share may be low due to inefficient management, a niggardly dividend policy, understatement of asset values in the balance sheet, wrong capital structure, the under-utilisation of existing real capital, over-capitalisation and low rate of return on capital employed, poor distributive techniques and policies, high operating costs and increasing marginal costs, obsolete production methods, and so forth. The existing management may lack the insight and foresight to rectify the poor or bad financial and production relationships, in which case a take-over or merger should be to the benefit of the shareholders of such a company, provided the above matters can be rectified by a take-

18. Guthmann, H.G. and Dougall, H.E., Corporate Financial Policy, Prentice-Hall, Inc., New York, 1948, p. 483.

over or merger.

A combination may be considered successful if the investment worth of all shareholders concerned after the merger or take-over is maximized. The shareholders should, however, always bear in mind that the above economies, and the increase in size, whether internally or externally, by new investment in the company, or whether by acquisition of already existing assets through acquisition or some form of fusion, need not show a positive correlation with profits. Not all combinations are economical, and the question of earnings-growth and growth in size is still open. Furthermore, there are cases where internal expansion would have been more profitable. The effect of a take-over or merger on the growth rate of earnings is, however a complex matter, and certainly not easily calculated. Furthermore, the effect of a take-over or merger on subsequent growth may even be negative. From the point of view of shareholders, it is important that after a merger, consolidation, amalgamation, or take-over, they are not faced with a decline in the dividend rate, or a capital loss, or both.

The shareholders of the acquired company may suffer as a result of leverage if the acquiring company has a large prior charge capital. The existing capital structures, gearing and leverage are important considerations when shareholders consider the merits of a take-over. The acquiring company (bidder) may have to issue prior charge capital to pay for the take-over (say on the basis of a partly cash and share-exchange basis) and this may affect shareholders adversely after the take-over. Thus, before shareholders agree to a take-over, they must carefully consider relative dividend rates, price-earnings ratios, apparent and expected dividend yields dividend cover, the relative growth prospects, taken separately and jointly, and in relation to the industry as a whole, earnings per share and expected changes in the earnings per share, the relative asset values and the basis of valuation of such assets, bearing in mind that it is not the book value that is important, but the true economic value and expected earnings capacity, and lastly, the voting control before and after the take-over or merger.

Sellers will normally agree to a take-over and mergers if they have a desire for further diversification of activities, if they wish to become associated with a larger, reputable company, if they feel that changes in management will be to their benefit, particularly where

the present management cannot keep pace with industry developments and competition, where the company has lost some key management through ill-health or death and where such persons cannot be replaced, and so forth.

After a careful consideration, the shareholders of the company subject to a take-over bid will, of course, agree to the take-over if their expected relative position after the operation will be better than before. A shareholder who does not wish to become a shareholder in another company, if some exchange of shares is involved, can simply sell his existing shares at the current market price. Some capital gain can normally be made when rumours of take-overs circulate, or when an actual bid has been made, due to excessive speculation in the initial stages.

A criticism commonly raised is the fact that the bidding company may be in a position, after acquisition, to liquidate the assets of the acquired company, at a profit, and a reasonably sound economic unit may become liquidated or destroyed. This may lead to large tax-free capital profits for certain individuals, at the expense of others. This criticism comes from Rose, who contended that "In some cases, however, the purchaser may indeed be willing to damage the future earning power of the company over which he acquires control if he can sell part of its physical assets at a really large profit over their book value, perhaps even going so far as to wind up the company."¹⁹ If the above procedure leads to a more economic allocation of scarce resources in the system, the procedure may be justifiable, otherwise not. Some criticism is apparently also aimed at some sale and lease-back transactions, where the motive is solely a capital gain.

Another disadvantage is that mergers and take-overs can lead to over-expansion, with the possibility of a decline in efficiency, particularly managerial and operating efficiencies. A take-over or merger can also lead to over-capitalisation of the company. The price paid for the acquisition may be out of proportion to the economies which may have accrued. An acquisition is generally financed from an increase in nominal share capital or by a loan issue. It can happen that shares are acquired at unrealistic prices during a boom period, and therefore, the timing of the take-over or merger has some significance.

19. Rose, H.B., The Economic Background to Investment, p.233.

Wrong estimates can lead to over-capitalisation and its disadvantages for shareholders.

The Huletts take-over in 1962 would actually present an interesting case study for a person interested in studying take-overs. After the new contracts with Japan for approximately 200,000 tons of sugar, 150,000 tons to the United Kingdom, outlets to the United States of America and Canada, it was possible that the total exports for sugar would exceed the record export of about 500,000 tons achieved in 1962. Some of the bigger sugar companies expected to establish their position in the world market.

On the 9th November, 1962, the tempo of the sugar battle had become the feature of the market. Hulett's shares increased from $\pm$ 240c on 15th October, 1962 to just over 500c on 5th November, 1962. Within 3 days the shares eased off again to 405c after the consortium had announced that it had gained control. Other sugar shares - members of the consortium - had also become easier. Tongaat lost 30c, Reynolds Bros. 55c and Gledhow 25c. The market in general had, however, been helped by the re-investment of some of the weight of money coming from the sale of Hulett's shares.

Hulett's acquired control of Natal Estates at 400c with the object of rationalising their combined sugar production. Control was obtained by Hulett's before the consortium's (Crookes, Tongaat, Pongola, G.C. Smith, Reynold Bros. and Gladhow and the Umzimkulu Co.) bid of 500c per share for 95 per cent of the issued capital of Natal Estates was made. Before the start of the sugar war Hulett's held no shares in Natal Estates. Control had been obtained almost entirely by Hulett's by buying on the open market. Natal Estates increased from 250c to 565c during this period.

Through the agency of Philip Hill and Higginson and Union Acceptances, the Tongaat consortium announced a bid for Hulett's itself. At that time Hulett's were standing at $\pm$ 420c on the market. The consortium offered 400c per share in cash (ex div) for 50 per cent of the shares owned by each shareholder and 150c per share in cash for all the 450,000 7½% preference capital, with voting rights. The consortium's bid for Hulett's, and Natal Estates for that matter, was a defensive move by a large section of the industry to prevent Hulett's which, with Natal Estates, then controlled 40 per cent of the South African sugar production, becoming any bigger.

It was a move by the member companies to protect themselves collectively and once and for all against possible absorption into the Hulett group. They thought Hulett was too big for safety. The Hulett shares held by each company were looked upon as a trade investment, and each company, including Hulett's, continued to operate as independent entities.

Hulett's claimed that the consortium was only offering R17.7 million for a company worth conservatively R45 million. Hulett's explained that its conservative dividend policy had been due to expansion programmes. Hulett's paid 12c dividend where they probably could have afforded 28c per share. Capital expenditure averaged R6.3 million per year over the last four years before the bid and the chairman promised that in future Hulett's would distribute 60 per cent of its profits after tax, which would have meant a doubling of Hulett's dividend rate. In the end, however, the shareholders agreed to the take-over.

The merger of Natal Navigation, Transvaal Navigation, Klippoortjie and Koornfontein under the management of Federale Mynbou resulted in the latter company managing 10 major collieries with growth prospects. The late Mr. Drayton (Natal and Transvaal Navigation) wanted to be relieved of the management problems of the collieries.

In the financial history of South Africa we have seen quite a number of take-overs, for example, African and European Investment by Anglo-American; New Union Goldfields by New Consolidated Goldfields (Gold Fields of South Africa); S.A.F.I.M. by Massey-Ferguson; Rooderand by Middle Wits.; the combination of General Mining and Federale Mynbou; Free State Saaiplaas by President Brand; Cuthberts by Goodwear Shoes; Huletts by the Consortium; and in other fields, for example, the brick mergers, coal mergers, milling companies and so forth. In a sense the development of the group-system in the South African mining industry is due partly to take-overs and mergers. The growth of Protea Holdings is a result of a series of take-overs.

The government is about to amend the Regulation of Monopolistic Conditions Act which would give it the power to investigate take-overs and mergers, and if necessary, to prevent certain take-overs and mergers. In our view one should be careful not to introduce unnecessary rigidities into the economic system, and the implications of the

amendments to the Act should be carefully studied before they are put on the statute book.

D. Valuation and Other Factors to be Considered

The general factors to be considered by the company contemplating a bid, including risk, the asset value and earnings, can be summarised as follows:-

- (1) Type of business carried on, and its place in the range between necessities and luxuries.
- (2) Locality and security of tenure of premises.
- (3) Competition, actual and potential.
- (4) Capital structure with special attention to priority classes of shares and to long-term liabilities, and the terms under which these have been issued or borrowed.
- (5) Management, particularly with regard to ability, integrity and experience.
- (6) Length of time established.
- (7) The nature and value of the tangible asset backing and whether the assets are likely to be difficult to realise, or are specially subject to obsolescence or are mainly of value only in the particular business involved.
- (8) Extent of the cover given by earnings in relation to dividends on the shares to be purchased.
- (9) Maintenance of profits and trend of profits - the absence of material fluctuations in annual profits being a major factor, and the estimation of future income stream.
- (10) Repayment obligations, if any, in respect of prior capital and loans (gearing).
- (11) The extent of the market for the product.
- (12) The most suitable scheme for merging the interests must be fully established and investigated. It may take one of the following forms:-
 - (i) The absorption of one of the companies by the other.
 - (ii) The purchase of the two undertakings by a newly formed company.
 - (iii) A holding company scheme.
 - (iv) Pooling of interests.
- (13) Basis of exchange and consideration.

Before a company makes an offer for the shares of another company, the above aspects will be carefully considered, and a ceiling price for

the shares established. The first offer would be pitched below this ceiling price; should there be any counter-bids, the bid price can be moved up to the ceiling price.

In view of the fact that we are mainly interested in the stock exchange matters in this thesis and in the position of the shareholders in a public company on the occasion of a bid, the valuation of the shares or value of a private limited liability company will not be discussed.

In valuing a company for merger or take-over purposes, the more complicated factors which must be considered are mainly the value of the assets of the other company(ies) when still operating as separate entities, the value after the merger or take-over, and the expected return which can then be earned on the new capitalisation or combined capital employed. Another problem will be to work out an equitable basis of exchange if the offer is to take the form of a share-exchange scheme, so that control and ownership can be properly distributed. The bidding company will have to take account of its own capital structure and liquid assets before deciding whether to make a cash offer, or partly cash and partly shares, or only an exchange of shares. Then only can the bidding company make an offer to the shareholders and induce them to accept the offer.

Several factors will influence the shareholders in their decision making, namely, the kind of offer and the value of the offer as measured against their expectations of their present holding in their company as a separate entity, such as future dividend rate and possibilities of capital appreciation and growth; or should they accept the offer, whether their holdings in the bidding company will show better prospects than their present holding in all respects. They will, therefore, only agree to the offer if they can expect more from this change than maintaining the status quo. If the offer is entirely a cash offer, the shareholder will only be prepared to accept the offer if he can re-invest the cash he receives on equal or better terms than his present holding. If the offer is based on a share-exchange basis, then the shareholder will fully analyse his future position as regards his contribution in ownership and control, future dividend and earnings rates, growth potential, capital appreciation, the efficiency and integrity of the management of the bidding company, the risk involved, the capital structure of the bidding company, that is, the presence or absence of priority classes of securities, and if present, the gearing and leverage.

When the ordinary shares of the company which is subject to the take-over bid are listed on the stock exchange, the bidding company may study the past record of the prices of these shares on the market (that is, highs and lows over the last few years), and base their cash offer on some figure which is in excess of the current market price, but which is still lower than the maximum (or ceiling) price which they will be prepared to pay, with the object of leaving some room for manoeuvre in the event of a counter-bid by some other party or consortium. If the settlement is to be in the form of a share-exchange scheme, or even partly cash and partly shares, the market value of the shares can also be used as a basis of computation. It is held that this is a reasonably equitable approach. The market price of a share will reflect the balance of expectations of a large body of individuals regarding the company and its future prospects, and all other factors such as assets values, earning power, expected future dividend and earnings yields, efficiency of the management, in short, all internal and external variables which may exert some influence on price. We have considered the stock exchange as a market where expectations are brought into consistency and in this respect we may contend that market price is a reasonable guide or basis for valuation in the case of take-overs, but we also feel that it may be a dangerous practice to consider the market price as a 'ready-made' valuation. If the offer is for cash, only the shares of the company subject to the take-over must be valued, and if settlement is on a share exchange basis, the shares of all companies, (including the bidding company), must be valued.

Should the shares be unrealistically overvalued, the bidding company will find that it is, of course, paying too much for the other company(ies). (In actual fact, in such a case it is doubtful if a bid will be made, except if there are some exogenous factors which are more important.) Even if the history of market prices has been fully investigated and the current market price is given, it may still be difficult to decide on an offer-price, because the average market prices (high and low) or the current market price may be completely misleading. It is also very important that the bidder offer the right price or else his bid may fail, or he may be inviting counter bids. All one can actually say is that the bidder will be faced with all the problems related to the valuation of assets in a market economy. The earnings multiplier may be some indication of whether the shares of the

company are considered a growth prospect. On the other hand, the advantage of taking market price as a measure is that the market price is a known and given factor and it reflects future expectations. One can go further and say that the market price represents the value placed on the company by its existing shareholders and that the bidder can then be guided by this valuation, and offer the existing shareholders something more, to induce them to accept the offer. For purposes of valuation and comparison the pre-bid level of stock exchange prices should be taken.

An offer to existing shareholders in excess of the market price for the share implies that the bidder, for some reason or another, expects that the future yield streams which may accrue to him, will be something in excess of the yield stream discounted by the market, that is, the bidder expects that under new management and better financial and operating methods and policies, the average productivity of the assets will increase. The bid would not have been made in the first place if the bidder did not expect a higher return from the assets than that reflected by the prevailing market price.

Some problems may arise in this respect. According to Bushnell, "Two complications arise, first deciding on the date of the merger and second valuing shares whose market is infrequent. From the general economic standpoint strong objections can be raised against market value on the basis that market prices for equity risk capital, especially in Australia, do not represent value to the community or economic value in any real sense.....When these points are considered, it will be apparent that, from the viewpoint of the economy as a whole, market price is only a rough indication of the value of shares given as consideration in a merger transaction."²⁰ The reason for his criticism is that the Australian capital market (stock exchange) is a small market and that the investors are poorly informed. "The accuracy of any market valuation is directly proportional to the number and skill of investors operating in the market and their knowledge of the company and the economy in general."²¹ In a market such as the Johannesburg Stock Exchange the same criticism may apply.

20. Bushnell, J.A., Australian Company Mergers, pp.10-11.

21. Ibid., p.12.

Par value cannot, of course, be used as a measure, since it represents only a historical figure and shows no relationship to the development and growth of the company, which in any event may be a well-established company with ample revenue reserves by the time of the bid. There is no relationship between earning power, asset values and par value of shares. The par value of the shares has, of course, nothing to do with the basis of exchange. Par value gives no indication of the economic value of the underlying assets and their future earning power. The asset values as such may also be of subordinate significance and the expected future income stream which the assets can produce is more important.

Historical book value, historical earnings and dividend rate do not appear to give a very satisfactory explanation of the terms of exchange or settlement in the case of mergers or take-overs. It is again a matter of the expected future growth rate in earnings and dividend rate which appear to be significant in deciding on the terms. If we accept that the stock exchange is a market which reflects correctly the balance of expectations regarding future income streams, then the market's valuation of the shares would, of course, very strongly influence the terms of the merger.

We actually need a model of share prices to determine whether the market valuation is fair, in the same manner as a model to determine the cost of capital. It is really a matter of determining the cost of the additional assets. The problems of calculating the cost of capital and valuation of the share, (independent of market price) have already been discussed in chapters II and VII respectively. In our view these basic principles apply to a large extent in the case of valuing the shares of the bidder and of the company(ies) subject to the bid.

Inherently mergers and take-overs carry with them considerable potentialities for either advantageous or adverse effects on the investment merits and worth, and market valuation of the given shares, via changes in the earnings per share available, or expected income streams after the merger or take-over, to the ordinary shareholders.

A hypothetical example may serve to illustrate the effect of a merger or take-over on the earnings per share available to ordinary shareholders, and some financial considerations which may arise.

	<u>Company A</u>	<u>Company B</u>
Total earnings	R400,000	R200,000
No. of ordinary shares	400,000	400,000
Earnings per share	R1.00	R0.50
Market price per share	R4.00	R1.00
Price-earnings ratio	4	2

Suppose that a merger is agreed upon whereby company B will be merged with company A, and that valuation is based on the respective market valuations per share to simplify matters. Company B ceases to exist. The shareholders of company B will receive 1 new share for every 4 shares held. Thus, in the present example the exchange ratio is 4:1 or 4.

After the merger or take-over one would expect the following relative position to obtain:-

		<u>Earnings per share</u>	
	<u>Shares received</u>	<u>Before merger</u>	<u>After merger*</u>
A Shareholders	400,000	R1.00	R1.20
B Shareholders	100,000	R2.00 (for four	R1.20
		shares)	
(Issued share			
Capital of Co. A)	<u>500,000</u>		

* Assuming that the combined earnings will be R600,000, the earnings per share will be R1.20.

To compare the relative positions of A shareholders and B shareholders, the shareholdings before and after the merger or take-over must be taken into account.

After the merger the A shareholders' holdings are unchanged and earnings available to them will amount to R1.20, compared with the R1.00 previously available; a gain of R0.20. The B shareholders suffered a dilution of earnings of R0.80 for every four shares previously held, as they received only 1 new share for every four previously held. The effect of the merger or take-over on the market valuation may be a matter of conjecture and is not at all certain.

If the earnings-multiplier remains at 4, the market price of the new shares will be R4.80, if it increases to 5, the price will be R6.00, and if it decreases to 3, the price will be R3.60. The way the market price will move is again a matter of expectations and the predominance of bullish or bearish sentiment. Should the price-earnings ratio remain at 4, or increase to 5, the shareholders of both companies would have gained. The A shareholders will possess shares with a market

value of R4.80 or R6.00 respectively instead of R4.00, and the B shareholders will then have shares valued at R4.80 or R6.00 instead of R4.00 for every 4 shares previously held. Both can realise capital gains by selling after the merger. Prior to the merger or take-over a portion of the earnings was valued at a multiplier of 4 and a portion valued at a multiplier of 2. If the combined earnings are valued at the higher of the two, shareholders should benefit. However, should the multiplier be 3, both groups of shareholders will suffer some small capital loss. In the case of company A, the shareholders would suffer a loss of $(R4 - (3 \times R1.20))$, or R0.40 per share, and the B shareholders a capital loss of R0.40 for every 4 shares previously held.

It is not uncommon for mergers and take-overs to result in the recapitalisation of the company or companies involved. Such recapitalisation may be a necessary step to take in finding an equitable formula for the exchange of the shares and settlement.

To return to our example of companies A and B. The shares of the latter company may be selling at a low multiplier, first, because of the low rate of return on capital employed and, second, because of some lack of knowledge or information concerning the state of the company's financial affairs, growth prospects and prospective earning capacity, the market may be over-discounting the dismal outlook. To the acquiring company (Co. A) the prospects may look somewhat better, and the merger terms will be influenced by the value placed on company B by the prospective purchaser (Co. A) in terms of company B's operating contribution in a joint venture or operation. The value placed on the shares of company B by company A will tend to be different from the market's valuation. It will more often than not be higher, and furthermore, the existing shareholders of company B must be offered something more, in terms of the rate of exchange, to induce them to accept the terms of the merger or take-over. Furthermore, company A may have more information and knowledge about the prospective earning capacity of the asset portfolio of company B than the market, and a higher valuation may be placed on such assets. The terms and nature of payment is also a function of the policy and mutiperiod plan structure of the acquiring company, its liquidity, and the capital structure of the company that is to be acquired.

E. Minority Shareholders

Section 103 bis and ter of the Companies Act provides for the provisions facilitating reconstruction and amalgamation and the power to acquire shares of shareholders dissenting from a scheme or contract approved by a majority.

If a take-over, merger or amalgamation scheme has been approved by the holders of not less than 90 per cent in value of the shares whose transfer is involved in the scheme, the bidding company (the transferee company) may, within 2 months (after the expiration of 4 months after the offer), give notice to all dissenting shareholders that the company is desirous of acquiring their shares on the same terms as that of the shareholders who approved of the scheme or contract, or on the terms which may be ordered by the Court. It should be borne in mind that in calculating the 90 per cent required for the approval of the scheme the shares already held by the offering (transferee company) or by a nominee for the company, must be excluded. A scheme must then be approved by 75 per cent of the number of shareholders, holding between them at least 90 per cent of the value of the shares. The minority shareholders have also the right to compel the transferee company to purchase their shares. The Court will not be inclined to vary the terms of the scheme, unless it is decidedly of the opinion that the scheme is unfair. In terms of Section 103 compulsory acquisition can thus take place, but with certain safeguards.

Should some minority shareholders remain, they may sometimes find themselves at a disadvantage and be oppressed by the majority. The controlling group can follow a niggardly dividend policy against which the minority can do nothing. This may also lead to a low price for their shares. Where the majority contemplate complete ownership, they may be in a position to acquire the minority interest cheaply, or on adverse terms from the latter's point of view.

F. Summary

Mergers and take-overs will affect the relative positions of shareholders and will influence the rate of growth of assets and earnings and the prices of shares on the stock exchange.

Mergers and take-overs can be either to the advantage or disadvantage of shareholders depending on whether their relative position is improved or not afterwards. This will depend on earnings growth,

dividend rate growth, asset protection and voting control.

The shareholder must consider the type of fusion and the terms of settlement, namely whether it is a cash offer or partially cash and partially an exchange of shares, or only an exchange of shares. The price offered to shareholders will be somewhat above the current market price of the shares in order to induce such shareholders to sell their holdings to the bidder. Naturally they will not sell unless they envisage some advantage to themselves.

There are numerous reasons for take-overs and mergers, namely take-overs as a result of a niggardly dividend policy, financial economies, production economies, distribution economies, and administrative economies. These economies may not be obvious in the short-run, but in the long-run the shareholders may benefit substantially from them.

Again we need a valuation model of shares to ascertain the basis of settlement in a merger or take-over. The value placed on the shares of the company to be acquired by the acquiring company will be somewhat higher than the current market price. The terms and nature of the settlement is also a function of the policy and multiperiod plans of the acquiring company and the market price of its own shares.

In conclusion we may also state that mergers and take-overs are an important case of capital regrouping and the re-allocation of resources may remove certain rigidities in industrial development. For this reason in principle we are in favour of mergers and take-overs.

CHAPTER XII

INSTITUTIONS, FINANCIAL INTERMEDIARIES AND
THE STOCK EXCHANGE

A. Introduction

Over the last few decades economists and various writers on monetary matters have emphasised the growth of the large number of specialised financial intermediaries and institutions in addition to the commercial banks and other intermediaries in the banking sector. The traditional theory of economic analysis and behaviour which concentrated only on goods (commodity market), bonds (Keynesian bond prices), and money is not comprehensive enough to provide an adequate explanation of the modern, complex financial structure and the role played by non-monetary institutions or intermediaries. Both the Radcliffe Report and the Report of the Technical Committee on Banking and Building Society legislation in South Africa have stressed the importance of the non-banking financial intermediaries in the financial system.

Financial intermediaries may be defined as all financial enterprises "...with the exception of two types: (i) Units whose assets consist predominantly of the securities of, or claims against, wholly owned or majority owned subsidiaries and affiliates (holding companies), and (ii) units owned by one or a small group of individuals, or by corporations or non-profit making organisations if they make no substantial use of outside funds, i.e. enterprises with or similar to what are usually called personal holding companies."¹ From the stock exchange point of view holding companies and the second group of units may, however, be considered as institutional investors. Gurley and Shaw defined financial intermediaries as "Financial institutions whose principal function is the purchase of primary securities² and the creation of claims on

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1. Goldsmith, R.W., Financial Intermediaries in the American Economy, Princeton University Press, Princeton, 1958, p.50.
 2. Primary securities include government stock and other stocks, ordinary shares, preference shares, debentures, mortgages, and other medium-term and short-term debt instruments. Thus not all primary securities are listed on the stock exchange.

themselves."³ In any highly-developed money economy, with highly-developed financial markets, we thus find a large number of financial institutions and intermediaries, as stated below. From the stock exchange point of view some or most of these intermediaries are of paramount importance, whereas others play a less important role. As we have stated before, the stock exchange is a medium through which financial capital is channelled into new investment, or where financial assets can be substituted for other financial assets (including money) and vice versa. Institutional investment policy and legal requirements will determine the securities invested in and whether the investment is on a temporary or more permanent basis. Some institutions will hold a considerable percentage of their assets in the form of marketable or listed securities, whereas other institutions, for example, building societies, will hold their assets (or investments) mainly outside the stock exchange.

The range of institutions with funds available for investment through the stock exchange is still very wide, and with the development of the South African financial markets over the last decade or two, this range has widened considerably. Apart from this, the absolute volume of investible funds available for employment through the stock exchange has also increased considerably due to the growth and expansion of the older and well-established institutions and financial intermediaries.

From the stock exchange point of view the term 'institutional investor' can be applied to a wide range of diversified undertakings, including financial intermediaries, such as commercial banks, savings banks, merchant banks, accepting houses, discount houses, insurance companies, self-administered pension and provident funds, closed and open-end trusts, mining and industrial finance companies, trading and manufacturing companies, investment companies, central banks, executor companies, universities, churches, holding companies, the public debt commissioners, charities, clubs, societies, and attorneys who advise clients and invest on behalf of private individuals. The public debt commissioners are included, since a considerable amount of extra-budgetary funds is invested in marketable securities, mainly government securities. Most of the above institutions invest funds, through the stock exchange, on a long-term (permanent) or semi-permanent basis. Not all the

3. Gurley, J.G. and Shaw, E.S., Money in a Theory of Finance, p.363.

investible funds available to these institutions will be directed towards the stock exchange, but only some proportion, depending on legal and other constraints and policy objectives.

In South Africa today, in quantitative terms, the institutions and financial intermediaries play an increasing role in the process of financing new investment. There is also a tendency for the institutions to play a more dominant role in the new issue market and the financing of untried ventures. In Britain this is apparently also the case.

"Although these institutions invest only a part of their accruing funds in new issues, it is now a common-place of the capital market to say that no large new issue can succeed without their support."⁴ Rose continued by substantiating this by saying that it is also true to say that the annual growth of the funds at the disposal of the institutions is large in relation to the net increase in the total supply of securities. Life insurance offices and pension funds also depend on new issues on the stock exchange as convenient investment outlets.

"As it is not economical for the leading life-assurance offices and pension funds to buy securities in amounts of less than a certain minimum size, they are always active supporters of the new-issue market out of self-interest as well as through an awareness of their new responsibility for the finance of industry."⁵ Referring to institutions such as life-assurance offices and pension funds Rose further stated "These income-conscious institutions hold a much larger proportion of their assets in the form of ordinary shares than would individuals if their saving were not passed through these institutional channels."⁶ In South Africa, where a limited number of securities really classify as 'blue chips' this role is even more significant. The major function of institutions then, for future growth, is not to confine themselves largely to gilt-edged issues, but rather new equity issues. This, of course, may have a detrimental effect on the basic services rendered by government, semi-government undertakings, local authorities, as these services are financed by the issue of fixed-interest securities.

In South Africa in the recent past approximately 50 - 55 per cent of all personal savings accrued in the form of contractual savings. A relatively small percentage of non-contractual private or personal

4. Rose, H.B., The Economic Background to Investment, p.286.

5. Loc. cit.

6. Ibid., p.458.

savings has been entering the stock exchange, or the risk-bearing field. In this respect, the institutions, by investing part of the contractual savings in their hands, and some portion of their own undistributed profits, either in existing securities coming onto the market, or in new issues, either by the private sector or the public sector, are fulfilling a significant economic function in the sense of providing external finance in the form of risk and loan capital, which is vital in a growing economy.

This concentration of voluntary private savings in the hands of institutions and financial intermediaries has some economic implications in the sense that the large body of contractual savers have little say in the direction into which these savings will be canalised but, of course, it has also the result that more individuals have an indirect interest in the stock exchange. The investment decision will, however, be concentrated in the hands of a few large bodies and the investment decisions will be influenced by the investment portfolio policies and multiperiod plans of the various institutions. This can, theoretically, have an adverse effect on the supply of risk capital. In South Africa the problem, from the institutional point of view, is that the Johannesburg Stock Exchange is still rather narrow and the number of companies of sufficient financial standing and size, which qualify for institutional investment, is limited. Mergers and take-overs, resulting in bigger units, will tend to increase the scope for investment by financial intermediaries and institutions, and such steps may even be encouraged by them.

B. The Economic Significance of the Institutions and Intermediaries

According to Gurley and Shaw, "The principal function of the financial intermediaries is to purchase primary securities from ultimate borrowers and to issue indirect debt for the portfolios of ultimate lenders. Although primary securities are their principal asset, financial intermediaries also hold the indirect debt of other intermediaries and own tangible assets as well."⁷ The effect of this function is that the intermediaries then play an important role in the efficient allocation of accrued savings to alternative uses in the economy, in other words, they assist in the process of financing investment and the acquisition of financial assets. A wide range of

7. Gurley, J.G. and Shaw, E.S., Money in a Theory of Finance, p.192.

institutions and intermediaries in an economy may also tend to raise the level of personal savings in the economy. The financing of new investment in the private and public sectors of the economy would be seriously hampered if it were not for the steady flow of funds from the intermediaries, through the stock exchange, to deficit-units in the different sectors of the economy. In our view an efficient financial system is a necessary condition for real growth, particularly where some proportion of such growth must be externally financed. Financial intermediaries then play an important role in the saving-investment process in any community, and they constantly transfer funds (savings) from surplus-units to deficit-units (borrowers). In return the financial intermediaries receive financial assets on which they earn a return in the form of interest, dividends, and capital gains on some assets. They then tend to increase the supply of loanable funds by demanding financial assets created by borrowers who finance capital stock growth externally. The result is that financial intermediaries grow as the economy grows.

It is, however, difficult to isolate the role played by financial intermediaries, or the financial structure, on the rate of growth in an economy. Goldsmith, however, contended that we may consider the financial structure as a factor contributing to economic growth.⁸ An analysis of the composition of the financial assets held by institutions and intermediaries and their share in total national assets (represented by financial assets), will give an indication of their importance in the economy.

A question sometimes posed is whether the institutional investors and non-banking financial intermediaries have increased the flow of funds directed at stock exchange securities (old and new), by comparison to what it would have been if stock exchange securities were more widely held by the general public. We know that overall institutions and financial intermediaries are not likely to be net sellers, and securities once purchased by them are not likely to come onto the market again after a short interval of time, since they are purchased on the basis of their long-run investment merits. It is,

8. Goldsmith, R.W., "Financial Structure and Economic Growth in Advanced Countries" in Capital Formation and Economic Growth, N.B.E.R., Princeton University Press, Princeton, 1955, pp.113-160.

however, clear that the institutions are bringing new business to the market on the demand side, for both the market and flow-supply of securities. The insurance companies, pension funds and open-ended trusts bring a large and very regular flow of funds to the market and may even create an excess demand relative to supply, with the result that certain shares may be selling at unduly high earnings multipliers. In our view mutual funds, for example, are not necessarily having a stabilising influence on prices and the earnings multipliers of certain shares on which the mutual funds have concentrated, are being pushed unduly high.

It has been pointed out that basic services, financed by the issue of fixed-interest securities, may be adversely affected by a structural change in the capital market due to a complete shift from fixed-interest securities to equities. Recently the government had to force institutions and financial intermediaries to hold a larger proportion of their financial asset portfolios in the form of government stock. This may have an adverse effect on the future rate of growth of the gross national product. We may accept the fact that for the private sector of the economy in a young developing economy to grow at a satisfactory rate, the infra-structure provided by the public sector cannot be allowed to lag behind. In this country we are well aware of bottlenecks in the fields of transport, communications, postal services, and so forth. The private sector cannot develop properly or at a satisfactory rate without these basic services. We are all aware of the fact that in an inflationary world investment in fixed-interest securities as a long-term investment prospect is not attractive at all, and that equities at least offer a hedge albeit imperfect against the deterioration of purchasing power. Taking account of the general pattern of interest rates, and the reverse yield gap, some public sector fixed-interest securities offer a reasonable return to the income-conscious investor. The institutions and financial intermediaries should be both income and capital-conscious, and in any balanced financial asset portfolio some money, some fixed-interest securities and some equities must be included. One may take the view that institutions and financial intermediaries, by virtue of their nature and size, have some obligation to provide funds for the public sector of the economy.

It should be pointed out, however, that in all developed, industrialised communities some legislation will exist to protect the safety of the community's savings which, as pointed out previously,

accrue in the form of contractual savings. The Stock Exchanges Control Act, 1947, as amended, and the stock exchange regulations are, to some extent, instruments protecting savings tied up in securities. The public sector will have to realise that they will have to compete in the open-market by offering competitive returns, or by issuing index-regulated stocks in future. There is really no shortage at present of risk capital, but it is important that some of the funds entering the risk capital field must come from institutions and financial intermediaries.

C. Institutional Investment Policy

As a collective group, institutions and financial intermediaries, (monetary and non-monetary), depending on their functions and policies, structure and legal obligations, are large investors inside and outside the stock exchange. The amount of money allocated to stock exchange investment will vary from one institution to another and the annual flow from a given institution to the stock exchange will also show variations from one year to another. The latter fluctuations may be due to changes in internal policy and probably changes in the Acts controlling these institutions, for example, the Banks Act, Insurance Act, Pensions Act, Building Society Act, and so forth.

Taken collectively these institutions and intermediaries have some investment principles in common however different the composition of their assets may be due to the legal differences and internal financial policies. The proportion of marketable securities contained in the portfolio will differ from institution to institution, but one may again assume that each institution will manage its portfolio to be in the best position, at a point of time, with regard to maximizing the expected future income stream, commensurate with the degree of risk they are prepared to assume. Before we look at the policies and underlying principles by which each group is guided, it will be useful to make a few general remarks.

One of the most important factors is that institutions and intermediaries, like manufacturing and commercial enterprises, also exploit the internal economies of large scale operations, except that in the case of these financial intermediaries and institutions it is a matter of borrowing and then investing and lending on a large scale. "On the lending side, the intermediary can invest and manage investments in primary securities at unit costs far below the experience of most

individual lenders. The sheer size of its portfolio permits a significant reduction in risks through diversification. It can schedule maturities so that chances of liquidity crises are minimized."⁹

The low unit cost of investment is made possible by the fact that these institutions and intermediaries can make full use of the principle of averaging. A basic principle is that of proper diversification and risk-spreading. This is also made possible by investment in the numerous differentiated securities in the financial markets, particularly the stock exchange. Without the stock exchange catering for old and new securities the principle of risk-spreading would be difficult to employ fully. All intermediaries and institutions must maintain certain minimum liquidity requirements, established either by experience or by the legal instruments of control. Without the stock exchange, as we have previously pointed out, financial assets will be far more illiquid. By investing in listed securities with a ready market the institutions and intermediaries can manage their affairs without carrying excessively large cash balances to cover unexpected contingencies. This is important as this will make more capital funds available for the financing of new investment.

The investment horizon will, of course, differ from one type of financial intermediary to another, for example, commercial banks, life-assurance offices and pension funds. In the case of commercial banks the horizon may be taken to be much shorter than, say, in the case of life-assurance offices. Taking account of transactions costs, (the cost of investing and disinvesting), commercial banks will probably hold more money under the precautionary motive, because there is a greater need for liquidity. The commercial banks will, therefore, tend to invest relatively more in more liquid assets, whereas the life-assurance offices can invest relatively more in less liquid assets.¹⁰ The longer the investment horizon, the more may be invested in less liquid assets. Some money and near-money balances will, however, be held under the precautionary motive.

Hicks distinguished between Funds and Financiers when referring to financial intermediaries operating in the financial markets.¹¹ He

9. Gurley, J.G. and Shaw, E.S., Money in a Theory of Finance, p.194.

10. More or less liquid must be interpreted in the sense it was used in the Treatise on Money by Keynes.

11. See Hicks, J.R., Critical Essays in Monetary Theory, pp.46-49.

considered a Fund as a "...body to which a certain capital has been entrusted, with no obligation but to make the return on that capital as large as possible."¹² In this category we may include investment trusts, with a fixed capital (liability), investing the funds represented by this liability in a diversified portfolio of securities. According to Hicks, the Fund's liabilities are asleep. The Fund will try to maximize the return on its portfolio and pay dividends, which we know, are not contractual payments.

The Financier's liabilities, on the other hand, are not asleep. As a group they deal in or hold primary securities in their portfolios, but they are held predominantly as reserve assets which can be easily converted into money when the need arises in emergencies. The latter may arise on the asset or liability sides of their balance sheets. "They may be related to the 'volatile' character of a part, at least, of his liabilities; or they may be related to the possible occurrence, at nearly any moment, of new opportunities for doing financial business."¹³ The demand for money (liquidity) by these professional financiers will be mainly a precautionary demand for money and not so much a speculative demand. In this sense the money and near-money balances held will be considered as a reserve asset included in the financial asset portfolio.

Their assets and liabilities are highly specialised, and economics of scale are important to them. It is obvious that intermediaries will incur costs, particularly the costs of borrowing, so that the amounts paid out to the holders of liabilities must be less than the income stream which accrues to the whole asset portfolio. This, of course, means that the holders of the liabilities of financial intermediaries will receive an income smaller than they would if they held the asset portfolio directly. The holders of the liabilities are, however, induced to forego the higher income in order to delegate the decision of the composition of the asset portfolio to experts, and to pool risks, where the size of the asset portfolio allows for economies of scale and diversification.

According to Hicks "The financial intermediary can prosper if it can make use of specialized knowledge about the prospects of particular kinds of real investment; so that it can make advances to firms, or investments in the securities of firms, which the bank would not know

12. Hicks, J.R., Critical Essays in Monetary Theory, p.47.

13. Ibid., p.48.

were sound investments; and if it can acquire resources which enable it to make these financial investments at a less loss of liquidity than they would entail upon the private saver. But it cannot prosper unless it makes a profit; this implies that it must borrow at a lower rate than at which it lends, there being a sufficient difference to cover its administrative expenses, and to compensate it for the additional risk in¹⁴ which it (in its turn) is involved in every extension of its operations." From the stock exchange point of view, the high degree of specialisation and specialised knowledge is important. The degree of specialisation will have a definite influence on the demand for certain classes or types of securities on the market and also ensures a steady flow of funds to the market. Since institutions and intermediaries specialise, they would cater for the special needs of selected groups of savers, directing savings to themselves on certain terms and they will only supply selected groups of capital-users on certain terms. This has also led to an increased standardisation of security issues. Specialised knowledge may also tend to lead to a situation where funds are directed to the most worthwhile projects. The reward accruing to intermediaries then arises out of the difference between the rate of return on primary securities they hold and the interest and dividends they pay on their indirect debt,¹⁵ or as Hicks pointed out, their in-rates must be lower than their out-rates.¹⁶

The following broad principles, apart from the differing legal arrangements, can then be applied to all financial intermediaries and institutions in their portfolio investment policies:-

(1) In view of the primary functions performed by the specialised institutions and intermediaries, the economies of large scale operation and a strict adherence to the basic principle of diversification, (and thus risk-spreading), each institution and intermediary will try to build up a balanced portfolio, compatible with the highest return and the degree of risk they are prepared to assume. This point has already been expanded on above.¹⁷

14. Hicks, J.R., Capital and Growth, p.286.

15. See Gurley, J.G. and Shaw, E.S., Money in a Theory of Finance, p.193.

16. Hicks, J.R., Capital and Growth, p.287.

17. See chapter VIII.

(2) Even though a balanced portfolio and diversification have considerable merit, within the limits of specialisation, the composition of the financial assets, including the investment portfolio, must be closely related to the nature and composition of the liabilities. The latter will be largely determined by the field in which the institution and intermediary is specialising, and whether the claims against it are short-term or long-term.

(3) By looking at the definitions of liquid assets and approved investments in the various acts (Banks, Insurance, Pension), there is some legal barrier to the investment policy and thus to the composition of the investment portfolio in each case, but even after complying with this restriction, the institutions and intermediaries will still have considerable scope for spreading risks or reducing investment risks to a minimum by a wide spread of financial assets in their respective portfolios without endangering the liquid position or getting the composition of the financial assets out of line with the composition of the liabilities or claims against it.

(4) Although most institutions and intermediaries can manage normal claims against themselves, due to the regular influx of funds, without upsetting the composition of their portfolios, changing economic and legal conditions may make it feasible or even necessary for the institutions and intermediaries to switch from one security to another, without necessarily being net sellers in the market. In a 'flexprice' market such as the stock exchange, where prices, yield and risk-differentials change, continuous revision of the portfolio is necessary to maintain income and capital. For these reasons and other contingencies which may arise, the marketability and liquidity of the portfolio should be maintained at a high level. As lenders the financial intermediaries can also misjudge the future real value of financial assets and they are also subject to the general and specific risks of the financial world. The capital gains and losses which accrue to them will have an influence on the rate at which their asset portfolios increase or decrease and will also influence their multi-period accumulation plans, which is again a function of expectations.

(5) In view of the fact that these institutions and intermediaries are profit-making enterprises, their investment policies regarding the investment merits of individual securities to be contained in the portfolio and also taking the portfolio as a whole, must give considerable weight to stability of income.

(6) The book cost of the securities contained in the portfolio is of significance to intermediaries and institutions. Because funds are flowing to these institutions and intermediaries in fairly regular amounts and at regular intervals of time, the principle of buying a given security at regular intervals can be successfully employed, keeping the average cost as low as possible. This principle is applicable to equity as well as gilt-edged investment. They are interested in capital appreciation, but should also cut losses.

(7) Lastly, but not least, is the question of safety of principal. This aspect will also have some influence on the composition of the portfolio, and relatively riskless fixed-interest securities will be included, even though some higher rate of return will be sacrificed.

It will be useful to look at point (2) a bit more closely. As already stated, the liabilities of the institutional investor or the intermediary can be either long-term or short-term depending on the degree of specialisation and their functions and purposes. This division has a very important bearing on the portfolio investment policy and thus on the composition of the portfolio. When dealing with external financing it was pointed out that it is feasible for a company to finance quick assets with short-term funds and long-term capital projects out of long-term or permanent funds. The same principle basically applies to institutions and intermediaries. The principle is that long-term liabilities (for example a life policy or a very long-term endowment policy) cannot be covered by short-term assets, and conversely, short-term liabilities cannot be covered by long-term investments or illiquid financial assets.

Institutions and intermediaries, in varying degrees, will have liabilities of both a short-term and a long-term nature and their assets should be accordingly diversified. The large number of failures of institutional investors and intermediaries in South Africa over the last decade has been due mainly to irrational investment policies and illiquidity. To cover short-term liabilities, expressed in money terms, some degree of liquidity is vitally important, and for this there is a wide range of possibilities, for example, short-term deposits in the banking sector, building societies, call deposits with the National Finance Corporation and other deposit-receiving institutions operating in the financial markets. Another important investment outlet to cover short-term liabilities would be the purchase of short-dated gilt-edged securities on the market. By rationally

spreading maturities, a large percentage of the portfolio may automatically consist of short-dated stocks. The funds accruing from the maturities falling due can be re-invested or utilised for the payment of short-term claims. The composition of the financial asset portfolio in a large institution or intermediary may change quite frequently. The point, however, remains that they also endeavour to maximize the utility functions of their portfolios, and try to reach, at each point of time, some preferred mixture of debt and financial assets.

To cover long-term claims expressed either in money or real terms, a large variety of listed securities may be invested in, for example, the long-term stock issues in the public sector by the government, statutory bodies such as Escom, Rand Water Board, Land and Agricultural Bank, and municipalities. In the private sector there exist mortgages, debenture stocks (usually secured), notes (usually unsecured), preference shares and ordinary shares, and all the sub-divisions of these main groups.

When dealing with long-term liabilities we must be careful to distinguish between liabilities expressed in money terms and liabilities expressed in real terms, the latter having special significance in our modern inflationary world where most prices, including money wages, are only flexible upwards. (The significance of this distinction will become more obvious when dealing with the investment policies of life-assurance and pension funds). As it may be difficult to classify liabilities into the abovementioned watertight compartments, a general classification could be attempted by analysing the true nature of the contracts covering the obligations of the institution or intermediary. If the liability is in the nature of paying a fixed amount, for example, an endowment policy or a life policy (without profits or bonuses), or a loan contracted in money terms where a definite amount is stated, for example, a debenture or a redeemable preference share or any other loan, then the liability is clearly expressed in monetary terms. On the other hand, it is normal procedure today for a pension scheme's liabilities to be expressed in real terms. To meet long-term liabilities expressed in monetary terms, the stock exchange provides a large choice of different listed securities as investment outlets. If the liability is expressed in real terms, the institution or intermediary will have to follow a definite policy in order to hedge against inflation and the ordinary shares listed on the stock exchange and the real estate market will

offer, even if only partially, some solution to the problem of inflation.

To summarise then the object of institutional portfolio management will be to reach an optimal or balanced asset-liability position, maximizing prospective yield, with due allowance for the various forms of risks involved in holding financial assets, the outcome of which must always be uncertain. Furthermore, the composition of portfolios of institutions and intermediaries will be influenced not only by the size of the intermediary or institution, liquidity considerations, risk, marketability, the flow of savings, or the available investments and expected yield streams, but also by legal constraints.

1. Commercial Banks

In terms of Act no. 23, of 1965, the purpose of which was to consolidate the laws relating to banking institutions, a commercial bank is defined as a "person who carries on a business of which a substantial part consists of the acceptance of deposits of money withdrawable by cheque."

When considering the portfolio investment policies of commercial banks in general and some problems (theoretical and practical) relating to portfolio management, one must take two main factors into consideration, namely the functions (or objectives) of the banks in the investment system, and, secondly, the legal instruments which will exert considerable influence on the policy of the commercial banks. It is not our purpose to discuss all the aspects of banking and monetary policy in any way, but we will merely try to show some implications of the portfolio investment policy and the significance from the stock exchange point of view.

The principal function of the commercial bank is to receive deposits on current account, savings-dépôts and other fixed-time deposits. Commercial banks are thus deposit-receiving institutions and the deposits will constitute the main liabilities. The deposits on current account are withdrawable on demand, that is without notice. No bank can afford to default on these deposit liabilities or obligations. The banks will then, apart from complying with the legal requirements of the Banks Act, 1965, (Act no. 23), be obliged to follow a conservative loan and investment policy. Safety of principal is of prime importance to commercial banks. Liquidity requirements and the legal instruments controlling banking operations, the objective of safety of principal and

the object of profit maximization will all exert an important influence on the composition of commercial banks' financial asset portfolios. The rational banking institution will, therefore, follow a policy which will provide for the safety and availability of all the deposits entrusted to it, and at the same time endeavour to maximize earnings without jeopardising the above objectives.

As we know, the principal income-earning assets of the commercial banks will consist mainly of overdrafts, loans, acceptances and securities. It is the latter that are of primary interest to the investment manager and it is also the latter that are important from the stock exchange point of view.

The legal definition of liquid assets in South Africa has recently been tightened "...by restricting it to assets which are either cash or can be turned into cash immediately and without any significant loss. This will bring the definition into closer conformity with accepted banking standards in countries with relatively well-developed financial structures."¹⁸ The liquid assets will include highly liquid assets (in the Treatise on Money sense), which can be easily liquidated and shifted. The liquid assets, (excluding the deposit with the Reserve Bank on which the banks do not earn interest) may be described as that part of the income-earning assets which can be easily converted into cash at very short notice without loss should the need arise. The liquidity of commercial banks must be maintained and cannot be sacrificed for a higher income on less liquid financial assets.

In terms of the Banks Act these liquid assets are now as follows:- Reserve Bank notes and subsidiary coin, credit balances with the Reserve Bank, deposits withdrawable on demand with the National Finance Corporation, deposits withdrawable on demand with a banking institution which is required to maintain a reserve balance with the Reserve Bank, loans to discount houses repayable on demand, Treasury Bills, government stock with a maturity to the latest redemption date of not more than three years, bills issued by the Land Bank and advances to the said Bank which, at the option of the lender, are convertible into bills, debentures of the Land Bank with a maturity of not more than three years, acceptances of a banking institution which is required to maintain a reserve balance with the Reserve Bank, not being acceptances of the

18. Report of the Technical Committee on Banking and Building Society Legislation, R.P. 50/1964, p. 13.

banking institution concerned itself, self-liquidating bills or promissary notes arising out of the movement of goods, with a maturity not exceeding 120 days, or 6 months in the case of agricultural bills, and which are eligible for discount by the Reserve Bank, and such other assets as the registrar may approve from time to time to be included in liquid assets. The above liquid assets can be monetized without considerable loss. Iscor debentures, South African Reserve Bank and S.A.B.C. stocks are included under the last item mentioned above.

In terms of section 16 of the said Act, a banking institution (other than a discount house) whose short-term liabilities to the public in the Republic, other than liabilities under acceptances and loans from other banking institutions, exceed the amount of five hundred thousand rand, must maintain a reserve balance with the Reserve Bank amounting to not less than 8 per cent of such liabilities.

The liquid asset requirements,¹⁹ which the banks must maintain in the Republic of South Africa are as follows:-

- (1) Thirty per cent of its short-term liabilities to the public in the Republic other than liabilities under acceptances. This can be increased to forty per cent and decreased to twenty per cent.
- (2) Twenty per cent of its medium-term liabilities to the public in the Republic, other than liabilities under acceptances. This can be increased to thirty per cent and decreased to ten per cent.
- (3) Five per cent of its long-term liabilities to the public in the Republic, and
- (4) Ten per cent of its liabilities under acceptances.

A short-term liability falls due for payment within 30 days as from a specified date, a medium-term liability is one which is payable after 30 days but within 6 months from a specified date, and a long-term liability is payable after 6 months from a specified date, or which, on that date, is subject to at least six months' notice before becoming payable.

Before the introduction of the new liquid asset ratio requirements the banks already maintained proportionately more liquid assets against cheque deposits. The change in the Banks Act did not make it materially more difficult for commercial banks to comply. They were already large investors in short-dated government stock even before the

19. See The Banks Act, (Act No. 23 of 1965), Section 17.

Act came into operation. (The liquid asset ratio requirements did not prove to be an adequate monetary weapon, and the Reserve Bank had to go outside the Banks Act to enforce a stricter control over the extent of bank credit creation).

A new addition to the Act was the prescribed investments. The prescribed investments include the following:- Liquid assets, deposits with any banking institution which is required to maintain a reserve with the Reserve Bank, other than deposits ranking as liquid assets, deposits with a permanent building society whose total assets as at the end of the last preceding quarter amounted to not less than ten million rand, deposits with a local authority, deposits with the National Finance Corporation and loans to discount houses, other than deposits or loans ranking as liquid assets, long-term stocks of the government, debentures or stocks guaranteed by the government, stocks of and loans to any local authority, debentures or stock of the Rand Water Board or the Electricity Supply Commission, debentures of the Land Bank, other than those ranking as liquid assets, and such other investments as the registrar may approve for this purpose.

Apart from the liquid assets the above list of prescribed investments includes some securities listed on the stock exchange and which are considered to be safe investments. A banking institution (excluding discount houses) must maintain in the Republic prescribed investments of an amount of not less than 15 per cent of its total liabilities to the public.²⁰ According to the Commissions Report the intention of this clause was not to ensure the liquidity of these institutions, since this is dealt with by the liquid asset requirements. "The purpose of the prescribed investments requirement is to ensure that those institutions which have mainly long-term liabilities and which accordingly will not be required to maintain much more than 5 per cent of their total liabilities to the public in liquid form, invest a reasonable proportion of their funds in a 'safe' form. In other words, this requirement is concerned with the solvency rather than the liquidity of deposit-taking institutions. Naturally, since all truly liquid assets are included in 'prescribed investments', commercial banks, merchant banks, and other institutions which in any event maintain a relatively high liquidity ratio will not be affected by this requirement to any significant extent, if at all."²¹ The object of the investment

20. See The Banks Act, (Act No. 23 of 1965), Section 18.

21. Report of the Technical Committee on Banking and Building Society Legislation, R.P. 50/1964, pp. 15-16.

manager will be to maximize the return on the investment portfolio as much as is consistent with safety and high quality in the portfolio, after complying with the prescribed investments.

The basic principle borne out by these legal requirements is that the institutions and intermediaries must match the nature of their assets to the nature of the claims against them, that is, short-term liabilities cannot be covered by long-term and perhaps illiquid assets. Whether this must be legally enforced or not, is not a matter of dispute in this thesis. Short-dated securities thus have some utility to commercial banks since they are liquid, both because the maturity is near at hand and because the market in short-dated securities is one with great absorptive capacity.

After the commercial banks have complied with the legal requirements as to liquidity and so forth, the remainder of their funds can be prudently invested in other listed securities, as can be seen from the composition of their financial assets. The object will be to get a maximum return on these investments compatible with safety and the amount of risk which they are prepared to assume. A high quality portfolio is of great significance to any bank. In America, such excess funds will be invested in a high quality 'bond list'. "If a bank has set aside adequate primary and secondary reserves, it can properly invest the remainder of its funds not needed for accommodating its borrowing customers in a bond list which it does not expect to disturb except for re-investment of maturities or in the event of sharp swings in the bond market which offer profit opportunities."²² The liquid asset ratio requirements and the prescribed investments contained in the Act will not greatly affect the degree to which commercial banks can spread the maturities and enable them to re-invest on better terms.

The sharp rise in the interest rates in South Africa over the last few years adversely affected the market valuation of long-term government stocks, and as a result commercial banks concentrated more on short-term stocks, whose prices are normally more stable. The long-term fixed-interest securities which they hold are vulnerable to rising rates of interest and this will adversely affect the money value of their investment portfolios. Apart from the date of maturity their long-term investments are thus less liquid. In a period of rising

22. Dowrie, G.W., Fuller, D.R., and Calkins, F.J., Investments, 3rd edition, p. 205.

rates of interest, commercial banks (and for that matter also other intermediaries), may sell long-dated stocks and purchase other listed securities. In the real world the commercial banks may not be unduly concerned about changes in the rates of interest. By spacing or staggering their maturities and re-investing the funds, either on better or worse terms, due to changes in the rates of interest and market prices, the banks tend to average out the fluctuations in the rates of interest.

In periods of low rates of interest, when stock prices are high, new investment, or re-investment of funds becoming available through maturities, will be mainly confined to short-dated government stock, (the prices of which are more stable), particularly if a rise in the rate of interest is expected with some degree of confidence. In a statement issued by the Midland Bank,²³ it was pointed out that over sixty per cent of their holdings were due finally to mature, in successive blocks, within periods ranging from less than one year to less than five years, and the rest within less than ten years. It has been suggested that maturities must be staggered in such a way that the average length to maturity would be no more than five years. Well-spaced maturities will also enable the bank to take advantage of any favourable trends in the money market. Taking account of the liquid assets and prescribed investments, the portfolio will contain mainly short-term government stock, long-term government stock, (to a lesser degree), stocks of local authorities and public corporations, and other investments in listed and unlisted securities. In September, 1968, commercial banks held, for example, the following:-²⁴

(1) Short-dated government stock	R341.1 million
(2) Other short-dated stock - mainly Land Bank debentures	108.8 "
(3) Long-dated government stock	53.5 "
(4) Stocks of local authorities and public corporations	62.7 "
(5) Other prescribed investments	241.7 "
(6) Other unspecified investments - listed and unlisted	45.6 "

23. See The Economist, dated 26th January, 1957, p. 331.

24. The South African Reserve Bank Quarterly Bulletin, December, 1968, S-14 and 15.

Items (1) - (5) are held in terms of the liquid asset and prescribed investment requirements. The dominance of short-dated stock over long-dated stock is, of course, in terms of the fact that the asset portfolio should match the type of liability. We shall see below that in the case of insurers the position is the reverse.

To summarise, one may say it is necessary for every bank to have a clearly defined investment policy, taking account of pertinent factors, such as (1) the quality of the securities invested in, which must obviously be of outstanding quality and high-grade, (2) spaced maturities to average out fluctuations in capital values and income due to fluctuations in the interest rates, (3) a well-diversified portfolio to spread risks, and (4) the liquidity of the securities underlying the portfolio and therefore the liquidity of the financial asset portfolio as a whole.

2. Life-assurance offices

We must distinguish between mutual and joint-stock life insurance companies. The joint-stock company belongs to the shareholders and they receive the dividends and not the policyholders. In a mutual company there are no shareholders. The assets and the excess net earnings belong to the policyholders. The policyholders also elect the board of directors.

The liabilities of the life-assurance company are mainly claims against life and endowment policies, annuity payments and cash payments against surrender of policies. They also lend money against policies. The liabilities are therefore of a short-term and long-term nature. The above claims are fixed in monetary terms and not in real terms. This makes the life-assurance company "...less vulnerable than other investors to inflation, but they naturally wish to participate in economic growth. The declining popularity of whole life policies and the growth of the 'with profits' endowment policy gives an added incentive to seek assets that are likely to appreciate in value."²⁵ Dowrie, Fuller and Calkins did not fully share this view, and contended that "There is little excuse for a hedging against inflation since the obligations of the company are payable in definite numbers of dollars, whatever their purchasing power may be, and increasing cost of operation alone would not warrant such a policy."²⁶ However, there is evidence in South Africa

25. Morgan, E.V. and Thomas, W.A., The Stock Exchange, pp. 175-176.

26. Dowrie, G.W., Fuller, D.R. and Calkins, F.J., Investments, 3rd edition, p. 220.

that there is a steady increase in the demand for old and new equities by insurance companies. Inflation may, however, affect retirement schemes, such as variable annuity contracts, as well as with profit policies, where hedging against inflation is necessary. The result is that hedging against inflation will be important even in the case of life-assurance companies; we cannot agree with Dowrie, Fuller and Calkins.

In view of the fact that the liabilities are mainly long-term, and that companies must cover long-term liabilities by long-term financial assets, the life offices will prefer to hold long-term financial assets. Long-term stocks in the gilt-edged market will have decided attractions for them. In June, 1968, insurers and private pension funds together held R12 million in short-dated government stock and insurers alone held R151.1 million in long-term government stock, which they may be inclined to hold until maturity. Since January, 1965 the amount of long-term government stock held increased considerably and more or less doubled itself. The R151.1 million is only slightly more than the figure held by the banking sector, including the Reserve Bank. The banking sector, including the Reserve Bank, held R726.9 million short-term government stocks, as compared to R12 million held by insurers and private pension funds. Long-term insurers held R303 million in equities in June, 1968, which is R201 million more than in 1961. In June, 1968, long-term insurers held a total of R559 million in fixed-interest securities, as against the R303 million in equities, including units in unit trusts.²⁷

Substitution of stocks nearing maturity for long-dated stocks may even take place from time to time. In South Africa the investment policy of insurance companies is also affected by legislation. The Insurance Act requires that only 40 per cent of their investible funds be invested in approved securities, such as securities which cover government and semi-government issues, deposits with banks and building societies, loans to policyholders, and so forth. The way in which the funds in excess of what is required to comply with the Act will be invested will be mainly determined by "...their primary functions as insurers, in part by the volume of resources at their disposal and in part by problems of liquidity, safety of principal and investment yield."²⁸

27. The South African Reserve Bank Quarterly Bulletin, December, 1968, S-36.

28. Clayton, G., "The Role of the British Life Assurance Companies in the Capital Market", The Economic Journal, no. 241, vol. 61, March, 1951, p. 90.

The annual inflow of premium monies, dividends and interest on existing financial assets exceeds the annual outflow of funds to settle claims and other obligations, with the result that a steady stream of funds will flow from the insurance companies to the stock exchange. Normal claims can be comfortably met out of the inflow of funds from the above resources, so that the insurance companies can follow a long-term investment policy and the need for changing the portfolio for liquidity reasons need hardly ever arise. Short-term financial assets need not constitute a large percentage of the investment portfolio. According to Rose the financial assets may even include "...unquoted securities as well as those quoted but without an active market."²⁹ The insurance companies can thus do with a portfolio which is less liquid than that of commercial banks and can therefore follow a more long-range investment policy. The need to sell securities on a weak market, in order to meet commitments, need not arise. This gives some degree of continuity to the investment policy, and a steady, long-range policy can be followed with more emphasis being placed on the income from long-term investments than on the need for liquidity.

Emphasis is placed on safety of principal and a safe, dependable income at all times. This does not, however, mean that the insurance company will follow a rigid policy. Substitution will take place from time to time, or as Rose pointed out, "They will alter the direction of their policy according to their assessment of the financial outlook, but they are not likely to be heavy net sellers of industrial investments through the fear of a temporary fall in security prices. Variations in investment policy, particularly in the case of the larger office, for which the availability of suitable investments is an important consideration, are more likely to take the form of a change in the type of security being acquired than of the large-scale substitution of securities for cash, or vice versa."³⁰ The life-assurance company, like any other institutional investor, will also properly diversify the portfolio.

In South Africa the insurance offices are legally obliged to invest in stock carrying a fixed interest. After complying with the legal requisites the company can invest the excess funds in the best possible way, taking into account the basic principles of marketability,

29. Rose, H.B., The Economic Background to Investment, p. 287.

30. Loc. cit.

safety of principal, income or net yield, and proper diversification to spread investment risks. A conservative investment policy is feasible and necessary. The reasons for this are (1) Some degree of liquidity for meeting claims, particularly extraordinary claims and, (2) income, even if accompanied by a greater risk, is important if the company wishes to compete effectively with other companies in the field of lower premiums, with-profits policies, bonuses, and so forth.

Furthermore, life-assurance companies will be concerned about their actuarial solvency, that is, the income from investments must be at least equal to that assumed in calculating the premiums on policies. Primary consideration should be given then to the eventual payments of the sums assured. Premiums are calculated by mathematical formulae and it is assumed that such premiums can be invested at a compound rate of interest. Mortality rates can be forecast quite accurately, but changes in the rates of interest over the long-run cannot be predicted with a high degree of confidence.

The role played by insurance offices in the financing of investment is of some economic significance. Because of increases in incomes, the desire for additional security for families and so forth, more and more insurance is sold annually. Clayton pointed out that this may take place at the expense of other forms of savings. But if we want to look at the role played by these companies in the finance mechanism or process, we must look at the composition of their financial assets and/or changes in the composition of their financial assets. He contended that "...the increases in their liabilities are matched by equal increments in the holding of their assets, including cash. Thus the effect which they have on the national rate of capital formation is primarily due to changes in the composition of their assets. If, as a result of pessimism, they reduce the proportions of their riskier holdings such as equities, and increase their holdings of fixed-interest securities and cash, certain borrowers are now deprived of the finance on which previously they could depend. This restrictive effect on the operations of entrepreneurs will result in a contraction of aggregate demand."³¹ In our view this is stretching the impact of insurance companies on the national economy a bit too far.

31. Clayton, G., "The Role of the British Life Assurance Companies in the Capital Market", The Economic Journal, vol. 61, March, 1951, p. 86.

Clayton, with reference to the United Kingdom and the Macmillan gap, where the market structure was not providing capital for small and untried ventures, criticised the insurance companies, as the most important institutional investors "...for contributing to these deficiencies of the capital market on the grounds that they have been too cautious in the choice of their investments. Their preference for fixed-interest securities has favoured the well-established firms as against the new and untried enterprises and the small firms, whose position they have done little to alleviate even in other directions".³² These companies can help indirectly by adapting their policies to changing conditions. The reasons for the ultra-conservatism on the part of insurance offices in the United Kingdom are considered to be the pre-occupation with liquidity and salability of the underlying securities, bias in favour of conservative investments, preference for fixed-interest securities, which induced the issue of loan capital instead of equities.

Clayton concluded that, in the interest of economic stability and progress, it is important that insurance companies "...should not vary unnecessarily the rate at which they invest their funds and should not be too conservative in the choice of their investments. In both cases a greater readiness to invest in equities would be of benefit. Although it is desirable that by their actions they should not reinforce inflationary and deflationary tendencies, some variations in the cash ratio are inseparable from the process of investment."³³ More should thus be invested in equities since the capital market will only benefit from this. This will particularly be the case if funds are directed at new projects (issues) of merit.

3. Private Pension Funds and Provident Funds

Pension funds, particularly privately self-administered funds, have shown a rapid and sustained growth in South Africa over the last decade or two. With the rise in gross national product and the desire for greater security and independence at retirement, pension funds have grown rapidly, with the result that a fair share of all contractual savings now accrues to privately administered pension funds. The result of this is that some portion of funds which would never have reached the

32. Clayton, G. "The Role of British Life Assurance Companies in the Capital Market", The Economic Journal, vol. 61, March, 1951, p. 93.

33. Ibid., p. 99.

the stock exchange is now earmarked for security investments, that is in fixed-interest securities and equities. Pension funds now play a more important role in providing finance for new investment.

In considering the investment policy of pension funds we must again take account of the nature of the liabilities of these funds and then analyse the composition of the financial assets of these pension funds. The liabilities represent a claim of pension (and/or annuity payments), either in a lump sum or equal monthly payments over a certain period of time, and cash claims (plus some accrued interest) on resignation. The liabilities are actually expressed in real terms. The company does not know what a person will earn in the employ of the company 30 or so years hence, and the pension may be based on the money earnings over the last five or ten years of the person's employment. Investment in equities is, therefore, to be recommended.

The composition of the assets of pension funds in South Africa will be influenced, apart from the nature of the liabilities, by the legal instruments controlling such funds and the trust deed under which they are set up. In South Africa the Act requires that 40 per cent be invested in approved securities or investments. These are government stock, local authority stock, public corporation stock, mortgages, and loans to local authorities and public corporations. Fixed-interest securities make up the bulk of the investment portfolio. In June, 1968, privately administered pension and provident funds held R109 million in government stock, R220 million in local authority stock, R178 million in public corporation stock, R116 million in other fixed-interest securities, (including preference shares), giving a total of R623 million in fixed-interest securities, as against R205 million in ordinary shares, including units in unit trusts.³⁴

The liabilities of a pension fund are of a long-term nature, as in the case of life-insurance, and basically the same principles will apply in the management of the portfolio. Annual payments may to some extent be fairly accurately assessed. The investment manager can follow a long-range investment policy making use of the principle of averaging. Safety of principal and stability of income are considered more important than liquidity and marketability. He can aim at maximum income compatible with safety of principal. The portfolio must be properly diversified to spread risks and to protect the fund. Temporary market

34. The South African Reserve Bank Quarterly Bulletin of Statistics, December, 1968, S-37.

fluctuations can to a large extent be disregarded. After satisfying the legal and liquidity requirements, the excess funds can be invested in the most profitable way. In Britain there has been, since the Second World War, a tendency for pension funds to invest more and more in equities, with the result that the equity share in portfolios has increased.³⁵ In principle we agree with an increase of the share of equities in such portfolios.

It is important for pension funds to invest in equities to protect employees against inflation. "An important influence toward change also has been a desire to protect employees against inflationary trends which threaten the purchasing power of their pensions."³⁶ Inflation will tend to raise money earnings and the financial assets covering the increasing claims must increase in value in the same direction.

"Even if prices remain constant, however, a growing economy implies that incomes grow at the same pace as output, and it will take only a modest rate of growth to raise average incomes three or four times during a man's working life. Hence, if a terminal salary scheme is to operate economically, it must have assets which share in the growth of the economy. Ordinary shares can give both a hedge against inflation and a share in growth that is denied to the holder of fixed-interest stock."³⁷ In Britain pension funds were apparently slow in realising this basic principle and slow in investing in equities. In our view some of the larger pension funds in South Africa follow too conservative a policy and substantially more could be invested in ordinary shares, including units of mutual funds. In the Sunday Times (Business Times) dated 22nd December, 1968, the registrar of financial institutions called for more conservatism and prudence in the investment of pension fund monies, particularly with reference to some of the smaller pension funds. We agree that smaller pension funds must be ultra-conservative, but we do not share the view that pension funds in general should be compelled to hold a larger percentage in the form of approved security investments. Nor do we consider that this should be extended to insurance companies and mutual funds. If pension funds select securities carefully and prudently, they may, in our view, safely hold 50 per cent

35. See Rose, H.B., The Economic Background to Investment, p. 292.

36. Dowrie, G.W., Fuller, D.R. and Calkins, F.J., Investments, 3rd edition, p. 250.

37. Morgan, E.V. and Thomas, W.A., The Stock Exchange, p. 177.

of their portfolios in equities, including units of mutual funds.

Once retired the employee is not protected. If continued inflation is anticipated, as we have learned at the August, 1967, conference,³⁸ the pension funds, if they are to fulfil their objectives and aims, will be forced to hedge against this inflation, particularly in view of the possibility of the cost-push type of inflation. For this purpose, of course, fixed-interest securities are not very suitable and more attention should be given to suitable financial and industrial equity issues.

We feel that a large number, (and also collectively), of the more significant life-assurance offices and some pension funds in South Africa still hold too small a proportion of their financial assets in the form of equities. The reason for this may be the fact again that not very many equities listed on the Johannesburg Stock Exchange qualify for institutional investment. However, the increasing role of the institutions and intermediaries in the process of financing capital formation, including the provision of risk-capital, will become more dominant in our expanding and growing economy.

4. Investment Trust Companies and Mutual Funds

We must distinguish between mining finance companies, industrial finance companies, investment companies, trusts and mutual funds. It is not our object to discuss mining and industrial finance companies, but rather to say something about investment trusts, known as closed-end trusts and mutual funds known as open-end trusts, the latter being relatively new to South Africa. Suffice it to say that there are numerous mining finance (and exploration) companies listed which would give investors, purchasing their shares, a diversified portfolio, (mainly gold) such as Anglo American, Anglovaal, J.C.I., General Mining, Union Corporation, Ofsits, C.H.I.C., West Wits, Middle Wits, Writs, Federale Mynbou, Rand Mines, Goldfields, and so forth. Industrial and general finance companies include Anglovaal Industries, de Beers Industrials, Sankor, Bonuskor, Premier Ind., Sakers, South Atlantic and Seafare.

(a) Investment Trust Companies

Investment trust companies such as Fugits, Common Fund, Second Nassau, Union and London, are closed-end trusts. They are listed, joint-stock, or limited liability companies, and are not trusts in the

38. See The South African Journal of Economics, vol. 35, No. 4, December, 1967.

strict legal sense. Closed-end trusts are sometimes also referred to as managed investment companies. It is in the shareholder's interest that the shares of the investment trust be listed on the stock exchange. The investment trust company will raise its capital by share and loan issues which are listed like any other company and traded in on the stock exchange in normal fashion. The capital is fixed - hence the name closed-end trust. Their liabilities are asleep, to use Hicks' terminology.

The investment company will invest the capital obtained in a diversified portfolio and the holder of such a share has a reasonably wide range of other listed securities underlying it. The main purpose of the investment trust company is not to control or become holding companies in the ordinary sense of the word, or to indulge in any manufacturing or commercial activity, but rather to invest the funds, obtained through the issue of their own shares, in the securities of other companies with the object of building up a well diversified portfolio in order to spread investment risks. The idea is that an individual holding the shares of an investment trust can achieve better diversification indirectly than he can by directly managing his own funds. These issues will appeal to the individual with no investment knowledge and command over only a small capital with which he cannot obtain a satisfactory spread of securities.

An individual will hold the shares of an investment trust for the purposes of income and capital appreciation over the long-run and not really for speculative purposes. Another advantage from the point of view of the investor is that the composition of the portfolio and the decision to invest in given securities, in other words how the shareholder's money should be invested, is left to the board of directors and a skilled management. The board of directors have complete discretion in choosing the investments and in deciding on the dividend and retention rate from year to year. The investment trust company, like any other company, will retain some proportion of net earnings to build up the financial asset portfolio. The investment policy is also aimed at long-term income growth and capital appreciation rather than short-term capital gains and the composition of the portfolio will not change for minor stock exchange fluctuations. The bulk of the portfolio will consist of ordinary shares.

Judging from stock exchange performance over a reasonably long period, the history of some investment trusts in South Africa has not been too happy. They have not been as successful, and they did not grow

and appeal to the public to the extent one might have expected. Fugit is, we feel, an exception to the above generalisation.

A disadvantage of the investment trusts, (as opposed to the mutual funds) is that the price or market value of the share of such a company on the stock exchange more often than not does not bear any relation to the net asset value of the share, which is to be expected. We also know, of course, that there is no fixed correlation between the rate of retention and the rate of growth of earnings and dividends.

The main difference between a mining and industrial finance company and a closed-end investment trust is that the latter company is interested in investment as such, whereas the former, apart from buying and selling certain issues, are also interested in company promotion, underwriting of certain issues, and the financing, control and management of other companies. The mining and industrial finance companies in South Africa are really of greater importance and magnitude than the investment trust companies, and play a more important role in the investment system and national economy, particularly in the field of financing new investment.

(b) Unit Trusts

Unit trusts are referred to as open-end trusts or mutual funds. Unit trusts are legal trusts and registered under the Unit Trusts Control Act No. 18 of 1947, as amended by Act No. 11 of 1962. The open-ended trust is not a joint-stock company, but is run by a management company working under a trust deed. In a unit trust then we really have three parties, namely, first, the management company which is a separate entity from the trust it operates, second, the trustee, which must be a registered public company under the Companies Act, 1926, as amended, or a company registered under a special Act, such as the Banks Act, and, thirdly, the unit-holders, who are the beneficiaries in terms of the trust deed. It is essential to obtain the services of a reputable trustee of financial and commercial standing. The capital and unimpaired reserves of the trustee must together amount to at least R1,000,000.

The trust deed describes the investment policy which the unit trust will follow, and the trustee is named, for example, in the case of the National Growth Fund the trustee is The Accepting Bank for Industry Ltd. and in the case of The South African Growth Equities Fund it is the Netherlands Bank of South Africa Limited. Other important matters set out in the trust deed are the basis on which the selling price of the

units is to be computed, the procedure for the redemption of units, the methods to be used for the creation of new units, how the dividend yield on units is calculated, and the charges to the unit holder. Where the boards of directors of the investment trusts have complete freedom in the choice of investments, the managers of the unit trusts are restricted by the detailed policy laid down in the trust deed. Each trust will, of course, have its own investment policy, but heavy emphasis in all cases will be placed on stability of income and the prospects of capital appreciation.

The management company must at all times have invested in the unit portfolio, of its own resources, an amount of at least 10 per cent of the underlying securities in the unit portfolio. The management company will hold such investment as beneficial owner. The management company may, however, apply to the registrar for permission to limit this amount to R200,000. The object of this requirement is mainly to create investors' confidence in the 'product' the management company is selling. In the case of unit trust schemes in property shares the management company must invest, of its own resources, an amount equal to 25 per cent of the fund, which the management company will hold as beneficial owner. On application the registrar may determine that the amount need not exceed R300,000.

For services rendered the management company will receive remuneration to cover its expenses, which include its obligation to pay the trustee's remuneration and disbursements. The management company will receive an initial charge, a service fee, and the rounding off accrual. The initial charge, in relation to a unit, means that portion of the selling price of a unit which represents the management company's charge to cover all expenses incurred by the company in creating and issuing units. The initial charge is fixed by the management company, but may not exceed 5 per cent of the selling price per unit without the written permission of the registrar.

The service charge is normally proportionate to the length of the relevant accounting period and is calculated at the rate of one-half of 1 per cent per annum of the average month end market value of the unit portfolio (excluding income accruals), during the accounting period. The service charge is thus at the rate of $\frac{1}{2}$ per cent per annum of the average month-end value of the unit portfolio and as soon as possible after the end of each calendar month the trustee must pay the management company $\frac{1}{24}$ per cent of the market value of the unit portfolio at the end of the respective calendar month.

When units are repurchased the management company may deduct from the price of each unit an amount to round off the price of the unit to the next lowest cent and an amount equal to any fiscal or other charges which may be payable in connection with the sale of that portion or part of the underlying securities represented by one unit.

The essence of a unit trust is that the portfolio is made up of a wide range of underlying securities, and is divided into titles called units. The unit trust is organised for the purpose of giving investors the opportunity to purchase units representing a diversified group of selected securities. The value of a unit is determined by the current market value of the underlying securities and the managers will redeem or sell units on that basis. The management company will issue units at the made-up price per unit plus a rounding off accrual which may not exceed one cent per unit. The made-up price will be equal to the aggregate of:-

- (1) the amount obtained by dividing the total number of units in issue on the specific date the new unit is issued into the market value of the unit portfolio at a time not more than 24 hours prior to that date. If the stock exchange was closed during the 24 hours stated above, the last day on which the stock exchange was open will be taken. All income accruals or payments received in lieu of income accruals from the creation of new units during the accounting period will be taken into account. Any income accruals set aside at the preceding ex dividend date for distribution, but which have not yet been distributed in respect of the accounting period which ended on the day prior to the last ex dividend date, will be excluded,
- (2) any compulsory charges attaching to the unit,
- (3) the initial charge.

In calculating the market value of the stock exchange securities to arrive at the market value for purposes of determining the made-up price for selling units, such market value will be based on the lowest sellers prices.

The repurchase price per unit is arrived at by dividing the total number of units in issue on the date on which notice was received by the management company into the market value of the unit portfolio at a time not more than 24 hours prior to that date, or on the last date on which the stock exchange was open. All income accruals and other payments received in lieu of income accruals from the creation of new units during the given accounting period will be taken into account. Any income

accruals and payments in lieu of income accruals which were set aside at the preceding ex dividend date for distribution, but which have not yet been distributed in respect of the accounting period ended on the day prior to the last ex dividend date, will be excluded. For purposes of calculating the market value for the above purpose, such market value will be based on the highest buyers prices. Furthermore, the management company may deduct an amount to round off the price to the next lowest cent, and any other necessary charges which may be incurred in connection with the sale of that part of the underlying securities represented by one unit.

The units are available in any quantity and can be liquidated at great ease at the re-purchase price. The 'capital' of the unit trust fluctuates daily. Units can be purchased through banks, stockbrokers, leading attorneys, leading accountants and leading insurance brokers and agents.

There are certain advantages in holding the units of a mutual fund.

- (1) A unit as such represents a diversified portfolio. The investor can buy units and spread risks to an extent which would have been impossible to achieve by investing on his own account. This applies particularly to the small private investor. A statutory requirement is that a unit trust may not purchase more than 5 per cent of the number of securities issued by any one concern which is not an investment company, and 10 per cent if it is an investment company. Furthermore, a unit trust may not invest more than 5 per cent of the net asset value of its portfolio in any one security. All securities purchased must be listed on a recognised stock exchange.
- (2) A second advantage is the fact that the investment is very readily convertible into cash.
- (3) Professional, highly specialised management, skilled selection and supervision of the portfolio and efficient services are offered to actual and potential unit holders. The individual private investor may lack the time continuously to supervise his own portfolio efficiently. Investing in unit trusts may be considered convenient from this point of view.
- (4) Units can be purchased in small denominations.
- (5) The management will assist the private individual in planning his investment programme, which may be on the basis of an open account, accumulation plan, systematic investment plan, systematic withdrawal plan, and so forth.

(6) The units purchased are fairly stable in price and as such not subject to speculative waves of bullishness and bearishness which may from time to time happen with a given share. Units are considered a good investment medium for the long-term benefits through growth in income and capital. The selling and re-purchase price of units are determined by the stock exchange prices of the securities underlying the unit portfolio. However, Grant warned us that the investor must still be careful and look at the quality of the trust's portfolio. He contended that "...the unit trust may be of great service to the investor who looks critically at what he is getting, but may seem too attractive to the casual investor who accepts everything that he is told in print without working out for himself how and where the money is really earned."³⁹ It should also be borne in mind that the unit trusts in South Africa have not yet proved themselves at a time of a slump on the stock exchange such as 1960-1961. The investor in units should carefully study the records of the types of securities held in the portfolios of the different funds, the degree of diversification offered and maintained, the past growth rates, the various sizes of the funds, and so forth.

(7) The purchaser of units can apply the principles of averaging which we have already discussed.⁴⁰

One should not expect the fund to do the impossible. In South Africa a few trusts are operating and the individual should consider whether the policy of the trust suits his own investment objectives, that the managers are men of high standing and integrity and with considerable experience and specialised know-how in the field of finance and investment, that the trust provides satisfactory services, and so on.

The purchaser of the units of a unit trust does not obtain all the advantages listed entirely free of charge. The management company must cover administrative expenses and the investor must pay two charges, namely the initial charge and the service charge. The initial charge is a non-recurring charge, which includes all the costs incurred in the formation and issue of units. The initial charge (maximum 5 per cent) varies according to the size of the investment and some remission is allowed on larger investment.

39. Grant, A.T.K., A Study of the Capital Market in Britain from 1919-1936, 2nd edition, p. 195.

40. See chapter IX.

A service charge, which is deductible from the income of the trust, amounts to $\frac{1}{24}$ th of 1 per cent of the market value of an individual's investment as determined at the end of each month. This is a payment for the constant supervision and management of the trust's asset portfolio. The service charge, taxation, and the auditors' fee may be deducted from the trust's dividend and interest income, but the balance must be distributed in dividends. In terms of the Unit Trusts Control Act no distributions may be made out of any capital profits or profits accruing as a result of bonus and rights issues. Such capital gains are retained and re-invested by the trust.

Some of the principles outlined at the beginning of this chapter applies equally well to unit trusts. Unit trusts are income- and capital-conscious investors. The primary objective may, however, be considered to be capital growth, and hence the investment in listed equities. A trust will normally not strive for a high current income if that involves taking an imprudent risk. The securities purchased by the trust will conform to the norms set by the fund managers and fit into the plan of diversification which the trust has set itself. At present the mutual funds must invest 15 per cent of the value of their portfolios in approved securities, of which $7\frac{1}{2}$ per cent must be in government stock.

In September, 1968 the market value of unit trusts' security holdings were as follows:-

Total market value	Approved securities ¹ (market value)	Ordinary shares (market value)	Other securities (market value)
R262.1 million	R36.0 million	R226.1 million	0.0 million

1. Approved securities include securities issued by the central government, local authorities, the Land Bank, Escom, the Rand Water Board, and so forth.

Source:- The South African Reserve Bank Quarterly Bulletin, December, 1968, S-38.

The portfolio of typical trusts may represent the following percentages in various industries:-

	Fund A		Fund B	
	No. of companies represented	Percentage of value of unit portfolio (market value)	No. of companies represented	Percentage of value of unit portfolio (market value)
Financial - mining	9	17.88	10	18.36
Financial - industrial	1	0.54	12	10.61
Banks	3	4.95	3	1.43
Breweries, wines				
hotels	2	1.79	3	6.32
Chemicals	1	1.26	2	2.90
Printing, paper				
packaging	3	1.25	6	3.94
Furniture	1	0.90	-	-
Property	1	0.25	1	0.27
Forestry	1	0.14	-	-
Textiles, clothing	3	2.64	4	1.96
Motor and transport	6	2.97	2	4.76
Tobacco	2	3.16	2	3.02
Building	6	4.88	4	4.37
Food, fish, produce	6	5.41	5	6.00
Pharmaceuticals	2	6.81	-	-
Iron, steel,				
engineering	8	10.81	12	12.25
Retailers,				
wholesalers	7	15.00	5	4.79
Total equities	62	80.64	71	80.98
Approved securities		15.52		15.57
Total value of stock				
exchange securities		96.16		96.55
Cash on call and deposit		2.64		2.45
Charges		1.20		1.00
		100.00		100.00

The mutual funds do not buy securities on margin, do not sell securities short, or buy any securities which are not listed on a recognised stock exchange. They also do not invest in the shares of a company with the object of exercising control. Provision is made for the full amortisation of securities where they are of a wasting nature.

In the case of a flexible trust the managers can vary the proportions of the different holdings in the trust at their discretion, provided that they conform to the investment clauses incorporated in the trust deed. The type of security invested in will also be influenced by the managers' views of what they think will secure the investing

public's approval. The success or failure of the trust will largely depend on the careful selection of the securities underlying the unit portfolio. A high degree of marketability of the portfolio must be maintained.

D. Summary

In our society institutions and financial intermediaries play an important role in the financing of new investment and economic growth. The future growth of this country will also depend on the extent to which institutions and financial intermediaries are willing to subscribe to new issues on the stock exchange to ensure a continued supply of risk capital for future expansion. In our view an efficient financial system is a necessary condition for real growth.

Institutions and financial intermediaries possess specialised knowledge and they therefore exert a strong influence on the efficiency of the allocation of scarce resources, particularly the substantial amounts which accrue in the form of contractual savings. Some legislation, however, exists to protect, as far as possible, the safety of the community's savings.

Taken collectively the institutions and financial intermediaries have some investment principles in common. They exploit the economies of large scale lending and borrowing. They are all subject, although to varying degrees, to legal and liquidity constraints. They all adhere to the basic principle of diversification and risk-spreading. They are in varying degrees concerned with the safety of principal and stability of income of the securities underlying their portfolios and with the rate of return and liquidity of the portfolio as a whole.

The Funds and Financiers, to use Hicks' terminology, will hold diversified financial asset portfolios which will also be a function of the nature of their liabilities. The liabilities of a Fund are asleep, but the Fund will endeavour to maximize the rate of return on its portfolio. The liabilities of the Financier are not asleep. The Financier will hold highly liquid assets in its portfolio, including money under the precautionary motive to cope with any emergencies. These assets are held as a reserve asset. If the liabilities of the institution or financial intermediary are of a short-term nature, such as those of a commercial bank, such liabilities cannot be covered by long-term or illiquid financial assets. Conversely, long-term liabilities should not be covered by short-term financial assets. The object of portfolio management is to reach a balanced asset-liability

position maximizing the resultant yield of the portfolio commensurate with the degree of risk the intermediary is prepared to assume. The composition of the portfolio will also be influenced by the legal framework within which the institution or financial intermediary must operate.

The financial asset portfolios of commercial banks, life-assurance offices, pension funds, investment companies and mutual funds will differ in some important respects. We have pointed out only some of the more important differences. We are of the opinion that both insurance companies and pension funds in South Africa have too large a percentage of their financial asset portfolios in fixed-interest securities and too small a percentage in equities. If a pension fund is to fulfil its objectives and aims, and if it is to operate economically, it must have assets which share in the growth of the economy and which serve as a hedge against inflation. For this purpose fixed-interest securities are not very useful.

CHAPTER XIII

SUMMARY AND CONCLUSIONS

In this thesis we have attempted to outline some of the interrelationships between a number of economic theories and principles and the economic phenomena which pertain to the stock exchange.

In chapter II we discussed some of the broader aspects of the demand for financial capital, the supply of financial capital, and some macro- and micro-economic considerations related to the process of finance. In our view a decision to invest is not based on one single or unique factor or consideration; rather, a number of factors will determine the magnitude of investments and the concrete form such investments will take. Complementarity, technology, population growth, capacity and capacity-utilisation, profit and sales maximization, maximization of shareholders' equity or utility, risk and uncertainty, taxation, and the expected rate of return on the new investment may be considered as the more important factors which will be taken into account. The crux of the matter is that any investment undertaken will form part of the multiperiod plans of management. The company may be considered as endeavouring to maximize intertemporal utility within the limits of certain constraints. Production, investment, dividend, retention, lending and borrowing plans are all interdependent and form part of the multiperiod plans in order to maximize utility.

The magnitude of investment undertaken in the economy during a given year will determine the demand for financial capital in that year. External finance will be resorted to in many cases, with the result that new investment during any given year will be partially financed by new loan, preference and ordinary share issues and partly from internally generated funds. The interest rate structure prevailing in the market will have an influence on the terms on which short-term and long-term external funds can be raised.

The volume of saving in the community (gross domestic saving) plus or minus the balance on the current account of the balance of payments will constitute the funds available for financing gross domestic investment. An adequate supply of financial capital is of great economic significance in a young, growing economy. We would suggest that under conditions of full employment, as existed in South Africa over the last few years, the emphasis should be on a more positive attitude or disposition toward increased saving. A large volume of

investment cannot lead an economy into trouble, provided that the investment programme is matched by a corresponding volume of saving.

Saving as such is influenced by a number of factors. The forms in which savings accrue will have a definite influence on the availability of financial capital to finance investment. Only a certain proportion of gross domestic saving will be allocated by the capital market. Depreciation allowances and retentions, for example, will not be allocated by the capital market to alternative uses. It is, however, important that some large proportion of gross domestic saving be earmarked for subscribing to new issues by the private and public sectors of the economy. New investment in real assets, the acquisition of financial assets, the utilisation of technological changes, and changes in the composition of the existing capital stock all require funds. The efficient allocation of savings to provide the finance is imperative. However, in our world perfect foresight is non-existent and investment decisions are based on subjective expectations and multiperiod plans, with the result that malinvestment in some form or another will always occur.

We must distinguish between the demand for funds by already established companies and the demand for funds by new companies. The demand for funds will normally differ in magnitude and in some cases in the sources tapped. External funds, of course, become important when gross internal savings are inadequate to finance the purchase of real and financial assets, and recourse to the capital market becomes imperative.

The purpose for which the financial capital is raised will have an influence on whether the capital should be raised on a permanent or temporary basis, and in the case of the latter, whether it should be on a short-term, medium-term or long-term basis. This will then have an influence on the class and kind of security issued.

The exact definition and measurement of the cost of capital is still a controversial matter. In our opinion, capital-budgeting decisions and the valuation of the ordinary shares of the company must be integrated. We consider that the capital-budget which will maximize the value or the price of the share is largely indeterminate in a dynamic world where unexpected changes can take place. We do not accept the Modigliani-Miller (1958) propositions for the various reasons mentioned in chapter II. In our view the cost of capital must be defined in terms of the notion of opportunity cost. We may consider the cost of

capital as that rate of return a company must earn on its new investments financed by a new issue in order to leave the interests of existing shareholders undamaged. It is really the prospective return which an existing shareholder is forced to forego in the event of the purchase of such a new share by someone else.

There are various reasons why companies issue different classes of securities. Each class of security has its advantages and disadvantages from the point of view of each company. A company must take a number of factors into consideration before a given class and kind of security is issued. The capital structure will thus be influenced by a large number of factors. In our view a unique solution resulting in an optimum capital structure is unattainable in a dynamic world. A model showing a unique optimum capital structure at a point of time may be constructed, but in the real world share prices are only 'temporary equilibrium' prices, interest rates are inherently restless, capital markets are imperfect markets, and companies do not raise financial capital from all major sources during a given year to maintain a given balance in the capital structure. A sound financial structure today may be unsound in a few months' time.

The large variety of different classes and kinds of securities listed on the stock exchange has its origin in the manner in which companies finance their activities. Managements with differing degrees of risk-aversion decide on the issue of certain classes and kinds of securities which will attract certain investors, and investors with varied degrees of risk-aversion compete for the purchase of these securities to find an outlet for their investible funds.

In chapter III we focused attention on the fact that capital markets are imperfect. The assumption of capital homogeneity must also be dropped. If homogeneity is assumed savers would invest only in one kind of asset at a uniform rate of interest, and deficit-units would be able to borrow as much as they liked at a uniform rate of interest in a perfectly competitive market. If the capital stock was homogeneous and if capital markets formed a homogeneous unit, no problems of allocation, malinvestment and savings going to waste would arise.

The capital markets perform two main functions, namely the allocation of scarce capital resources to various uses and the provision of facilities for the purchase and sale of existing securities. For ex ante allocation of scarce resources to take place effectively we need proper channels of communication between potential saving and potential

real investment. For the effective financing of economic activity a high degree of mobility of financial capital is required. The capital markets must facilitate this mobility through their structure, organisation and distributive techniques. Underdeveloped capital markets in a country may become a factor impeding real economic growth. A dynamic market economy thus needs well-developed, flexible and properly functioning capital markets to maintain economic growth.

The stock exchange, being an integral part of the capital markets in our society, performs a valuable function in providing facilities for the purchase and sale of existing securities. This facility gives investors the opportunity to sell securities which they no longer wish to hold and to purchase other securities which they now want to hold instead, or they may substitute securities for money and near-money balances and vice versa. The different securities in the capital markets which are available for individuals to hold also enable them to diversify their financial asset portfolios and thus to spread risks. Risks can be shifted to those who are from time to time willing to assume such risks. Indeed, the raison d'être of the capital markets is to shift risks from one individual to another.

In chapter IV we described the functions of the stock exchange. The stock exchange as such is only a near-perfect market and this again will influence the ex ante allocation of scarce resources.

The primary functions of the stock exchange were dealt with in two parts. The first is the imparting of liquidity and marketability to the existing stock of securities and the second is the consistent valuation of the titles representing the existing capital stock in a community.

Both marketability and liquidity are relative terms, the latter to some extent dependent on the former. Liquidity really means the extent to which a financial asset is realisable without loss, and the degree of liquidity is the extent to which an asset is more certainly so realisable without loss. We must therefore distinguish between financial assets which are more or less liquid. Money is, of course, the most liquid of all financial assets. Short-dated government stocks are, for example, more liquid than ordinary shares, since they are more certainly realisable without capital loss at some future date, whereas ordinary share prices are more volatile. The facilities provided by the stock exchange enhance both the liquidity and marketability of existing listed securities.

We consider capital as a heterogeneous stock of resources to be used in different combinations according to different multiperiod plans in the creation of future income flows or yield streams. The composition of this heterogeneous capital stock is subject to constant change and so is the income flow which the capital stock can produce in the future. The stock exchange is an intertemporal market for the existing titles to the existing capital stock and these titles are daily revalued on the stock exchange in terms of the expected future income streams the capital stock may produce. The stock exchange is an intertemporal asset market where the 'temporary equilibrium' prices reflect the balance of expectations regarding the future earning capacity of the capital assets. The stock exchange is a market where expectations are brought into consistency with each other. The market will, however, daily place a different value on the capital stock in the community. We have discussed the different approaches to the problem of capital measurement. We do not accept any cost and backward-looking measures of capital, but consider market value to be the best of all possible measures of capital. Market value is a forward-looking measure of capital, and we consider it as a logical approach to the problem of measuring capital. On the stock exchange transactions result from the behaviour of forward-looking individual decision-makers, and the 'temporary equilibrium' prices reflect the consensus of opinion regarding the future efficiency or earning power of the heterogeneous capital stock. The market value of a share is the social objectification of an otherwise subjective phenomenon.

The secondary function of the stock exchange is to provide a channel through which the effective demand for financial capital by the private and public sectors of the economy can be satisfied. This function is merely a by-product of the primary function.

The stock exchange facilitates the efficient allocation of savings to different uses. Financial capital will tend to flow to the points of highest return. It is, of course, through the pricing mechanism on the stock exchange that scarce financial capital resources are more effectively allocated to different economic uses, the future outcomes of which are unknown. Stock exchange prices are not economically functionless but knowledge is always transmitted, not only to surplus-units who are the suppliers of financial capital, but also to those who must make investment decisions in an uncertain world. Without a stock exchange the allocation of scarce resources might have taken place in a rather more haphazard way. The conditions prevailing on the stock

exchange will strongly influence the amount of funds which can be externally raised, as well as the cost of such capital, that is the extent to which the shares of the company are overvalued or undervalued by the market. There are various reasons why the market price of a share at a point of time can deviate from what may be considered as investment worth based on the long-term prospects of the company. If a company whose earnings are relatively low could raise funds on the same favourable terms as a company with high earnings, a tangible incentive to efficiency would be destroyed. However, it is the function of the market, where the 'temporary equilibrium' prices reflect the balance of expectations, to spread knowledge to all corners of the market. The price of the share may then reflect the confidence of the investing public in the multiperiod plans of the management. If the share of the low earnings company is selling at a low earnings multiple, the market may deny such a company fresh funds on favourable terms. In this sense the stock exchange serves a useful purpose in keeping managements on their toes.

Should the long-run equilibrium propounded by Chase, where security prices reflect the marginal cost of reproducing the underlying real assets ever be attained, the problems inherent in optimal ex ante allocation would, of course, be alleviated. In this case the marginal equalities would guarantee the optimality of allocation. In our view such long-run equilibrium is not a very useful concept, and we can only envisage 'temporary equilibrium' prices at a point of time. In a market where the value of the turnover in existing securities far outweighs the value of new issues, the influence of the marginal cost of reproducing the underlying real assets on price will be weak. Furthermore, knowledge is not equally diffused throughout the market. A given share may also be subject to manipulation and the 'temporary equilibrium' price may reflect an artificial situation. For these reasons the stock exchange becomes an imperfect taskmaster. But the fact that the stock exchange facilitates the consistent valuation of the titles representing the capital stock makes consistent capital change more possible than it otherwise would have been.

It is not the function of the stock exchange to protect individuals against capital losses which they may suffer as a result of unfulfilled expectations, but the organisation and control of the stock exchange is such that the investing public is largely protected against fraudulent flotations, with the result that investment risks are reduced.

In chapter V we briefly described the characteristics of stock exchange investment media. The individual will hold a diversified portfolio of these different classes and kinds of securities. Each class and kind of security will be considered by the individual from the point of view of the legal rights attached to such a security, and factors such as stability of income, safety of principal, control, the possibilities of capital appreciation, and the general and specific risks attached to the security will be given some weight. The different classes and kinds of securities will appeal to different groups of investors.

Chapter VI deals mainly with the 'temporary equilibrium' of security prices. In our view the 'temporary equilibrium' method makes sense when applied to an intertemporal asset market such as the stock exchange. When we are concerned with stock exchange security prices we are interested in a truly dynamic process. The 'temporary equilibrium' prices reflect the balance of expectations of a large body of individuals. The expectations regarding future yield streams are inherently restless and are continuously changing, with the result that share prices are volatile.

In a dynamic world expectations are continuously revised in the light of new knowledge and new expectations are formed at different points of time. The demand functions for and market-supply functions of securities are governed by such changing expectations. The result is that security prices are flexible or volatile. The crux of the matter is that the equilibrium price established on a given market day, together with any other knowledge which may reach actual and potential market participants, will be analysed and interpreted, and expectations and multiperiod plans will be revised and adjusted to new situations.

The equilibrium on the stock exchange is in essence a stock equilibrium, that is an equilibrium at a point of time. New issues, which constitute a flow-supply, are added to the existing stock-supply on a given market day. We need a clear distinction between stocks and flows only when we are concerned with equilibrium over time. There is thus a temporal distinction between equilibrium at a point of time and equilibrium over time. The former is a stock equilibrium, whereas the latter is a stock-flow equilibrium.

The expectations regarding the future prices of yield streams will tend to diverge. No two individuals interpret the same information in exactly the same way. We may, however, speak of converging

expectations when a large body of individuals interpret certain information or events in the same way. The fact that expectations diverge means that some individuals must, at some future date, be proved wrong. The suppliers of financial capital must bear the risks of capital losses which may occur due to dynamic market forces, apart from the risks inherent in a given company of which they are shareholders.

We must see the relationship between the magnitude of price changes and the quantities changing hands in perspective. In a stock market the change of ownership of securities is a mere incident in the matter of their change of price. It is more correct to say that the change of ownership occurs because of a change of price, that is changing prices induce changes in ownership. With reference to a given share, it appears that diverging expectations may result in activity volatility, accompanied by only small changes in price, whereas converging expectations may produce considerable price volatility without any real activity volatility. The consensus of opinion may be bullish, with the result that many willing buyers meet few willing sellers, or conversely, bearish sentiment may predominate, with the result that many willing sellers may meet few willing buyers. The net result is that prices may move over wide margins. Given the state of wealth and the same state of knowledge of outside opportunities, transactions will take place between those bulls who expect the future prices to be higher than the current market price and those bears who expect the future prices to be lower than the current market price. When an individual buys and sells stock exchange securities he expresses an expectation about future yield streams and prices as well as an expectation about yields on assets outside the stock exchange. If expectations did not diverge there would be no market in securities and no need for a stock exchange. Not all individuals will be convinced bulls or convinced bears at a point of time and we will find a large body of hesitators in between which may at any stage join the ranks of either the bulls or the bears.

The securities listed on the stock exchange are imperfect substitutes. The stock exchange really consists of a number of sub-markets which, nevertheless, do form a system. On a given market day equilibrium is attained simultaneously in each of the sub-markets which form part of this system.

Problems related to expectations and uncertainty were traditionally treated in terms of probability theory of the frequency type. The criticism against the probability theory is that it cannot be successfully

applied to investment decisions other than of a homogeneous series. Furthermore, when taking risky decisions such as the purchase of an ordinary share, where the unknowns are numerous, certainty-equivalent approaches have limited value in explaining the behaviour of the uncertain investor. If it was possible to reduce every uncertain expectation to a certainty-equivalent or sure-prospect, diversification would be unintelligible. Although we are in sympathy with Shackle's criticism of probability theory, his own exposition in terms of focus-outcomes is equally inapplicable to stock exchange investment decisions. His theory is also not applicable when we are concerned with explaining portfolio diversification. The decision to invest in a given security is not a once-for-all decision which cannot be reversed. Furthermore, Shackle did not tell us anything about the market processes and the transmission of knowledge which will affect expectations.

In dealing with expectations we briefly discussed Hicks' notion of the elasticity of expectations. The elasticity of expectations is merely a measure (like a thermometer) of certain phenomena and cannot explain change. Furthermore, changes on the stock exchange are not few and far between, and we should not introduce quasi-stationary concepts into our analysis. In addition, we also do not know in fact how expectations will change or what changes in them will render the market stable or unstable.

Our views on the stock exchange are irreconcilable with those of Chase. We must distinguish between our market day (or 'temporary equilibrium') and Chase's long-run market equilibrium. Chase abstracted from dynamic expectations. In a stationary world there may be a tendency to the kind of long-run equilibrium of security prices postulated by Chase, but in a true dynamic condition such as prevails on the stock exchange, such a long-run analysis seems to be of little real value. We cannot accept the assumptions of a perfect asset market, perfect foresight, and never changing expectations and multiperiod plans. Our views therefore differ from Chase's in one main respect, namely the long-period stationary assumptions on which he based his hypothesis. We maintain that the notion of 'temporary equilibrium' makes sense in an analysis of the dynamic processes which reflect the changes taking place on an asset market such as the stock exchange.

We have focused attention on monetary and capital theory in an effort to explain the relationships between security prices and interest rates, including the yields on ordinary shares. We fully discussed

Keynes' views as propounded by him in the Treatise and The General Theory. In our view the exposition of the bearishness function in the Treatise is in many respects superior to the liquidity preference theory in The General Theory. For Keynes the rate of interest is a purely monetary phenomenon. In our view Keynes was perfectly right in opting for a stock equilibrium in dealing with the interaction between idle money balances and security prices. The liquidity preference theory must be extended to allow for security differentiation and thus a whole complex of rates of interest which do not have to move uniformly in the same direction.

There are numerous reasons why individuals will hold money and near-money balances in their diversified financial asset portfolios. Portfolios will then contain financial assets which are more or less liquid with money being fully liquid. The size of the money and near-money balances held will be a function of the individual's subjective expectations and risk-aversion. Not all Keynesian money need be non-interest bearing. However, given a strong enough aversion to risk some money will be held, even if the explicit rate of return on this money is negative.

The liquidity preference theory is in actual fact a portfolio theory (that is a stock equilibrium theory) and thus fits into our 'temporary equilibrium' analysis and our views on the activities of bulls and bears. We are of the opinion that the changing expectations of bulls, bears and hesitators, which prompt their behaviour and activities, will exert a strong influence on the interest rates and yields via shifts in the liquidity preference.

The yields and yield patterns on the stock exchange must also be explained with reference to capital theory. We have concentrated only on Keynes' marginal efficiency of capital and on the marginal productivity of investment. We have also demonstrated that our views on the stock exchange are equally irreconcilable with those of Keynes. In our view Keynes failed to realise that for point of time equilibrium short-term expectations will matter just as well as long-term expectations. In a market such as the stock exchange both the game-players and the long-term investors will learn from each other. In our view the stock exchange is a market where the expectations of a large group of individuals are brought into consistency.

We have also explained why we do not accept the traditional view that speculation will always even out price fluctuations. In our view

this will depend on the extent to which expectations either diverge or converge. When expectations diverge and bulls and bears match each other, the magnitude of price changes may be very small, accompanied or unaccompanied by a large turnover. Should expectations converge, speculation may aggravate price fluctuations.

We therefore consider that the dynamic processes which reflect the changes on the stock exchange must be explained in terms of the 'temporary equilibrium' method and inherently restless expectations must be explicitly introduced into the analysis.

The process of valuation was discussed in chapter VII. The price of a share ruling at a point of time implies subjective valuation by a large body of individuals. An individual will compare his own subjective valuation with the objective market valuation placed on the security by the market. The individual's own subjective valuation may, however, differ substantially from the market valuation. He may consider the security to be overvalued or undervalued, and this will then determine his strategy. It is obvious that any individual will subjectively appraise a certain security in an effort to place some subjective value on it before he commits his funds to such a security or before he sells a given security. A given security may be an attractive proposition at one price, but vulnerable and a poor proposition at another price.

The elements of subjectivity, uncertainty and risk are always present. Investment analysis can only be effective within rather wide tolerance limits. The individual has only past and current data at his disposal, constituting his knowledge up to a point of time and such data used and conclusions reached are subject to human interpretation. Although the risks attached to a given security cannot be cardinally measured, the function of investment analysis is still an attempt to analyse and stress some of the internal and external risks inherent in a given company, and to enable the individual to formulate some subjective estimate of the risks inherent in a given security which may be present to a lesser or greater degree in other comparable securities.

Before he adopts a certain strategy, the individual will investigate some qualitative and quantitative factors related to the security. In his classification of securities he will carefully consider the type and nature of the company, as well as the characteristics, risks and hazards of the industry in which the company is operating. We believe that

proper industry classification is an ingredient in the process of valuation. Even during a period of economic boom and prosperity some depressed industries and companies may still be found. Furthermore, the individual must ascertain the relative positions of companies within a given industry, and for this comparative analysis is a prerequisite. Not all companies within a given industry will share equally in the growth of the industry. Some companies may be at a competitive disadvantage for various reasons, for example an incompetent management.

The individual must also consider the prevailing conditions on the stock exchange before he commits his funds to a given class of security, or a given group of securities of the same class. The emphasis in the market tends to shift from time to time and this will influence his strategy.

The fundamentalist will carefully investigate the financial statements of companies and any supplementary information at his disposal regarding managements' multiperiod plans. The fundamentalist will make use of some, or most, of the financial ratios which we have discussed, always bearing in mind that past trends in the ratios are no criterion for the future. The future performance of the company (or management) cannot be entirely judged from past performance. The financial ratios cannot answer all the qualitative and quantitative questions with which the individual is confronted, because such analysis also has certain limitations. Such ratios cannot show the underlying causes of any adverse changes in a company's financial position or status. Another question which remains is whether the management possess the skills, insight and foresight to rectify any adverse trends. The investor is faced with a number of intangible factors which cannot be answered by quantitative analysis.

With reference to earnings, dividends, and valuation, we are of the opinion that the question of whether shares are valued in terms of an expected growing dividend stream or in terms of expected growing earnings has now become a bit of a backnumber. Assuming a given growth rate and an infinite investor time horizon, both ways of looking at the situation are equivalent. However, we have not proved this mathematically. We have opted for a dividend model in our exposition, since the rate of retentions and the growth rate of earnings and dividends are allowed for in such a dividend model.

We have considered two methods of valuation; first, the current price expressed as a function of a growing stream of dividends to infinity and second, the current price of the share expressed as a function of a finite dividend stream plus some capital gain when the individual sells out at the end of period n . Mathematically the two methods yield the same result. The current price may then be defined in terms of any one of the above methods of valuation. The important variables are the rate of growth of dividends, which is a function of the rate of retentions and the rate of return earned on the new investments financed by such retentions, and the rate of discount, k .

However, in the real world such a mathematical valuation model may not be very useful. The reason for this is that the combination of exact or precise mathematical formulae with highly imprecise assumptions about expected future growth may result in some absurd value being placed on a given issue. Good judgment is still the essence of the matter. In a dynamic world where unexpected change is the order of the day there is no guarantee that the growth in earnings and dividends can be maintained, particularly during adverse years. Optimistic assumptions about the growth of earnings, especially if projected far into the future, may lead to rather spurious valuations with the aid of higher mathematics.

In our view the individual must be extremely careful before he commits his funds to a so-called growth share. One question which cannot be answered is for how long into the future the past growth trends can be maintained. Thus, uncertainty as to the magnitude of changes in the growth rate and the uncertainty of growth duration into the future will always be present. This means that, at a point of time, an investment in a growth share may not be feasible or may be unwise. Growth shares are highly prized, and may already be overvalued by the market. If a share is selling at a high multiple of earnings the price may be discounting, not the immediate future, but the hereafter. There may also be some market risks in holding a growth share for prolonged periods, as they may become vulnerable in the market. When a high rate of growth will come to an end no individual will ever know beforehand.

We do not consider charting as a science. We are, however, of the opinion that proper security analysis and market analysis should be integrated.

Market analysis as such cannot tell us much about the magnitude of future price changes, which are unpredictable. We are in full support of the random-walk hypothesis. The analogy between share price

movements on the stock exchange and the movements of molecules in a liquid or gas (Brownian Motion) appears to be very apt. Share price movements are of a stochastic nature, and past price fluctuations can tell us little, or nothing, about the magnitude of future price changes.

The individual may, however, make money on the stock exchange by acting and reacting faster than the market to any fresh news regarding the prospects of the company which will influence the expectations of a large body of individuals.

In chapter VIII we briefly discussed some of the internal and external risks with which the individual is faced. There is no doubt that subjective taste for risk and risk-aversion play an important role in the strategy of individuals. All the individual can really do is to try to analyse the true nature of the risks involved, subjectively to measure or assess the risks, to decide on the degree of risk he is prepared to assume, and then to hedge against those risks which he is more conscious of. His multiperiod accumulation plans will be a function of his risk attitudes. The composition of his portfolio at any point of time will therefore be a function of his risk attitudes, and a highly subjective matter.

The object of diversifying financial asset holdings is to minimise the impact of a single decision or judgment. Diversification of financial assets means that these assets are not perfect substitutes, that is an expected gain in one situation is not a perfect substitute for an expected gain in another. Proper diversification of financial assets means that the returns and relative price changes of the constituent securities should not be highly correlated. Should the returns and relative price movements of the constituent securities be highly correlated and tend to move in unison, diversification becomes powerless. Diversification also has certain limitations.

A given combination of a portfolio is not a once-for-all combination and the individual will substitute one financial asset for another at the margin if he subjectively feels that this will be to his advantage. Portfolio equilibrium is in essence again a stock equilibrium and corresponds to our market day equilibrium discussed in chapter VI.

In a system of debits and credits individuals will find themselves in different debt-wealth or asset-income positions. These positions are subject to change over time and play an important role in investment strategy.

In terms of the E-V hypothesis each security presents the individual with a different expected return-risk (or mean-variance) combination, and all the securities combined will then give the mean-variance of the whole portfolio. The expected return-risk position of the entire portfolio is the important magnitude in which the individual is interested.

In the choice of an efficient portfolio the individual can attempt to maximize the expected return for a given variance (risk), or to minimise the variance (risk) for a given expected return. The risk-lover will be prepared to assume a greater risk (variance) in the hope of an exceptional or above-average gain, while the risk-avertter will be satisfied with a lower expected (or below-average) return, but with a smaller variance.

We have demonstrated how a set of attainable efficient portfolios in terms of the E-V hypothesis can be found. However, the E-V approach cannot exactly provide the answer to which portfolio in the efficient set will be chosen by the individual. For this we must again revert to utility analysis.

The individual will endeavour to maximize the utility function of his portfolio and he will attach certain utilities to the possible outcomes or pay-offs. We have demonstrated how the individual will reach his equilibrium with the aid of the utility maxim. We have also combined the E-V approach with the utility approach. We have also in a sense integrated Hicks' analysis in terms of his marginal advantage curves with our E-V model.

We are in favour of the utility approach in portfolio selection. In our view it is, however, logically possible to support the utility maxim whilst still accepting the use of the mean and variance as criteria of portfolio selection.

Some of the techniques and practices found on a stock exchange were discussed in chapter IX. These practices and techniques are well-known in America and are frequently used. Some are also used on the Johannesburg Stock Exchange, but on a more limited scale. We are of the opinion that adequate legislation to cover all facets of short selling and manipulation should be introduced.

Individuals should pay special attention to bonus and rights issues. A bonus or rights issue may be either to the advantage or disadvantage of the existing shareholders, depending on the relative price

movements before and after the particular issue. Convertible issues are also of special interest to certain investors. We discussed these issues in chapter X.

In chapter XI we outlined some of the more important considerations pertaining to mergers and take-overs. Mergers and take-overs will affect the relative positions of shareholders. Again mergers and take-overs can be either to the advantage or disadvantage of shareholders, depending on whether their relative position is improved or not afterwards.

The shareholders must consider the type of fusion and the terms of settlement. They will, of course, only sell or agree to the merger or take-over if their expected relative position or prospects after the merger or take-over is effected appears to be better than their present position. Again we must be able to value shares on the bases already discussed.

There are numerous reasons for mergers and take-overs, for example financial economies, marketing economies, production economies, and administrative economies. Niggardly dividend policies may also render a company vulnerable to a take-over. Some of the above-mentioned economies may not be obvious in the short-run, but in the long-run the shareholders may benefit. Mergers and take-overs are an important case of capital regrouping, and resources will be transferred from uses where the productivity is low, to uses where the expected productivity is higher. Mergers and take-overs may also remove some rigidities in the industrial development of a country, and for this reason the economic implications of the pending amendments to the Regulation of Monopolistic Conditions Act should be carefully studied before they are put on the statute book. In principle we are in favour of mergers and take-overs where this is to the benefit of shareholders.

The economic significance and portfolio policies of financial intermediaries and institutions, with special reference to commercial banks, life-assurance offices, pension funds and mutual funds, were discussed in chapter XII. In an industrialised, stock-exchange-equipped community the intermediaries will play an important role in the financing of new investment and economic growth. They convert non-risk capital into risk capital, which is important in the process of finance. In our view a well-developed, efficient financial system is a necessary condition for real economic growth.

Financial intermediaries and institutions possess specialised knowledge and they therefore exert a strong influence on the allocation and re-allocation of scarce financial capital resources. The economic significance of this cannot be over-emphasised.

Collectively the financial intermediaries have some investment principles in common, which we have discussed. They are all subject to legal and liquidity constraints, but in varying degrees. An important consideration is the nature of the liabilities of the institution or intermediary, which we have fully explained.

In our view life-assurance offices and pension funds in South Africa have followed too conservative a financial asset portfolio policy. They hold too large a percentage of their portfolios in fixed-interest securities and too small a percentage in well-selected ordinary shares.

Finally, we feel that it is not an exaggeration to state that an industrialised, market economy cannot really exist without a stock exchange. The stock exchange is the central market for the existing wealth in our society and it also occupies a central position in the financing of productive activity. A great responsibility for our economic future rests upon the efficient functioning of the Johannesburg Stock Exchange. The process of adaptation to changing conditions, and improvements in efficiency is, however, never complete.

The future economic progress of this country depends on two factors, first, the ability and willingness of individuals to save, and secondly, the willingness of individuals to invest their savings in productive assets which will facilitate future production, that is, individuals must be prepared to assume the risks inherent in a dynamic economy where unexpected changes can take place.

In this thesis we were then mainly concerned with the interrelationships between certain economic theories and principles, and the economic phenomena which pertain to the stock exchange. The practical issues involved received scant attention. The stock exchange, however, offers an excellent opportunity for further research, both on the theoretical and empirical fronts.

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