The effect of earnings per share categories on the share prices of the top 40 JSE listed companies

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DECLARATION

I, **N ROBBETZE**, declare that *The effect of earnings per share categories on the share prices of the top 40 JSE listed companies* is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references. This dissertation has not previously been submitted by me or any other author to any other university.

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PROOF OF LANGUAGE EDITING

TAALPRAKTISYN | LANGUAGE PRACTITIONER

28 October 2015

I, Elmarie Viljoen-Massyn, hereby certify that I have language edited the attached MCom (Accountancy) dissertation, *The effect of earnings per share categories on the share prices of the top 40 JSE listed companies*, by Natasha Robbetze.

I am a language practitioner registered at the South African Translators' Institute (member number 1001757) and my highest qualification is an MA Language Practice. Please contact me should there be any queries.

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REMARKS TO THE READER

The reader is reminded of the following:

- The literature included in this dissertation comprised sources ranging from the 1960s to 2015. This not only ensured that the most recent research was taken into account, but also proved that research on the topic of profits and earnings per share has been relevant to researchers and investors for more than 50 years.

- The format and referencing of this dissertation are presented in accordance with the policies of the North-West University (Vaal Triangle Campus). The Harvard referencing method was applied in this study. In accordance with the latest referencing guidelines of the North-West University (2012 version), the first indicated surname is cited, followed by the term *et al.* in cases where the argument of three or more authors is quoted within a text, for example: 'According to Meyer *et al.* (2005:872)…' The North-West University does not require all surnames of three or more authors to be indicated, even when the source is referenced for the first time in the text. For more information on referencing techniques applied in this study, please visit the North-West University's referencing link at http://www.nwu.ac.za/sites/www.nwu.ac.za/files/files/library/documents/verwysings.pdf

- Statistical evidence included in Chapter 4 was reported in accordance with prescriptions by Pallant (2013). This required the statistical results to be rounded to two decimals, with the exception of R square calculations and probability scores, which were rounded to three decimals. Furthermore, results are presented without indication of a zero before a decimal point, for example, r = .65.

- In Chapter 4, two different tables are displayed for the purpose of analysing each paired t-test. These tables are **not** titled independently, but are collectively referred to as, for example, **Tables 4.21:** …

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ABSTRACT

Title: The effect of earnings per share categories on the share prices of the top 40 JSE listed companies

Key words: Diluted earnings per share; earnings per share; headline earnings per share; investment decisions; share price associations; share price behaviour

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Investment decisions can be influenced by different factors, including press coverage of an entity's, recommendations made by advisors, tax consequences of the investment, the financial needs of the investor and published accounting information. Public entities publish annual financial statements, which investors collect and study in order to compare the performance of different entities before making investment decisions.

Earnings per share (EPS) is considered as an important accounting indicator of risk, entity performance and corporate success. It is used to forecast potential growth in future share prices, because changes in EPS are often reflected in share price behaviour. The relationship between EPS and share prices can, ultimately, be attributed to the law of demand. Should investors analyse the EPS of a firm and find it satisfactory, the share of such an entity is acquired. This leads to an increase in the demand for this type of share and, consequently, in the share price.

Companies listed on the Johannesburg Stock Exchange (JSE) are required to publish three different categories of EPS: basic, diluted and headline EPS. It has become apparent that there is no indication as to which category explains share price behaviour best. The study strived to answer the research question: Which category of EPS has the greatest effect, if any, on the share price behaviour of the top 40 JSE listed companies? No previous South African study has attempted to answer this question.

The top 40 JSE listed companies were selected and the relationship between different categories of EPS and share prices was analysed empirically for the period 2005 to 2013. This study demonstrated that basic EPS correlated best with the changing behaviour of

share prices of the top 40 companies. Furthermore, the study established that headline EPS proved to deliver lower correlation coefficients than other EPS categories. This study recommends that basic EPS should, ultimately, be considered by investors and business managers of the top 40 JSE listed companies. Headline EPS proved to be less useful; therefore, it can be posited that the measurement requirements of IAS 33 are sufficient in excluding headline EPS from its measurements.

Limitations of the study included that the sample was limited to the top 40 JSE listed companies and that findings cannot be generalised. Furthermore, multicollinearity was present among independent variables, which eliminated the possibility of prediction modelling. Despite these limitations, the study was able to fulfil its primary objective by indicating that basic EPS and stock prices share the greatest interdependence.

OPSOMMING

Titel: Die effek van die verdienste per aandeel kategorieë op die aandeelpryse van die top 40 JSE-genoteerde maatskappye

Sleutelterme: Verwaterde verdienste per aandeel; verdienste per aandeel; wesensverdienste per aandeel; beleggingsbesluite; aandeelprys assosiasies; aandeelprys gedrag

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Beleggingsbesluite kan deur verskillende faktore beïnvloed word, insluitend die media dekking wat 'n entiteit kry, aanbevelings wat deur adviseurs gemaak word, belasting gevolge van die belegging, die finansiële behoeftes van die belegger en gepubliseerde rekeningkundige inligting. Publieke entiteite publiseer hul finansiële state jaarliks. Beleggers versamel finansiële state en bestudeer die syfers om die prestasie van verskillende entiteite te vergelyk, voordat beleggingsbesluite geneem word.

Verdienste per aandeel (VPA) word as 'n belangrike rekeningkundige aanduiding van risiko, entiteitsprestasie en korporatiewe sukses geag. Dit word gebruik om potensiële groei in toekomstige aandeelpryse te voorspel, omdat veranderinge in VPA dikwels in aandeelprysgedrag weerspieël word. Die verhouding tussen VPA en aandeelpryse kan toegeskryf word aan die wet van vraag. Indien beleggers die VPA van 'n entiteit analiseer en dit bevredigend vind, sal die aandeel van so 'n entiteit verkry word. Dit lei tot 'n toename in die vraag na hierdie tipe aandeel en gevolglik ook in die aandeelprys.

Daar word van maatskappye wat op die Johannesburgse Effektebeurs (JSE) genoteer is verwag om drie verskillende kategorieë van verdienste per aandeel (VPA) te publiseer: basiese-, verwaterde- en wesensverdienste per aandeel. Dit het aan die lig gekom dat daar geen aanduiding bestaan van watter kategorie die gedrag van aandeelpryse die beste kan verduidelik nie. Die studie poog om die volgende navorsingsvraag te beantwoord: "Watter kategorie van VPA het die grootste effek, indien enige, op die

aandeelprys gedrag van die top 40 JSE-genoteerde maatskappye?" Geen vorige Suid-Afrikaanse studie het gepoog om hierdie vraag te beantwoord nie.

Die top 40 JSE-genoteerde maatskappye is as steekproef geselekteer en die verhouding tussen die verskillende kategorieë van VPA en aandeelpryse is empiries ontleed vir die tydperk 2005 tot 2013. Hierdie studie het bevind dat basiese VPA die beste korreleer met die veranderende gedrag van aandeelpryse van die top 40 maatskappye. Verder is vasgestel dat die wesensverdienste per aandeel laer korrelasiekoëffisiënte as ander VPA kategorieë oplewer. Die studie beveel aan dat basiese VPA uiteindelik deur beleggers en bestuurders van die top 40 JSE-genoteerde maatskappye oorweeg moet word. Wesensverdienste per aandeel blyk om minder nuttig te wees, en daarom kan dit gestel word dat IAS 33 se metingsvereistes voldoende is, ten spyte van sy weglating van wesensverdienste per aandeel as maatstaaf.

Beperkings van die studie het ingesluit dat die steekproef tot die top 40 JSE-genoteerde maatskappye beperk was en dat bevindinge nie veralgemeen kan word nie. Verder was multikollineariteit tussen onafhanklike veranderlikes teenwoordig, wat die moontlikheid van voorspellingsmodellering uitgeskakel het. Ten spyte van hierdie beperkings, het die studie in sy primêre doel geslaag deur aan te dui dat basiese VPA en aandeelpryse die grootste interafhanklikheid deel.

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LIST OF ABBREVIATIONS

EC	European Commission
EFRAG	European Financial Reporting Advisory Group
EPS	Earnings per share
FAS	Financial Accounting Standard
FASB	Financial Accounting Standard Board
FDI	Foreign direct investment
IAS	International Accounting Standard
IASB	International Accounting Standard Board
IFRS	International Financial Reporting Standard
JSE	Johannesburg Stock Exchange
M	mean score
n	number of statistical observations
p	probability score
par.	paragraph
PwC	PricewaterhouseCoopers
r	Pearson product moment coefficient
ROA	Return on assets
ROCE	Return on capital employed
ROE	Return on equity
SAICA	South African Institute of Charted Accountants
SE	standard error of the mean
SFAS	Statement of Financial Accounting Standard
SPSS	Statistical Package for the Social Sciences
USA	United States of America

CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE STUDY

"Sometimes it takes longer to create value, but if the companies generate more earnings, the stocks will ultimately reflect that." – Nelson Peltz

1.1   INTRODUCTION TO THE STUDY

A set of financial statements has several purposes, such as providing comparable, verifiable, timely and understandable economic information (Oberholster *et al.,* 2011:11). Among these, the primary purpose is to inform investors and potential investors about the activities, profitability and financial position of an entity for a specific period (Adams & Media, 2014:1). Investors collect copies of annual financial statements and compare the results and numbers to those of other companies in order to predict which entity would render the best return on the investment (Adams & Media, 2014:1; Moles *et al*., 2011:113).

The Oxford English Dictionary (2014) defined the term 'investor' as 'any person or organisation that has money invested in a specific venture'. Lovell (2010:1) argued that investors provide money to support an idea or project with the expectation of earning a return, while Legum (2005:4) suggested simply that an investor is a party that makes an investment. From these interpretations, it can be reasoned that an investor is any party that makes an investment by providing money to a venture with the expectation of earning a return.

According to conventional financial theories regarding portfolio management, investors base investment decisions on the rationale of risk and return considerations (Brigham & Ehrhardt, 2007:128; Correia *et al.,* 2011:3-27; Jagongo & Mutswenje, 2014:92). The Merriam Webster Online Dictionary (2015a) defined 'risk' as 'the chance that an investment will lose value,' while Reynders *et al.* (1984:248) described 'risk' as any deviation between expected and actual results which leads to the occurrence of a loss. Correia *et al.* (2011:3-3) reasoned that a risk is any possibility of loss that results from a given action. In summary, it can be posited that the term 'risk' refers to any possible loss

that can occur when expected results are not achieved. There is a direct relationship between risk and return – when risk is higher, the investor will expect a higher return to compensate for the absorption of high risk and possible loss (Moles *et al.,* 2011:244; Reynders *et al.,* 1984:249). Rational investors would avoid abnormally high risk in order to shield investments against losses (Jagongo & Mutswenje, 2014:95).

Blume and Friend (1978:98) were of the opinion that volatile earnings are a primary indication of risk to the investor. Minton *et al.* (2002:198) support this view by arguing that investors prefer to invest in entities that have less volatile earnings, because the forecasting of such earnings is simpler and the investment appears less risky. Investors are concerned with future yields and use historical financial information to predict future returns (Baker & Haslam, 1973:64), because historical results and past trends provide clues regarding future potential (Hinman, 2014:17). Investors analyse financial information and invest in entities that are able to provide growth (May, 1968:113). A significant benchmark in quantifying such growth is to measure the EPS trends of the entity (May, 1968:113). Smart and Graham (2012:159) concur by suggesting that a entity's growth rate is determined by performance indicators such as earnings. May (1968:113) argued that an entity could influence its own EPS and identified two methods through which EPS can be increased:

- Growth can be generated internally by using the capital structure of the entity, because increases in debt financing can result in tax savings without necessitating the issuance of more ordinary shares; and
- Growth can be generated externally through acquisitions and mergers, where growth is created by means of combined resources that would not otherwise have been available.

From the arguments of May (1968:113) and Smart and Graham (2012:159), it is evident that growth rates in historical earnings can be used to establish possible future increases in growth potential. It is argued that EPS plays a significant role in the investment decisions taken by investors, because EPS trends can be used to measure risk and performance.

In addition, it is important to study the relationship between EPS and the share price of stock. Brigham and Ehrhardt (2007:13) posited that EPS signals prospects to investors. EPS is an indication of shareholder's wealth and, should EPS increase, increases in the value of the share will be expected (Mkhonza, 2007:43). It would seem that EPS is one of the most important variables that drive share price changes (Ahmed, 2006:1).

Furthermore, share prices are often influenced by supply and demand (Parker & Media, 2014:1). If there are more shares available than investors are willing to take up, the share price will decrease (Parker & Media, 2014:1). If there are fewer shares available than investor demand, the share price will increase (Parker & Media, 2014:1). It is, therefore, evident that investment decisions influence the demand for shares and that share prices increase when the demand rises. Balsam and Lipka (1998:235) argued that earnings explain share price behaviour of stock, because the relationship between accounting earnings and share prices have been extensively studied. Chang *et al.* (2008:10) concur by explaining that EPS influences share prices in the long run. However, limited local studies have been conducted to determine which category of EPS best explains the behaviour of share prices. The following figure is a simplified explanation of the above discussion:

Figure 1.1: The effect of EPS on investment decisions and share prices
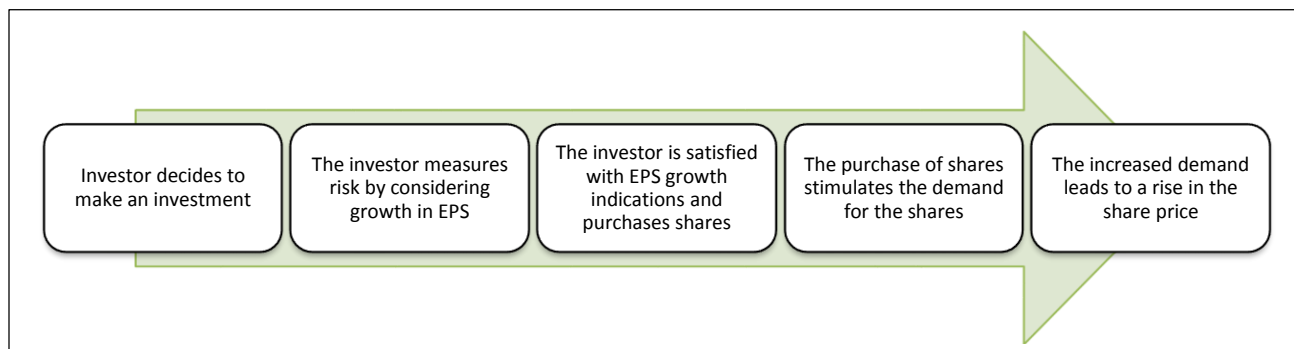
Source: Own research

Figure 1.1 indicates that the investor, firstly, decides to make an investment and thereafter evaluates growth in EPS of different entities to measure risk before deciding which entity's shares to acquire. Subsequently, shares are purchased. When several investors purchase shares of the same entity, the demand for the type of share is stimulated; this leads to growth in the share price of such a share.

In the paragraphs to follow (par. 1.1.1, 1.1.1.1, 1.1.1.2 and 1.1.1.3), the concept of 'earnings per share' will be investigated and the different categories of EPS will be identified and discussed in detail.

1.1.1 The concept of earnings per share

According to the International Accounting Standard (IAS) 33: *Earnings per share*, an entity that trades equity instruments on public markets is required to disclose EPS as part of its financial statements (BDO, 2014:1; IFRS, 2014a:A1189). Non-public entities can also chose to disclose its EPS voluntarily, but they are not required to do so (BDO, 2014:1).

EPS is a calculation that allocates a company's profits to each of its ordinary shares (Vaidya, 2014:1). It serves as an indication of profitability by measuring the entity's performance in relation to share capital that is employed to generate such returns (Koppeschaar *et al.,* 2013:600)*.* EPS has become a useful investment decision tool for investors, because it indicates future prospects and growth (Mlonzi *et al.,* 2011:144). For the purpose of measuring EPS, IAS 33 has made provision for three categories of EPS, namely basic EPS, diluted EPS and headline EPS (BDO, 2014:1). An overview of each of these types of EPS follows next.

1.1.1.1 Basic EPS

Basic EPS is the simplest form of EPS (Vaidya, 2014:1). For the purpose of calculating basic EPS, profit or loss attributable to the holding entity must be adjusted for after-tax amounts of preference dividends (IFRS, 2014a:A1191). Basic EPS divides the actual earnings after preference shares by the weighted average number of ordinary shares (Dunn, 2010:136).

In accordance with IAS 33.9, the basic EPS must further be divided into two different basic EPS amounts: the total basic EPS and the basic EPS arising from continued operations (Kennon, 2014:1). Basic EPS must be disclosed on the face of the Statement of Profit or Loss and Other Comprehensive Income (BDO, 2014:1).

It is submitted that basic EPS is the simplest form of EPS, which is calculated by dividing earnings after preference shares by the weighted average number of shares. Basic EPS

is applicable to all possible capital structures and disclosed as part of the Statement of Profit or Loss and Other Comprehensive Income.

1.1.1.2 Diluted EPS

Diluted EPS is more complex than basic EPS (Kennon, 2014:1). Diluted EPS expresses the EPS that an entity would generate if all warrants, convertibles and options have been exercised, causing the total ordinary share capacity to increase (Koppeschaar *et al.,* 2013:618). In calculating diluted EPS, the total basic earnings are adjusted for any after-tax savings that would arise when convertible instruments are exchanged for ordinary shares before it is divided by the increased number of ordinary shares (BDO, 2014:1). Increases in the quantity of ordinary shares typically result in a lower and, thus, diluted EPS (Kennon, 2014:1).

Diluted EPS must also be divided into two different diluted EPS amounts: diluted EPS from continued operations and total diluted EPS (Kennon, 2014:1). Furthermore, the diluted EPS of an entity must be disclosed on the face of the Statement of Profit or Loss and Other Comprehensive Income (BDO, 2014:1).

It is submitted that diluted EPS can be calculated when an entity has issued convertible preference shares, convertible debentures, options, warrants and contingently issuable shares. These instruments lead to a potentially higher number of ordinary shares and cause an increase in the weighted average number of shares. Earnings after preferences shares are adapted for after-tax savings and divided by this higher number of shares. This leads to a diluted EPS figure.

1.1.1.3 Headline EPS

For companies listed on the JSE, publishing headline EPS is a listing requirement (SAICA, 2013:4). Headline EPS is calculated by excluding separately identifiable re-measurements from the earnings of the entity (Steenkamp, 2013:1).

The headline earnings can be calculated by using the basic earnings and adding back or deducting any items that are excluded from headline EPS (Steenkamp, 2013:1). Headline earnings are divided by the weighted average number of shares in order to calculate headline EPS (Bragg, 2013:1). Diluted headline EPS is also calculated by dividing

headline earnings, adjusted for any after-tax savings that would arise when convertible instruments are exchanged for ordinary shares, by the weighted number of ordinary shares, adjusted for any potential ordinary shares that might be issued (Bragg, 2013).

Headline EPS is often used by investors for comparative purposes and provides a single earnings number that describes the performance of the entity (SAICA, 2013:9). The above information (par. 1.1.1.1, 1.1.1.2 and 1.1.1.3) can be summarised as follows:

Figure 1.2: The interrelation among the categories of EPS
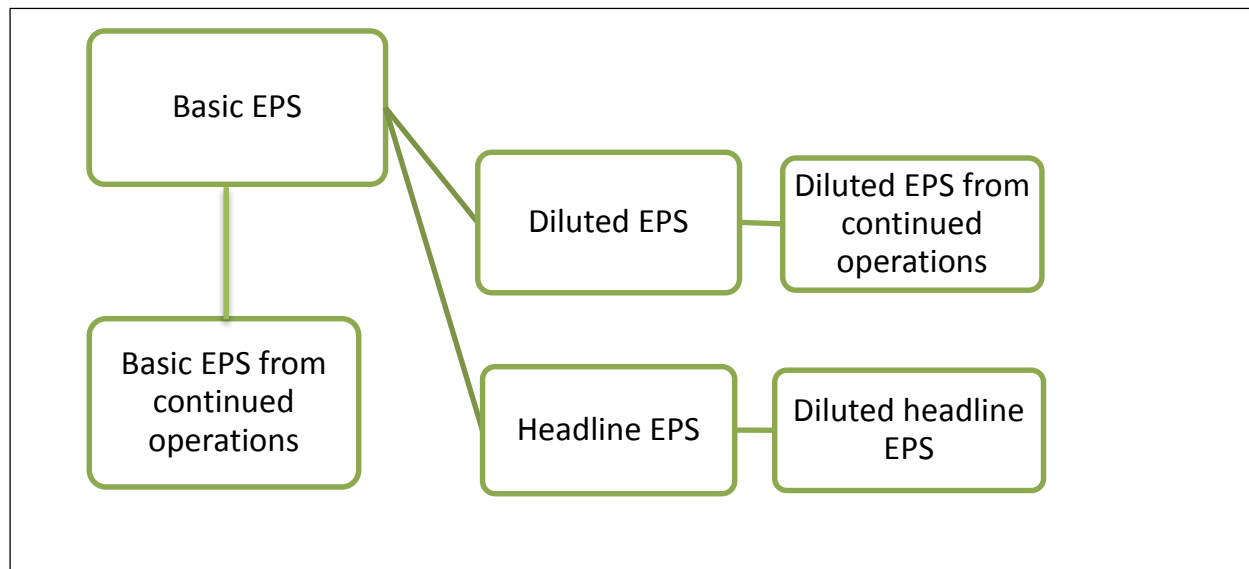
Source: Own research

1.2   MOTIVATION OF TOPIC ACTUALITY

Investors consider EPS as a meaningful measure of an entity's performance (Menaje, 2012:98; Stainbank & Harrod, 2007:91). Thus, EPS fulfils an important role in the investment decisions taken by investors, because it is an indication of risk (Minton *et al.*, 2002:198; Moles *et al.*, 2011:244). There are three categories of EPS (SAICA, 2013:4), but it is unclear from the literature which category has the greatest effect on share price behaviour.

Internationally, studies have focused on EPS, its effect on share prices, as well as the correlation among the different categories of EPS and share price behaviour. Among these, some of the most regularly cited studies are: Balsam and Lipka (1998), Nichols

and Wahlen (2004), Chang *et al.* (2008) and Menaje (2012). Table 1.1 indicates the purpose and results of each of these studies.

Table 1.1: The purpose and results of international studies

Researcher(s)	Purpose of the study	Results
Balsam and Lipka (1998)	To determine the category of EPS (that is basic, primary and diluted EPS) that best describes share price behaviour.	Diluted EPS correlated best with share price behaviour.
Nichols and Wahlen (2004)	To measure whether cash flow from operations or earnings could correlate best with share prices.	Earnings correlated better with share prices than cash flows could.
Chang *et al.* (2008)	To measure the relationship between EPS and share prices.	Share prices moved in the same direction as earnings in the long run.
Menaje (2012)	To determine whether EPS or return on assets (ROA) impact on share prices.	EPS could have a greater impact on share prices than ROA.

Source: Researchers listed above

Evidently, only one of these international studies considered the impact of different categories of EPS on share price behaviour.

In South Africa, regularly cited studies such as Auret and De Villiers (2000), De Villiers *et al.* (2003), De Wet and Du Toit (2007) and Erasmus (2010) have studied the topic of EPS. Table 1.2 summarises the purpose and results of these studies.

Table 1.2: The purpose and results of local studies

Researcher(s)	Purpose	Results
Auret and De Villiers (2000)	To determine whether dividends per share or EPS could better relate to share price behaviour.	EPS was able to correlate best with share price changes.
De Villiers *et al.* (2003)	To measure whether cash flow per share or EPS could best predict share price behaviour.	EPS was able to correlate best with share prices.
De Wet and Du Toit (2007)	To identify performance indicators that influence share price behaviour.	No selected performance indicator was able to associate with share price behaviour.
Erasmus (2010)	To determine whether dividends per share, EPS or cash flow per share would best correlate with share prices.	Both dividends per share and EPS were able to correlate with share prices.

Source: Researchers listed above

From Table 1.2, it is apparent that none of these local studies considered the category of EPS that affects share prices most. It is submitted that such research must be applied in the South African context, because it could assist investors in identifying accounting information that is able to associate with share price behaviour.

Should investors be persuaded that one category of EPS is more indicative of possible share price growth, it could be important for an entity to acknowledge and manage this type of EPS, because capital structures of the entity can influence EPS (May, 1968:113).

It is evident that, should investors, for example, rely on diluted EPS when making investment decisions, the entity would want to avoid the issuance of convertible debt instruments that could lead to a lower diluted EPS, as was noted in par. 1.1.1.2. In doing so, the entity would be able to shield its share price against declines.

Lastly, the usefulness of the quantity of EPS published can be questioned. Both IAS 33 and JSE listing requirements require three categories of EPS to be published, but if, for example, only two categories of EPS are really useful to the investor, it might be argued that only those categories should be published. This argument is supported by DeBerg and Murdoch (1994:260), who suggested that a category of EPS may be eliminated if it is not potentially useful to the investor. No research attention has been paid to this since then.

1.3   PROBLEM STATEMENT AND RESEARCH QUESTION

Investors rely on financial information when making investment decisions. Investors compare financial information of different entities in order to determine which entity would render the best possible return (Adams & Media, 2014:1). Investment returns are linked to risk, and EPS is often used as an indication of such risk (Blume & Friend, 1978:98; Minton *et al.,* 2002:198). Therefore, EPS is employed by investors as an instrument to support investment decisions (May, 1968:113) by attempting to predict possible future returns (Baker & Haslam, 1973:64; Hinman, 2014:17).

Entities listed on the JSE are required to publish three categories of EPS: basic EPS (IFRS, 2014a:A1191), diluted EPS (IFRS, 2014a:A1195) and headline EPS (SAICA, 2013:4). An international study has been performed to determine which category of EPS is most useful in forecasting possible future growth (Balsam & Lipka, 1998:235), while limited studies regarding EPS have been performed in South Africa, as was discussed in the motivation for the study in par. 1.2. As a result of limited local research, the following question arises:

Which category of EPS would have the greatest effect on share prices and should, ultimately, be considered when making investment decisions in South Africa specifically? No previous local studies answering this question were identified in the literature. Thus, there exists no indication as to which EPS category should enjoy preference when making

investment decisions in a South African context. The research question can, therefore, be formulated as follows:

Which category of EPS has the greatest effect, if any, on the share price behaviour of the top 40 JSE listed companies?

1.4   OBJECTIVES OF THE STUDY

The study was conducted to determine which category of EPS has the greatest effect on share prices. The relationship between the categories of EPS and share prices was investigated in order to answer the research question. The results of this study will indicate to the investor which category of EPS can best be associated with share price behaviour.

The following objectives were formulated for the study:

1.4.1 Primary objective

In an attempt to answer the research question (par. 1.3), the primary objective of the study was to determine which category of EPS (basic EPS, diluted EPS or headline EPS) is best associated with share prices of the top 40 JSE listed companies.

1.4.2 Secondary objectives

In order to achieve the primary objective, the following theoretical and empirical objectives were formulated for the study:

1.4.2.1   Theoretical objectives

1. To determine the economic importance of making investments;
2. To investigate the accounting factors that investors contemplate when making investment decisions;
3. To summarise previous studies published on the topic and evaluate the results thereof in order to highlight the importance of EPS figures;
4. To explore IAS 33 and headline EPS; and
5. To identify the research design and methodology to be applied in this study.

1.4.2.2 Empirical objectives

6. To determine which category of EPS (basic EPS, diluted EPS or headline EPS) correlates best and least with the changing behaviour of share prices on the JSE from 2005 to 2013;

7. To make recommendations towards which category of EPS, or combination thereof, investors should, ultimately, consider when making an investment decision; and

8. To make recommendations towards the category of EPS that is least useful to investors.

1.5 RESEARCH DESIGN AND METHODOLOGY

The study comprised a literature review and an empirical study. The study commenced with the literature review in order to fulfil the theoretical objectives 1 to 5. For the purpose of fulfilling empirical objectives 6 to 8, quantitative research methods were applied. Numerical data were collected and analysed to assess the relationship and interaction among variables (that is the categories of EPS and share prices). The findings from the analysis will be demonstrated statistically.

1.5.1 Literature review

The literature sources consulted in this study were publicly available and consisted of:

- Electronic articles;
- Newspaper articles;
- Electronic books;
- Published books; and
- Published theses and dissertations.

1.5.2 Empirical study

The empirical portion of this study comprised the following methodology dimensions:

1.5.2.1 Target population

Because earnings can explain share price behaviour (Balsam & Lipka, 1998:235; Chang *et al.,* 2008:10), the study focused on determining the category of EPS that is most reliable

in correlating with growth in share prices in an attempt to answer the research question stated earlier.

The target population of this study was the top 40 JSE listed companies, because these companies are required to publish three different categories of EPS, while their market capitalisations are high, reputations impeccable and information easily accessible.

1.5.2.2 Sample method

For the purpose of this study, non-probability sampling was applied. Non-probability sampling is a sample of which the selection probability is unknown (Bless *et al.,* 2006:106). There are four basic types of non-probability sampling: convenience sampling, snowball sampling, quota sampling and focus groups (Bless *et al.,* 2006:105-107). This study applied convenience sampling. Convenience sampling refers to a sample which is limited to a part of the population that is easily accessible (Greener, 2011:65-67).

1.5.2.3 Sample size

The sample of the study comprised the top 40 JSE listed companies in South Africa. The sample size was selected due to convenience and accessibility, as well as the fact that these companies have the 40 highest market capitalisation rates in South Africa. These top 40 entities have already successfully been used in South African studies such as Barac and Moloi (2010) and De Villiers (2012). Consequently, the sample size was also equal to the population of the study, as noted in par. 4.2.1, which can contribute to worthy research findings, because the entire population was investigated as part of the research sample.

1.5.2.4 Measuring instrument and data collection method

The study intended to gather data regarding EPS categories and share prices of the top 40 JSE listed companies by investigating correlations among these variables.

Financial information was analysed for a period of nine years – 2005 to 2013. This period was selected because IAS 33, as currently applied by entities, only became effective as from 1 January 2005 (BDO, 2014:1). Information pertaining to the different categories of EPS was, therefore, analysed from this date up to the date of the latest accessible financial reports (that is 2013). Section 30 of the Companies Act (71 of 2008) requires

entities to publish financial reports within six months after year-end. For this reason, information pertaining to the 2014 year-end was not available for all companies at the time the research was conducted. Consequently, information until the 2013 year-end was analysed.

Three different share prices were selected in measuring statistical relationships: the share price 20 days before the publication of EPS, on the day of publishing, and 20 days after publication. This method of share price selection has been applied successfully by Chabalala (2014). Furthermore, the approach is supported by Morse *et al.* (2011:266), who argued that a short event window can measure the impact of a new event on investment behaviour, while Swart and Hoffman (2013:32) posited that investors react to earnings announcements between 20 and 40 days after proclamation has taken place.

1.5.2.5 Statistical analysis

The study was based on secondary data and focused on the collection and analysis of information relating to the EPS and share prices of the top 40 listed companies on the JSE.

Secondary data were collected by means of analysing published annual financial statements. During the research process, the researcher made use of BMI SPSS Statistics Software (Version 22.0 for Windows), the Sens (2015) database and the McGregor BFA (2015) database.

The following statistical methods were applied on the empirical data sets:

1. Correlation modelling; and
2. Paired t-testing.

1.6   ETHICAL CONSIDERATIONS

Information was obtained by means of secondary sources. Therefore, the information is considered to be public knowledge. The ethical considerations relevant to the study are discussed in more detail in Chapter 3, par. 3.2.3.6.

1.7   CHAPTER LAYOUT

The study consists of five chapters:

Chapter 1: Introduction and background to the study

This chapter indicates that EPS has an influence on investment decisions and share prices of stock. Furthermore, Chapter 1 identifies the different categories of EPS and outlines that limited previous local research has been performed in order to determine which category of EPS is most useful in associating with share prices. The lack of previous local research formed the motivation for the study to be performed and laid a platform on which the problem statement of this study was based. The research methodology is described briefly, followed by the chapter overview of the study.

Chapter 2: Investments and earnings per share – a review of literature

This chapter addresses theoretical research objectives 1 to 4. It also provides a detailed overview of why investments are of importance to an economy and investigates the accounting factors that investors should consider when making investment decisions. It indicates that EPS is a vital consideration for investors, which is supported by the outcomes of previous similar studies. Furthermore, it explores IAS 33 and the importance of headline EPS. Lastly, it emphasises that EPS categories were applied in order to achieve empirical objectives.

Chapter 3: Research design and methodology

This chapter describes how statistical information was gathered, organised and analysed. It provides a detailed synopsis of the research question, research design, and research methodology. It discusses the type of research that was performed, the population of the study, the sample and sampling method, how data were collected and analysed, the reliability and validity of data, and the ethical considerations.

The purpose of the chapter is to identify the research design and methodology that were followed to achieve the theoretical research objective 5.

Chapter 4: Empirical research findings

Chapter 4 contains a detailed evaluation of the results from the empirical study, as well as the impact of the results on investment decision making. This chapter addresses empirical research objectives 6 to 7.

Chapter 5: Conclusion and recommendations

Chapter 5 provides a summary of the study, makes relevant recommendations and concludes on research objectives 1 to 8. It recommends that basic EPS should, ultimately, be considered by investors and managers of the top 40 JSE listed companies. It also indicates that headline EPS is least useful to investors.

1.8   CHAPTER SUMMARY

The main objective of this chapter was to indicate that EPS has an influence on share prices. It was established that investors consider EPS as an indicator of possible risk, growth and performance of an entity. Should investors be satisfied with the EPS trends of a company, they would purchase the shares of such an entity. If several investors act accordingly, share prices will increase due to the law of demand.

Listed companies in South Africa are obligated to publish three different categories of EPS. In studying the latter, it has become apparent that EPS is able to influence share prices, but that there exists uncertainty regarding which category has the greatest effect on share price behaviour.

Researchers, both locally and internationally, have studied the relationship between EPS and share prices. Limited South African research has been performed to determine which category of EPS correlates best with share prices. Consequently, this study attempted to answer the research question: 'Which category of EPS has the greatest effect, if any, on the share price behaviour of the top 40 JSE listed companies?'

In applying the research methodology set out in par. 1.5, a literature review and empirical study were conducted in order to identify findings that answer the research question.

Chapter 2 will highlight the economic importance of investments, identify key accounting indicators that are significant to the investor, study the applicable accounting standard

(IAS 33), investigate the practicality of headline EPS and summarise similar previous studies. Therefore, the next chapter will consist of a literature review which addresses the theoretical objectives 1 to 4, set out in par. 1.4.2.1.

CHAPTER 2

INVESTMENTS AND EARNINGS PER SHARE –
A REVIEW OF LITERATURE

"If you aren't thinking about owning a stock for ten years, don't think about owning it for ten minutes." – Warren Buffett

2.1   INTRODUCTION

It is a known fact that investments are the driving force behind economic prosperity (Istrate, 2011:1353). Investing is of importance because it drives economic growth (Papola, 2013:1) and enables investors to earn investment returns (Stonier & Hague, 1972:486). The purchasing of shares is often referred to as an 'investment' (InvestorGuide, 2013:1). The Macmillan Dictionary (2015a) defines the word 'investment' as 'money used in a way to earn more money'. Akrani (2011:1) argued that investment takes place when financial assets (such as shares and bonds) are purchased, while Hassett (2008:1) suggested that the decision to purchase a share is considered to be an investment. From these arguments, it can be posited that investment takes place when financial assets are purchased with the intention of earning a future gain.

When making investment decisions, EPS is a key consideration (Bogdan & Balaciu, 2007:129), because it assists the investor in predicting future returns (Hinman, 2014:17). As mentioned previously (par. 1.1.1), there are three categories of EPS: basic, diluted and headline EPS (BDO, 2014:1). Basic and diluted EPS are regulated by IAS 33, while headline EPS is a JSE listing requirement (SAICA, 2013:4).

EPS is one of the most widely used accounting statistics (Meigs *et al.*, 1977:594), because it is a key measure of the attractiveness of an entity's shares (Moles *et al.,* 2011:332). It also provides a link between accounting information and the market's estimation of share value (Moles *et al.,* 2011:332). In Chapter 1, it was established that EPS fulfils a key role in investment decision making. It has become evident that investing and EPS are related, because changes in EPS can influence investment potential and share value, according to researchers such as Ahmed (2006:1) and Mkhonza (2007:43).

This chapter will commence with an investigation of the economic importance of investments. Thereafter, it will be determined how investors make investment decisions by considering essential accounting factors, one of which is EPS. Similar previous studies will be analysed in order to highlight the importance of EPS, and IAS 33 – the standard which regulates this accounting indicator (as noted in Chapter 1, par. 1.1.1) – will be investigated. Because headline EPS falls outside the scope of IAS 33, it will be studied independently. Consequently, the main purpose of this chapter is to address secondary research objectives 1 to 4, as discussed in Chapter 1, par. 1.4.2.1. Figure 2.1 below indicates how each main paragraph is linked to the secondary objectives.

Figure 2.1: Links between main paragraphs and secondary objectives
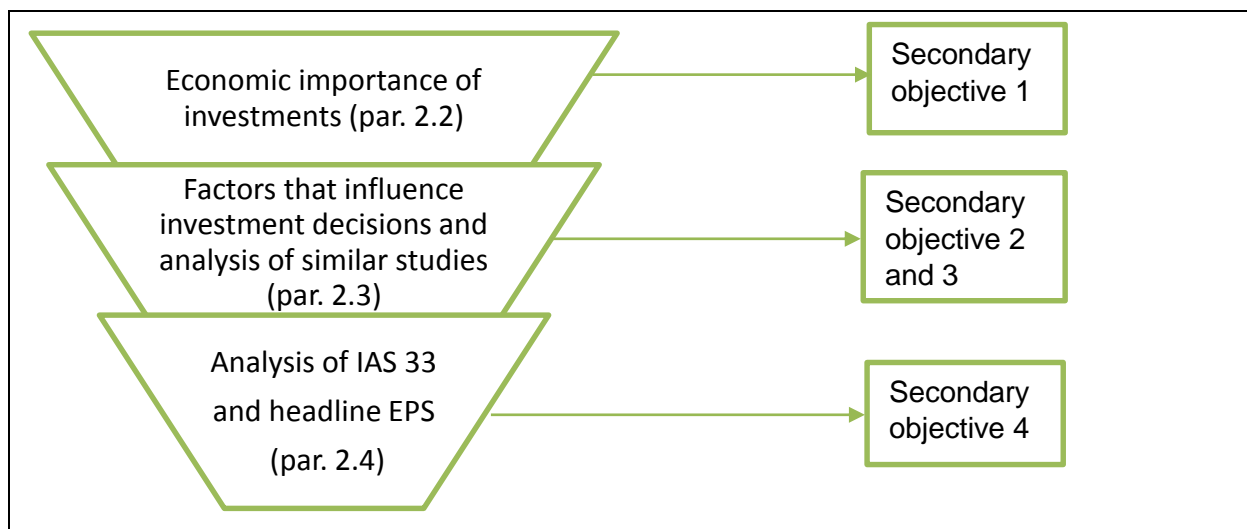
Source: Own research

In accordance with Figure 2.1, par. 2.2 to follow begins with an explanation of the economic importance of investments.

2.2   THE ECONOMIC IMPORTANCE OF INVESTMENTS

Investment decision making is a complex process (Li & Tsang, 1999:1), because it can be influenced by many factors, including a firm's reputation, annual reports, index returns and tax consequences of returns (Nagy & Obenberger, 1994:65). To contribute merit to this dissertation, it was important to determine why investors should be motivated to invest and, consequently, be aware of the category of EPS which affects the value of

their investments most. Subsequently, it will be indicated that investing should take place because it is to the advantage of both the investor and the economy.

2.2.1 The role of investments in general economic wealth

Rynn (2011:1) argued that manufacturing is a significant cause of economic growth in an economy. Washington (2011:1) contributes to this view by suggesting that production leads to greater outputs and employment. Production can, however, not take place without capital expenditure.

Capital expenditure refers to the purchase of new ventures, factories, plant and machinery or the development of existing ones (Stonier & Hague, 1972:485). Capital expenditure is financed through issuance of new shares or new debt instruments (Stonier & Hague, 1972:485). According to Baumol and Blinder (1985:656), investment ensures that production takes place. The investor starts the investment process by providing funds to the entity, after which the entity uses the funds to purchase necessary inputs such as labour, machinery, land and other resources. These inputs result in profit making (Baumol & Blinder, 1985:657). But the entity must also incur a 'cost of investment,' because the investor is expecting a return in the form of dividends or interest (Stonier & Hague, 1972:486). From the previous discussion, an investment process can be constructed as illustrated in Figure 2.2.

Figure 2.2: The investment process
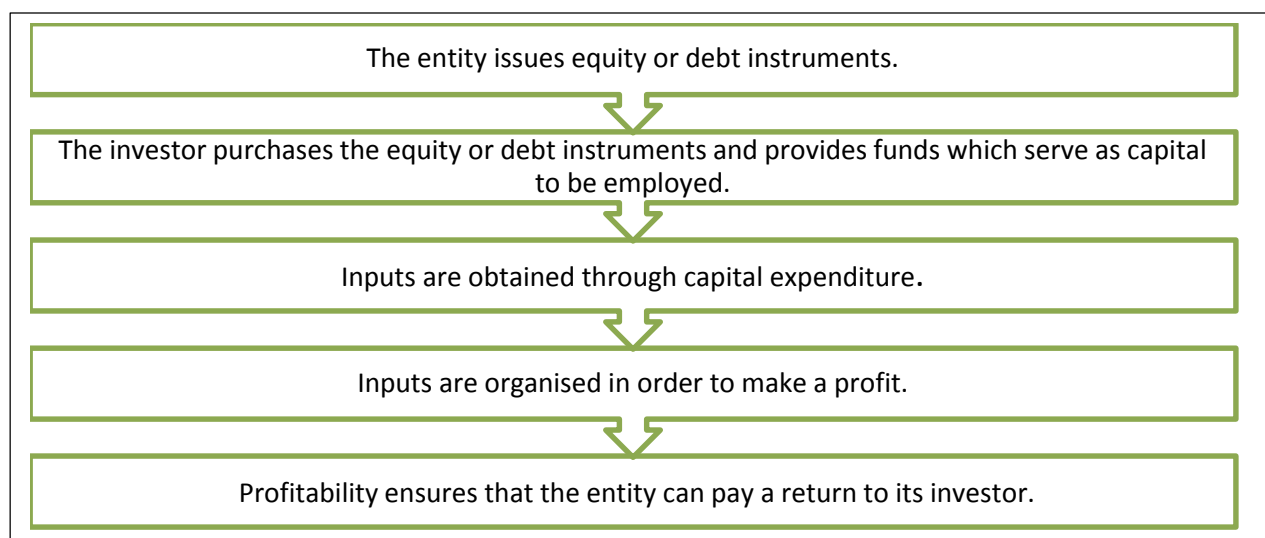
Source: Own research

Figure 2.2 indicates that an investor provides capital to an entity by purchasing the debt or equity instruments thereof. Such capital is used to incur capital expenditure by purchasing inputs. These inputs are organised to earn profits. When profits are made, returns are paid to the investor.

Chung *et al.* (1998:56) explored the impact of corporate capital expenditure on share prices and found that the announcement of capital expenditure had a positive effect on share prices. In a South African study, Bhana (2008:61) analysed 378 cases of capital expenditure between 1995 and 2004. Information related to capital expenditure was impounded in the share prices three days before public announcements were made and it seemed that positive reaction to capital expenditure was a consequence of the belief that capital expenditure creates shareholder wealth (Bhana, 2008:61). From these findings, it can be posited that investors are concerned not only about current returns they receive on their investment, but also about the ability of the entity to provide for future shareholder wealth maximisation by making provision for advancement. The Business Dictionary (2015a) defines 'wealth maximisation' as 'a process that increases the current net value of business or shareholder capital gains with the objective of bringing the highest possible return'. Correia *et al.* (2011:1-12) reasoned that wealth maximisation is measured through increases in share prices. Brigham and Ehrhardt (2007:7) also explained that wealth maximisation, ultimately, means that market prices of shares are maximised. From these interpretations, it can be argued that 'wealth maximisation' takes place when the prices of shares increase, resulting in a gain for the investor. Apart from the advantages to the individual investor, it must also be determined how an entire economy can benefit from investing activities.

Investments are regarded as an incentive to economic activity, because they enable profitable business to be carried on, resulting in an increased demand for goods and services, job creation and material progress of society (Istrate, 2011:1353). Economic growth and development depend essentially on a country's ability to invest and use resources productively (Bayraktar, 2003:64). A positive correlation between investment rates and economic growth has indicated that investment can generate greater employment, reduce poverty and ensure better living standards (Agrawal, 2000:2). Singh

(2013:1) reasoned that investments lead to increases in income, because increased investment is followed by greater production, employment and, ultimately, higher national income. Investments are financed through savings (Bayraktar, 2003:65). Higher savings lead to more investing, and it appears that savings are desirable for improving a country's welfare (Agrawal, 2000:2). Therefore, investments and savings drive economic growth (Papola, 2013:1).This discussion on how investments and savings can contribute to a growing economy is summarised in the following diagram:

Figure 2.3: How investments stimulate economic processes

Investments are made.
Increases in production can occur.
More employment opportunities become available.
Outputs are increased.
More income is earned and more taxation becomes payble.
Consumer spending increases and potential for saving is shaped.
Savings can be reinvested.

Source: Own research

Figure 2.3 indicates that investing must take place first and foremost. When capital becomes available, production can be increased and more individuals can be employed. As production rises, outputs escalate. When outputs are increased, more income can be earned and more tax will be paid. When individuals earn larger incomes, consumer expenditure is higher and consumers can also afford to save money. In turn, savings will lead to more investment possibilities. Evidently, investments are advantageous to both the investor, who earns a return, and the economy as a whole.

From Figure 2.3, it is also apparent that investments, ultimately, lead to more income and possible savings. From these principles, John Maynard Keynes, a prominent economist, developed an Investment Multiplier in the 1930s (Chand, 2015:1). Keynes believed that increased investment leads to higher national income (Singh, 2013:1). Keynes developed a mathematical tool to establish the relationship between income and investment (Davar, 2012:3).

The Investment Multiplier is expressed algebraically. It explains how many times income will increase as a result of increased investments (Chand, 2015:1). The multiplier (K) is a ratio that indicates increases in income (Y) due to increases in investment (I) (Singh, 2013:1). The multiplier can mathematically be expressed as follows:

Figure 2.4: The Investment Multiplier

$$K = \frac{Change\ in\ Y}{Change\ in\ I}$$

Source: Singh (2013:1)

Keynes's version of the multiplier formula has been extended to additional multipliers (such as a Government Spending Multiplier and a Tax Multiplier), but economists have questioned the reliability of the concept (Davar, 2012:11). They are concerned about whether the Investment Multiplier provides accurate quantitative data (Davar, 2012:11). Despite this concern, this multiplier still remains an important indicator of the fact that increased investments lead to rises in income (Chand, 2015:1).

On South African turf, investment spending has been lagging, and it seems that the growth in capital expenditure was only 3.1% during 2013 and 2.6% in 2014 (Lings, 2014:1). Foreign direct investment (FDI) is an important alternative to local financing processes and, in accordance with modernisation theories, FDI promotes economic growth and development (Adams, 2009:940).

2.2.2 Foreign direct investment in the South African economy

In a modern economy, globalisation could lead to investment opportunities in the form of FDI (Adams, 2009:939). Globalisation is defined by the Oxford English Dictionary

(2015a) as 'the process by which businesses and other organisations develop international influence or start operating on international scale'.

Jeffery (2002:1) posited that globalisation is a process in which international trade is brought about through modern communication, while McCulloch (2009:1) suggested that globalisation referred to the rapid increase in the share of economic activity taking place across country borders. From these arguments, it can be reasoned that globalisation takes place when modern communication is employed to bring about international trade opportunities across country borders.

FDI is regarded as the foreign ownership or control of 10% or more of an entity's voting rights (Almfraji & Almsafir, 2014:207). The dynamic behind FDI can include four main motives: natural resource seeking, market seeking, efficiency seeking and strategic asset seeking motives (Dunning, 1998:46). The objectives of these motives can be summarised as follows:

Table 2.1: Objectives of FDI motives

Motive	Objective
Natural resource seeking	To ensure that there is an available supply of stable, low cost, high quality natural resources
Market seeking	To exploit and promote new markets
Efficiency seeking	To achieve economic use of available resources and to diversify relevant risks
Strategic asset seeking	To sustain and develop global competeveness by applying advanced technology, branding and management expertise

Source: Cui *et al.* (2014:490)

Large markets, abundant natural resources, effective legal systems, developed infrastructure and low interest rates typically increase potential for FDI, while corruption and political instability can have the opposite effect (Asiedu, 2006:74). It would seem that factors which are indicative of improving economic performance lead to increased FDI

potential for a country (Asiedu, 2006:65). In return, FDI can bring about increased capital investing, human capital development, increased exports and technological advancements.

Fedderke and Romm (2006:758) argued that FDI has had a positive impact on growth rates recorded in the South African economy. This, in turn, has resulted in a positive effect on capital and labour, and export activities have increased (Fedderke & Romm, 2006:758).

Borensztein *et al.* (1997:116) suggested that technology plays an essential role in increasing growth rates of developing countries. The adoption of foreign advanced technology could possibly lead to a more competitive business environment and better financial prospects, while establishing positive interaction between FDI and human capital development, such as educational opportunities and attainment (Borensztein *et al.*, 1997:134).

The role of central government in FDI should also not be underestimated. Governments should ensure that macro- and microeconomic policies secure and stimulate an international investment culture (Bayraktar, 2003:64). In return, governments earn generous tax revenues from investment activities (Bayraktar, 2003:64). Policy makers are advised to implement policies that attract foreign investors (Gui-Dibya, 2014:255). Governments should develop an educated and trained labour force and continuously improve the business environment (Gui-Dibya, 2014:255). Tax policies also influence investment decisions. Hall and Jorgenson (1967:391) posited that changes in tax policies could alter investment behaviour and that tax devices could be used to stimulate investment. Evidently, tax policies can also be used to persuade the foreign investor to make investments in host countries. During 2014, the South African government introduced section 12T, which allows investments to be made tax free (De la Harpe, 2014:1). In accordance with this section, investors are allowed to open a savings account at a financial institution and save up to R30 000 per annum in investment returns without any tax consequences (De la Harpe, 2014:1). Any savings must, however, be in cash (De la Harpe, 2014:1). Evidently, it is also a priority to the South African government to apply tax policies to stimulate investments and savings.

From the above information, it is apparent that investment decisions can be made to the advantage of both investors and the general economy. Greater investment in an economy leads to higher national income. Should governments be unable to generate local investments, foreign investments can greatly improve the performance of an economy. Governments develop policies to encourage FDI by ensuring that labourers are skilled and that the business environment is attractive to foreign investors. FDI leads to economic growth, increases in export potential, improved technological business processes and educational development of labourers.

In conclusion, investments fulfil an important role in economic prosperity. The economy is stimulated by investment which leads to higher national income and greater savings and investment potential. For the investor, investment returns are generated, which also leads to increases in income and wealth potential. The following section discusses the factors that influence investment decisions taken by investors. These are general factors that can affect the type of entity that the investor chooses to invest in.

2.3.   GENERAL FACTORS THAT INFLUENCE INVESTMENT DECISIONS

Investors make investment decisions after considering several investment factors. Nagy and Obenberger (1994:65) identified seven factors that influence the investment decisions of individual investors:

- Neutral information;
- Self-image and firm-image coincidence;
- Classic factor;
- Social relevance factor;
- Advocate recommendation factor;
- Personal financial needs factors; and
- Accounting information.

Each of these factors are discussed next.

Neutral information

This factor is typically represented by press coverage, index returns and recommendations by investment advisors (Nagy & Obenberger, 1994:65). Neutral information is perceived as information from outside sources that are unbiased (Nagy & Obenberger, 1994:65). There are two possible models that indicate the investor's reaction to such sources. The first model suggests that investors overreact to certain information that becomes available, such as the issuance of new equity (Jagongo & Mutswenje, 2014:95). The second model supports the argument that the investor underreacts to information such as share repurchases (Jagongo & Mutswenje, 2014:95). From these arguments, it is evident that investors will either overreact or underreact to neutral information, depending on the type of event that is disclosed by an outside source.

Self-image and firm-image coincidence

This factor refers to the firm's reputation, status and the general feeling regarding the product and service delivered by the entity (Nagy & Obenberger, 1994:66). In a study, Epstein and Freedman (1994:107) found that investors were interested in information such as the company's social activities, product safety, ethics, employee relations and community involvement. Such information can also contribute to the overconfidence of the shareholders, due to biased self-attribution (Jagongo & Mutswenje, 2014:96). Clearly, investors are also interested in whether an entity positively contributes towards employees, customers and community.

Classic factor

The classic factor analyses the expected dividend, affordability of the shares, the tax consequences and the minimisation of risk (Nagy & Obenberger, 1994:66). This factor is a wealth maximisation criterion (Nagy & Obenberger, 1994:66). Weston and Copeland (1986:648) indicated that the tax position of investors will influence their desire for returns. If dividends cause investors to be highly taxed, they would probably desire a lower dividend (Weston & Copeland, 1986:648). Higgins (2009:301) posited that the investor can determine risk in two possible ways: scientifically and through historical

evidence. Scientific analysis of risk is performed by determining risk probabilities, while historical records can provide an indication of risk trends (Higgins, 2009:301). It seems that investors are concerned not only about measuring risk, but also about the tax liabilities that are created by investment returns.

Social factors

Social factors cover aspects such as environmental reports, the presence near the investor's residence and international operations (Nagy & Obenberger, 1994:67). These factors were found to be least important to investors in a study by Nagy and Obenberger (1994:66). Jagongo and Mutswenje (2014:100), however, found that environmental factors were important to the modern investor. It is, therefore, argued that investors are becoming aware of social factors and that these factors can influence the decisions of investors when investment decisions are being made.

Advocate recommendations

This factor represents recommendations made by stock brokers, co-workers, family members and friends (Nagy & Obenberger, 1994:67). Argan and Sevil (2014:96) explored the relationship between investors' intentions, satisfaction and word-of-mouth communication and concluded that there is a strong relationship among these factors. Evidently, investors seek advice and employ the opinions of advisors. Investors can react to advice in four ways: hold shares on a sell recommendation, sell shares on a sell recommendation, hold shares on a hold recommendation or sell shares on a hold recommendation (Jagongo & Mutswenje, 2014:96). The type of advisor can also affect the investor's attitude (Jagongo & Mutswenje, 2014:96). It would seem that investors are not self-reliant and that they are influenced by advisors around them when making investment decisions.

Personal financial needs

This factor considers future returns, the period of the investment and diversification needs (Nagy & Obenberger, 1994:97). When stock has unfavourable future expectations, the investor will most probably sell it even if it renders a favourable current return (Jagongo & Mutswenje, 2014:97). The most important personal financial needs

factor is diversification (Nagy & Obenberger, 1994:65). Correia *et al.* (2011:1-23) suggested that risk can be reduced when the investor invests in a combination of assets. This is also known as the 'portfolio theory' (Correia *et al.*, 2011:1-23). From these arguments, it can be posited that investors invest in diverse assets in order to minimise the risk of losses.

Accounting information

Accounting information can typically be obtained in annual reports, financial statements and prospectuses (Nagy & Obenberger, 1994:66). Nagy and Obenberger (1994:65) found expected corporate earnings to be the most significant investor consideration. Clearly, expected accounting performance is of interest to the investor. Financial statements provide economic information to users such as employees, management, suppliers, bankers and shareholders (Brealey *et al.*, 2008:787). Investors analyse financial statements to evaluate a company's performance (Chapter 1, par. 1.1) (Higgins, 2009:37). Block *et al.* (2009:57) claimed that ratio analysis is applied in order to measure profitability, asset utilisation, debt utilisation and liquidity. Therefore, the argument is made that accounting information and the analysis thereof enable users of financial statements to determine whether their best interests are being served by an entity.

Chang and Most (1985:359) posited that the annual financial report of the entity is the most important information source to investors. Jagongo and Mutswenje (2014:100) argued that, among the investor's considerations, the performance of the entity will mainly influence investment decisions of investors, while Higgins (2009:6) argued that financial statements are the best indicator of financial performance. Therefore, par. 2.3.1 that follows will investigate only the sources of accounting information that are indicative of performance. Other identified factors are not within the scope of the study and will not be considered.

2.3.1 Sources of accounting information

Several researchers, such as Chang and Most (1985), Jacoby *et al.* (1983) and Bogdan and Balaciu (2007), have performed studies to determine the most effective accounting information on which investment decisions should be based. Such accounting

information would typically enable the investor to predict risk (May, 1968:113) and estimate future returns (Hinman, 2014:17).

Biggs (1984:318) studied the primary sources of financial information that are used by analysts and ranked them as follows:

1) Statement of Profit or Loss and Other Comprehensive Income, which is an indicator of financial performance during a specific period (Oberholster *et al.*, 2011:6);

2) Property, plant and equipment information, which refers to information about tangible assets that are used to carry on business (Oberholster *et al.,* 2011:61);

3) Long-term debt, which refers to debt that is not expected to be settled within 12 months (Service, 2014:72);

4) Shareholders' equity, which is the residual interest in assets after deducting the value of liabilities (Service, 2014:47); and

5) Capital expenditure, which is the use of funds to obtain physical assets that will be productively employed for at least one year (AccountingTools, 2015a:1).

On the other hand, Chang and Most (1985:366) indicated the importance of different items of the annual report by ranking them as follows:

1)   Statement of Profit or Loss and Other Comprehensive Income, where company performance is reflected by total comprehensive income (Service, 2014:79);

2)   Statement of Financial Position, which portrays the economic resources of the entity, indicating solvency, liquidity and cash flow potential (Oberholster *et al.*, 2011:6);

3)   Statement of Changes in Equity, which represents a series of reconciliations between opening and closing balances of each component of equity (Service, 2014:91);

4)   Accounting policies, which provides supplemental information needed to better understand financial statements (Oberholster *et al.,* 2011:7); and

5)   Sales and income by product line, which can be used to indicate how profitable a specific product line is during a period (Booker & Media, 2015:1).

AccountingTools (2015b:1) indicated that financial statement importance can be ranked as follows:

1) Statement of Profit or Loss and Other Comprehensive Income, which indicates all income and expenses recognised for a specific accounting period (Koppeschaar *et al.*, 2013:41);

2) Statement of Financial Position, which represents non-current assets, current assets, non-current liabilities, current liabilities and equity (Koppeschaar *et al.*, 2013:34);

3) Statement of Change in Equity, which indicates the net asset value of an entity (Service, 2014:47);

4) Statement of Cash Flows, which provides information pertaining to the investing, financing and operating activities of an entity through the distribution and receipt of cash and cash equivalents (Oberholster *et al.,* 2011:7); and

5) The audit report, where auditors provide reasonable assurance that financial information is free from material error or misstatement (Marx *et al.*, 2011:1-11).

From the three lists mentioned above, it is clear that Biggs (1984:318), Chang and Most (1985:366) and AccountingTools (2015:1) view the Statement of Profit or Loss and Other Comprehensive Income to be the most important source of accounting information to investors. Block *et al.* (2009:27) support the view by suggesting that the Statement of Profit or Loss and Other Comprehensive Income is the major device of profitability measurement. Higgins (2009:15) posited that investors usually have two questions when it comes to company performance: 'How did the company do in the last period?' and 'How will the company perform in future?' These questions are answered when studying net income, operating income, earnings before interest and tax (EBIT), and earnings before interest, tax, depreciation and amortisation (EBITDA) (Higgins, 2009:15). Furthermore, EPS is also disclosed on the face of the Statement of Profit or Loss and Other Comprehensive Income (IFRS, 2014a:A1202). It is argued that all income and earnings information required to answer these fundamental questions are disclosed in the Statement of Comprehensive Income.

The Statement of Financial Position is the second most important source, as indicated by Chang and Most (1985:366) and AccountingTools (2015:1). Evidently, property, plant and equipment information will be indicated on the Statement of Financial Position, and the recognition of property, plant and equipment as the second most important consideration by Biggs (1984:318) is, therefore, in line with the arguments of Chang and Most (1985:366) and AccountingTools (2015:1). The Statement of Financial Position provides the investor with a 'snapshot' of the entity's finances by indicating the basic accounting equation of assets = equity + liabilities (Higgins, 2009:6).

Having determined that the Statement of Comprehensive Income and Statement of Financial Position are the most important sources of financial information, specific accounting considerations will be discussed in par. 2.3.2. These specific considerations are disclosed in the Statement of Comprehensive Income and Statement of Financial Position.

2.3.2 Specific accounting considerations

In identifying specific accounting factors, Murphy (1967:91) argued that return on equity (ROE), dividend pay-outs and growth in EPS are essential considerations for investment decision making. Jacoby *et al.* (1983:110) identified three factors that top performing analysts use when analysing financial information: earnings trends, price–earnings ratio and EPS for the last four years. In later studies, McEwen and Hunton (1999:14) found that the use of key ratios, earnings summary information and older income information greatly contributes to accuracy of forecasts, while Bogdan and Balaciu (2007:129) reasoned that EPS is one of the oldest, most used and mentioned indices in the analyses of financial information. Higgins (2009:12) also posited that earnings is an important indicator of financial health. Vigario (2008:285) outlined that earnings can be used to valuate majority shareholding. According to Vigario (2008:285), such valuations are performed by multiplying the price–earnings ratio by the maintainable future earnings of the company. Maintainable future earnings refer to the estimation of future earnings through the forecast of future operating results and prospects (Shields, 2015:1). Such forecasts are based upon analyses of historical results (Shields, 2015:1). Vigario (2008:285) indicated that the majority shareholding valuation is expressed as follows:

$$Valuation = PE\ ratio \times maintainable\ future\ earnings$$

From the arguments of Higgins (2009:12) and Vigario (2008:285), it is apparent that earnings can be applied to assess both financial health and value of the shareholding of an entity.

According to these researchers, key ratios, dividend pay-outs and EPS enable investors to correctly estimate future returns, financial health and shareholding value. It is submitted that key ratios are calculated from the Statement of Comprehensive Income and Statement of Financial Position. Dividend pay-outs are indicated in the Statement of Changes in Equity, while EPS is disclosed on the face of the Statement of Comprehensive Income. It is then evident that these sources of financial information are in line with the ranking of Chang and Most (1985:366) as set out above.

Based on the conclusion that the key financial ratios (par. 2.3.2.1), dividend pay-outs (par. 2.3.2.2) and EPS (par. 2.3.2.3) are important factors which investors use to analyse accounting information and base their investment decisions on, each of these factors are discussed next.

2.3.2.1 Key financial ratios

Analysing a firm's financial performance is of importance to shareholders (Smart & Graham, 2012:40). Effective financial analysis is based on the application of financial ratios (Smart & Graham, 2012:40). Ratio analysis enables the investor to identify financial trends (Brigham & Ehrhardt, 2007:452) and compare the financial results of firms in the same industry (Brigham & Ehrhardt, 2007:459).

Correia *et al.* (2011:5-12) identified six groups of financial ratios:

- Liquidity ratios, such as the current and quick ratio;
- Asset management ratios, such as inventory turnover and asset turnover;
- Debt management ratios, such as the debt ratio and debt to equity ratio;
- Profitability ratios, net profit margin, return on equity (ROE) and return on assets (ROA);

- Cash flow ratios, such as the cash flow to debt and cash flow per share ratios; and

- Market value ratios, such as the price–earnings ratio and earnings yield ratio.

Samuel (1992:1) posited that the key financial ratios among these are: return on capital employed (ROCE), net profit margin and asset turnover, while Murphy (1967:91) argued that ROE is also of importance to investors. Jacoby *et al.* (1983:110) suggested the price–earnings ratio is of importance to investors, and Stainbank and Harrod (2007:98) identified ROA, cash flow per share and dividend yield as essential investor considerations. These key ratios will be discussed in the section to follow:

- ROCE;
- Net profit margin;
- Total asset turnover;
- ROE;
- Price–earnings ratio;
- ROA;
- Cash flow per share; and
- Dividend yield.

ROCE

The Cambridge Online Dictionary (2015) defines the term 'return on capital employed' as 'a company's profit for a particular period compared to the amount of capital invested'. Brigham and Ehrhardt (2007:108) indicated that ROCE is a method used to determine growth in profitability, while Collier (2009:113) claimed that ROCE can be improved by increasing profits. Evidently, it can be posited that ROCE measures profitability by comparing earnings that arise from capital employed by capital invested.

The Business Dictionary (2015b) explains that ROCE measures the profitability and efficiency of capital investments of an entity and must, therefore, be higher than the cost of acquiring such capital. ROCE is also referred to as 'the primary ratio,' because it indicates the returns earned before any distributions have been made (Riley, 2012:1).

NASDAQ (2011a:1) indicated that ROCE is calculated by dividing the earnings before interest and taxation by the capital employed, which can be expressed as follows:

$$ROCE = \frac{Earnings\ before\ tax\ and\ interest}{Capital\ employed}$$

Capital employed can be calculated by adding short-term loans to equity and subtracting intangible assets from the amount (NASDAQ, 2011a:1). But, according to AccountingForManagement (2014a:1), capital employed can be one of the following factors:

- Total assets, which is the sum of all assets held by an entity;
- Total fixed assets, which refer to plant, machinery and equipment;
- Fixed assets plus working capital, which are plant, machinery and equipment plus the difference between current assets and current liabilities; and
- Total capital, reserves and surpluses, which are the shareholders equity of an entity.

Evidently, return on capital can be calculated in several ways, because the denominator can consist of different accounting factors. It is, therefore, submitted that the calculation of ROCE can differ between firms and that information could, thus, become incomparable.

Net profit margin

The net profit margin indicates profitability by measuring net profit as a percentage of sales (Petty *et al.*, 1982:60). The higher the ratio, the more profitable the entity (Parrino & Kidwell, 2008:34). Correia *et al.* (2011:5-18) indicated that the net profit margin is calculated by dividing the profit after interest and tax by sales, which can be expressed as follows:

$$Net\ profit\ margin\ = \frac{Net\ profit\ after\ interest\ and\ tax}{Sales} \times 100$$

An essential consideration of this margin is that increases in sales must result in increases in net profit after tax, and should increases in sales be accompanied by high increases in expenses, the net profit margin could decline (Marx *et al.*, 2003:101).

Reynders *et al.* (1985:132) explained that the net profit margin is important to investors for two possible reasons:

- It indicates funds that will be available for dividend distribution to shareholders; and
- It indicates funds that could be accumulated and reinvested to maximise returns to investors.

One of the obstacles in applying the net profit margin is that it is influenced by the financing structure of the entity (Brigham & Ehrhardt, 2007:449). A firm that has the exact same operations as another, but relies on debt financing, would typically reflect a lower net profit margin due to higher financing cost (Brigham & Ehrhardt, 2007:449). It can also be difficult to determine whether a net profit percentage is 'good' in its absolute sense, because it can differ between industries (Moles *et al.,* 2011:133).

Total asset turnover

Total asset turnover measures an entity's ability to use its assets efficiently in order to generate sales (Marx *et al.,* 2003:99). Weston and Copeland (1986:185) indicated that total asset turnover is calculated by dividing sales by total assets, which can be expressed as follows:

$$Total\ asset\ turnover\ = \frac{Sales}{Total\ assets}$$

The total asset turnover can indicate the level of sales a firm generates per rand of total assets (Parrino & Kidwell, 2008:24). The higher the turnover, the more efficiently the assets of the entity are employed (Parrino & Kidwell, 2008:24). For this reason, it can be posited that shareholders consider this ratio to determine whether the assets are used effectively in order to generate revenue.

Total asset turnover includes the value of fixed assets (such as plant and equipment) (Smart & Graham, 2012:43). Entities can apply different depreciation methods to identical assets or maintain fully depreciated fixed assets on their financial records (Smart & Graham, 2012:43). This leads to one firm's appearing more efficient than another simply because depreciation is written off quicker, or assets are disclosed at a carry value of 0 (Smart & Graham, 2012:43).

ROE

ROE is a ratio that divides the net income by common equity (that is the sum of share capital, retained earnings and equity reserves) (Brigham & Gapenski, 1988:779). It measures the rate of return earned on the stockholder's investment (Petty *et al.,* 1982:62). According to Brigham and Gapenski (1988:779), ROE can be expressed as follows:

$$ROE = \frac{Net\ profit\ after\ tax}{Total\ equity}$$

The ROE ratio is often compared to the industry norm in order to draw meaningful conclusions (Petty *et al.*, 1982:63). Because interest and dividends are paid to creditors and preferred shareholders, a company can earn a greater or smaller ROE than ROA (Meigs *et al.*, 1977:789).

Damodaran (2007:11) argued that ROE focuses on the equity component of the investor's investment. Net income is generated through the employment of equity and, therefore, the ratio measures how much income each rand of equity has generated (Damodaran, 2007:11). Marx *et al.* (2003:106) posited that ROE is an indication of three important economic factors of an entity:

- Operating efficiency of the entity;
- Asset usage efficiency of the entity; and
- Financial leverage of the entity.

One of the complexities that can arise is that ROE is often measured in terms of book value instead of market value (Damodaran, 2007:11). Book values do not reflect market

values, and some firms could reflect a negative book value for equity in their financial records (Damodaran, 2007:11).

De Wet and Du Toit (2007:59) claimed that entities should, ultimately, create shareholders value for shareholders and that such value is created by means of equity returns that exceed cost of capital. There are several controversies as to which internal drivers have the greatest impact on shareholder wealth, but financial analysts have focused on drivers such as ROE, dividends and earnings per share (De Wet & Du Toit, 2007:59). ROE has been one of the most widely used measures of corporate performance (Rappaport, 1986:31) and it can be an important financial ratio for consideration by an investor (Monteiro, 2006:3).

ROE represents the end product of a financial ratio analysis called the 'Du Pont analysis,' which has contributed to its popularity (Stowe *et al.*, 2002:85). It is a joint analysis of useful ratios that, ultimately, result in a single figure (Marx *et al.,* 2003:108). Correia *et al.* (2011:5-21) reasoned that ROE is concerned with the net profit margin, ROA and the financial leverage multiplier, because it can be analysed mathematically as:

$$Du\ Pont\ = \frac{Net\ profit}{Sales} \times \frac{Sales}{Assets} \times \frac{Assets}{Equity}$$

where

$$Return\ on\ assets\ = \frac{Net\ profit}{Sales} \times \frac{Sales}{Assets}$$

and

$$The\ financial\ leverage\ multiplier = \frac{Assets}{Equity}$$

Evidently, the Du Pont analysis breaks down ROE into other financial ratios.

Figure 2.4: The Du Pont analysis
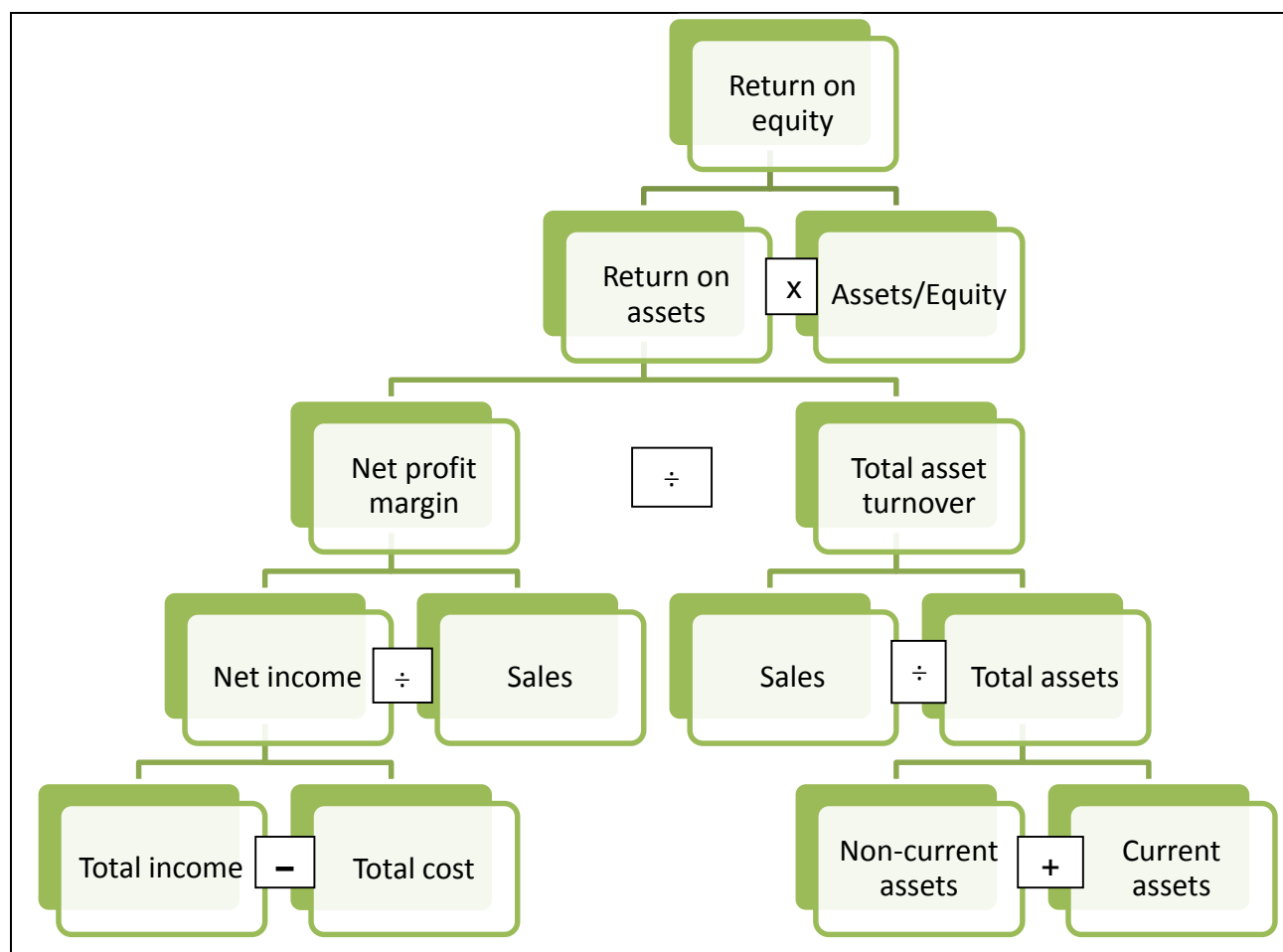
Source: Adapted from Brigham and Gapenski (1988:783)

Figure 2.4 indicates how ROE can be analysed by means of other ratios. When total cost is subtracted from total income, net income is calculated. Non-current assets and current assets are added together, resulting in total assets. When net income is divided by sales, a net profit margin is calculated, while sales divided by total assets express total asset turnover. When the net profit margin is divided by the total asset turnover, it results in ROA. ROA is then multiplied by assets on equity in order to calculate ROE.

Over the years, researchers such as Reimann (1989), Finegan (1991) and Jensen and Meckling (1999) have grown to believe that ROE is not necessarily a meaningful measurement of investment returns. In their study, De Wet and Du Toit (2007:67) found a weak correlation between ROE ratios and shareholder returns. Owing to changes in

accounting policies, ROE has become a poor performance measurement (Reimann, 1989:18). In Reimann's (1989:18) study, ROE left 66% of the variations in share prices unexplained.

Finegan (1991:33) further argued that ROE ignores the timing of cash flows. For this reason, it is more advisable to use a free cash flow model, which seems to be a better means of determining whether shareholder wealth can be created (Finegan, 1991:45). Free cash flow is a valuation method through which expected future cash flows are discounted in order to estimate the value of equity (Moles *et al.*, 2011:718). Furthermore, Copeland *et al.* (1996:105) suggested that ROE might lead to the overlooking of long-term growth, because it places extensive focus on the short-term performance of the entity.

According to Jensen and Meckling (1999:13), ROE is not a reliable tool of measurement, because it is susceptible to manipulation by managers. Jensen and Meckling (1999:13) mentioned that Economic Value Added (EVA) is a better decision-making tool, while De Wet and Du Toit (2007:61) viewed EVA as the economic profit of an entity after deducting the total cost of capital.

It would seem that many researchers are not keen on using the ROE ratio as a means of determining shareholder wealth seeing that it correlates poorly with shareholders return, is easily manipulated and focuses only on short-term performance.

Price–earnings ratio

The price–earnings ratio is a ratio that indicates how much shareholders are willing to pay for reported profits (Correia *et al.,* 2011:5-20). The price–earnings ratio can measure the risk that is identified with the firm, because a lower price–earnings ratio would typically indicate higher riskiness (Correia *et al.,* 2011:5-20). The price–earnings ratio is related to current and expected growth of the entity and reflects the extent to which earnings are viewed as transitory (Brigham & Ehrhardt, 2007:452). According to Weston and Copeland (1986:191), the price–earnings ratio is expressed as follows:

$$Price/earnings\ ratio\ = \frac{Market\ price\ per\ share}{Earnings\ per\ share}$$

The average price–earnings ratio on the JSE is between 17 and 20 (Mittner, 2014:1), and any firm that has a price–earnings ratio lower than this should typically be viewed as having poor growth prospects (Brigham & Ehrhardt, 2007:452). Marx *et al.* (2003:108) suggested, however, that some entities displaying poor performance could still maintain high price–earnings ratios. Therefore, the level of future performance cannot always be expressed unambiguously by the ratio.

ROA

This ratio measures the return after interest and tax that is rendered as a percentage of total assets (Brigham & Gapenski, 1988:779). The formula can be expressed as follows (Petty *et al.*, 1982:62):

$$ROA = \frac{Net\ income\ after\ interest\ and\ tax}{Total\ assets} \times 100$$

ROA is an indication to the shareholder whether the entity is able to use its assets effectively in order to render a return (Weston & Copeland, 1986:99). Increases in assets can, however, lead to a lower return on asset percentage if increases in assets are not accompanied by increases in net income (Petty *et al.,* 1982:62). It is, therefore, submitted that the entity must use its assets efficiently in order to increase its return on asset ratio.

Moles *et al.* (2011:133) advised against the use of this ratio, because the information provided about the efficiency of asset usage is obscured by financing decisions and tax payments. It is, therefore, submitted that entities that pay more interest and taxes will maintain a lower return on its assets.

Cash flow per share

According to NASDAQ (2011b:1), cash flow per share is calculated as follows:

$$Cash\ flow\ per\ share = \frac{Cash\ flow - preferred\ dividends}{Number\ of\ ordinary\ shares}$$

Valahzaghard and Lemraski (2014:581) found in their study an inverse relationship between cash flow and ROE, and that returns were lower when more cash was available. The ratio measures the cash that is generated by each ordinary share (Weston &

Copeland, 1986:227), but the generation of cash does not necessarily imply that such cash was reinvested to render further returns (Marx *et al.,* 2003:46). It is, therefore, posited that the ratio itself is useful only when cash is used to generate more cash. De Villiers *et al.* (2003:123) also established that the relationship between share prices and EPS was stronger than the relationship between share prices and cash flow per share. Clearly, cash flow per share is a less favourable indicator of share price performance.

Dividend yield

The ratio indicates the return that the investor obtains on the investment in the form of a dividend (Correia *et al.,* 2011:5-20). The average dividend yield on the JSE during 2014 was 3.46% (JSE, 2015:1), while the value of dividends can be indicated by changes in dividend yields over time (Correia *et al.,* 2011:16-24).

Dividend yields assume that dividends are the primary determinants of share value and, for dividend yields to remain constant, the entity is required to maintain a corresponding growth rate in its share price and dividends (Marx *et al.,* 2003:130). Share prices can, however, be volatile, while the entity would strive to maintain a constant dividend payment and, therefore, the dividend yield ratio can be erratic (Marx *et al.*, 2003:131).

According to Petty *et al.* (1982:363), the formula for dividend yield is expressed as follows:

$$Dividend\ yield\ = \frac{Dividend\ per\ share}{Market\ value\ per\ share}$$

One of the limitations of the dividend yield calculation is that increases in share prices are not necessarily driven by dividends, but rather by increases in earnings (Chiang *et al.*, 1997:34). Moles *et al.* (2011:332) went so far as to suggest that investors will accept low dividend payments as long as they expect higher share prices in future.

From the above discussion, it has become evident that all the key ratios have certain shortcomings. Collier (2009:121) argued that ratio analysis is highly subjective and that ratios mean very little if there are no benchmarks. Brigham and Ehrhardt (2007:460) add to this argument by suggesting that it is difficult for companies to determine meaningful industry averages. In addition, the fulfilment of an industry average does not necessarily

indicate effectiveness, because many companies might have the potential to outperform such an average (Brigham & Ehrhardt, 2007:460). Furthermore, Collier (2009:121) explained that there are different variances of the same ratio and that different firms can select to use different forms of a ratio. This will affect comparativeness of ratios (Collier, 2009:121). Ratio assessments are also unable to indicate future expectations, because they only focus on historical comparisons (Vigario, 2008:215). Correia *et al.* (2011:5-25) outlined that it is difficult to determine whether a ratio is 'good' or 'bad'. Ratio analysis, ultimately, depends on the judgement of the analyst (Correia *et al.,* 2011:5-25). The outcomes of ratio analysis can also be affected by differences in accounting policies, where one company seems to perform better than another for the simple reason that accounting policies differ (Correia *et al.*, 2011:5-25). The shortcomings of ratio analysis can be summarised as follows:

Table 2.2: Shortcomings of ratio analysis

	Identified shortcoming
1.	Ratio analysis requires identified benchmarks in order to be interpreted correctly.
2.	It is difficult to identify meaningful and effective industry benchmarks with which all entities must comply.
3.	There are often different variances of the same ratio which can be applied in ratio analysis.
4.	When different variances of a ratio are applied, information obtained from these ratios are incomparable.
5.	Ratios are not necessarily indicative of future expectations.
6.	Ratio analysis requires application of professional judgement of the analyst.
7.	Differences in accounting policies can influence the comparability of the results of ratio analysis.
8.	The results of ratio analyses are not necessarily unambiguous. It could be difficult to determine whether a result is 'good' or 'bad'.

Source: Own research

Paragraph 2.3.2 provided a discussion of the key ratios. It has become evident that investors often rely on ratio analysis when making investment decisions. There are,

however, many shortcomings when ratio analysis is applied, as indicated in Table 2.2. In par. 2.3.2.2, dividend pay-outs will be discussed.

2.3.2.2 Dividend pay-outs

The Macmillan Dictionary (2015b) indicates that a dividend is 'a share of the profits of a company, paid once or twice a year to the people who own the company's shares'. Moles *et al.* (2011:905) posited that a dividend is something of value that is distributed to shareholders, based on the proportion of their shareholding. Graham and Smart (2012:6) reasoned that a dividend is a periodic payment that firms make to the shareholders. Thus, it can be argued that a dividend is a periodic distribution that is made to shareholders based on the proportion of shareholding.

A dividend distribution to the owners of a corporation can take on two forms – a cash dividend or a dividend *in specie* (Petty *et al.,* 1982:86; Moles *et al.,* 2011:661). A dividend *in specie* can include the distribution of assets (such as inventory) to the shareholders (Petty *et al.,* 1982:86). Dividends represent one of the important decisions that have to be taken by financial managers – they have to weigh up the decision to retain earnings versus paying dividends to the shareholders (Brigham & Gapenski, 1988:19; Correia *et al.,* 2011:16-2). The decision of how much of the current earnings will be paid out as dividends is called the dividend policy of the entity (Brigham & Gapenski, 1988:19).

There are several factors that influence dividend policies. The following is a list of such factors (Weston & Copeland, 1986:646):

- Legal factors, because they provide a framework within which a dividend policy must be formulated (Vigario, 2008:369);
- Liquidity position of the entity, because dividends cannot be paid if there are no surplus funds (Block *et al.,* 2009:563);
- Debt repayment, because it can influence the ability of the entity to retain profits and pay dividends (Weston & Copeland, 1986:646);
- Debt contract restrictions, for debt providers can set up financial expectations that must be fulfilled before dividends become payable (Weston & Copeland, 1986:646);

- Asset expansion requirements, because the need to invest in new assets can influence the ability to pay dividends (Weston & Copeland, 1986:646);
- Clientele requirements, because some investors can rely on dividends as a source of income to live on (Vigario, 2008:370);
- Stability of dividends, for investors favour companies with established dividend records (Vigario, 2008:370);
- Access to capital markets, because high investment returns accumulated by the entity can be carried over to the investor in the form of dividends (Block *et al.* 2009:563);
- Control, for raising funds by issuing additional shares will result in control dilution for controlling shareholders (Block *et al.*, 2009:564);
- The tax position of shareholders, because lower tax rates stimulate the desire for higher dividend payments (Block *et al.,* 2009:564); and
- Tax on accumulated earnings, because higher company tax rates will result in lower dividend pay-outs (Weston & Copeland, 1986:646).

In accommodating the above factors, there are several types of dividend policies that are implemented by companies. The following policies are applied:

- Constant dividend pay-out ratio, where a fixed percentage of earnings is paid out as dividends each year (Correia *et al.*, 2011:16-13);
- Stable dividend per share, where a fixed amount per share is paid out each year (Vigario, 2008:364);
- Regular dividend plus bonus, where a fixed amount per share is paid out plus an additional bonus percentage, should additional earnings be available (Correia *et al.,* 2011:16-14); and
- Residual policy method, where dividends are paid out only after all attractive projects have been invested in (Correia *et al.*, 2011:16-3).

Block *et al.* (2009:560) posited that dividend payments resolve uncertainty in the minds of investors. It would, therefore, seem that the dividend policy of the entity is significant, because it will influence the volatility of share prices (Hussainey *et al.,* 2011:59). Volatile

share prices indicate higher risk, while investors would typically prefer less risk (Hussainey *et al.,* 2011:59). Allen and Rachim (1996:86) found a negative relationship between dividend pay-outs and share price volatility – the higher the dividend, the lower the share price volatility. These findings are supported by Hussainey *et al.* (2011:67), whose study also suggested an inverse relationship between the dividend pay-out ratio and volatility of share prices. It is then evident that an entity would want to implement a dividend policy that supports constant share price behaviour, because investors value dividend payments, and their reaction to unsatisfying dividend payment leads to share price volatility. The relationship between share prices and dividend payments has led to the design of a 'dividend growth model' for estimating the price of shares (Marx *et al.*, 2003:124). According to Correia *et al.* (2011:6-11), the dividend growth model can be expressed as follows:

$$P0 = \frac{D1}{k - g}$$

where:

g = dividend growth rate

D1 = dividend for the next period

k = cost of equity and

P0 = market share price

The dividend growth model assumes that dividends will continue to grow in perpetuity (Correia *et al.,* 2011:6-11). The expected market price is computed by discounting expected future dividends (Moles *et al.*, 2011:719). The usefulness of the dividend growth model approach is limited, because it makes the assumption that dividends will grow at a constant rate, while such constant rates might not be sustainable in the long run (Moles *et al.*, 2011:719).

According to Ohlson and Juettner-Nauroth (2000:3), dividends and earnings interact. Brigham and Ehrhardt (2007:259) argued that growth in dividends occur primarily due to growth in EPS, while Campbell and Shiller (1988:27) suggested that changes in earnings

could be used to forecast future dividends. Chiang *et al.* (1997:34) found that changes in earnings per share explained changes in investment returns better than dividends could. These findings were supported by a South African study by Auret and De Villiers (2000:39), which also found that share price behaviour was better explained by EPS trends. Both these studies indicated that EPS correlated better with share prices than dividends could, which creates clear limitations to the application of a dividend growth model in share valuations.

From previous information, it is posited that dividends are dependent upon earnings and that earnings explain investment return behaviour.

Key ratios and dividend pay-outs were discussed in the previous sections. The remaining accounting factor, EPS, will be discussed in par. 2.3.2.3.

2.3.2.3 Earnings per share

The Memidex Dictionary (2013) defined 'earnings per share' as 'the portion of a company's profit allocated to each outstanding share of common stock'. Moles *et al.* (2011:85) suggested that EPS is calculated when net income is divided by the number of outstanding ordinary shares. AccountingForManagement (2014b:1) indicated that EPS measures how much net income was earned by one ordinary share. It would seem that EPS measures the performance of the entity on a per-ordinary-share basis. Dunn (2010:136) adds by indicating that EPS is arrived at when earnings attributable to shareholders are divided by the number of issued ordinary shares. Evidently, EPS is calculated by dividing earnings by the number of ordinary shares in issue. These calculations, as well as disclosure of EPS figures, are prescribed by IAS 33 (SAICA, 2014:A1189). It is, therefore, submitted that definite regulations exist as to how EPS figures are calculated and presented in the financial statements of an entity.

Growth in EPS determines the availability of future funds for reinvestment and dividend payment (Murphy, 1967:91). Companies usually have one primary objective – to increase EPS (Petty *et al.*, 1982:582). The increase in EPS should have a favourable effect on the value of shares and create shareholder wealth (Mkhonza, 2007:43). Ohlson and Juettner-Nauroth (2000:3) argued that investors want to buy high future returns for

as cheap as possible and analyse historical EPS to determine possible future growth rates, while Smart and Graham (2012:159) indicated that EPS is an indication of risk to the investor. It seems that EPS is a critical indicator of future returns and possible risk to the investor. EPS is also significant, seeing that it forms part of three financial ratios: price–earnings ratio, earnings yield ratio and dividend cover ratio (Correia *et al.,* 2011:5-20; Moles *et al.*, 2011:135).

The price–earnings ratio indicates how much investors are willing to pay for reported profits and is calculated by dividing the market share price by the EPS value (Brigham & Gapenski, 1988:780) (par. 2.3.1.1). Price–earnings ratios are higher for firms with high growth prospects (Brigham & Gapenski, 1988:780). Hogg (2005:9) posited that the price–earnings ratio shows the relationship between share prices and earnings. Investors would buy shares when the price–earnings ratio is low and sell when the price–earnings ratio is high (Hogg, 2005:10).

Borad (2011:1) described the dividend cover ratio as a method of determining the relationship between earnings and dividends. This ratio is calculated by dividing the EPS by the dividend per share (Borad, 2011:1). QFinance (2009:1) mentioned that dividend cover is the number of times the dividend can be covered by earnings and it indicates whether dividend payments are sustainable.

According to Kennon (2010:1), the earnings yield shows how much the investor earns as a percentage of the investment. It is calculated by dividing the EPS by the market price of the share (Kennon, 2010:1). Increases in share prices are likely to cause the earnings yield ratio to drop (Brigham & Gapenski, 1988:782). Figure 2.5 shows how EPS is intertwined with other financial ratios.

Figure 2.5: EPS as part of financial ratios
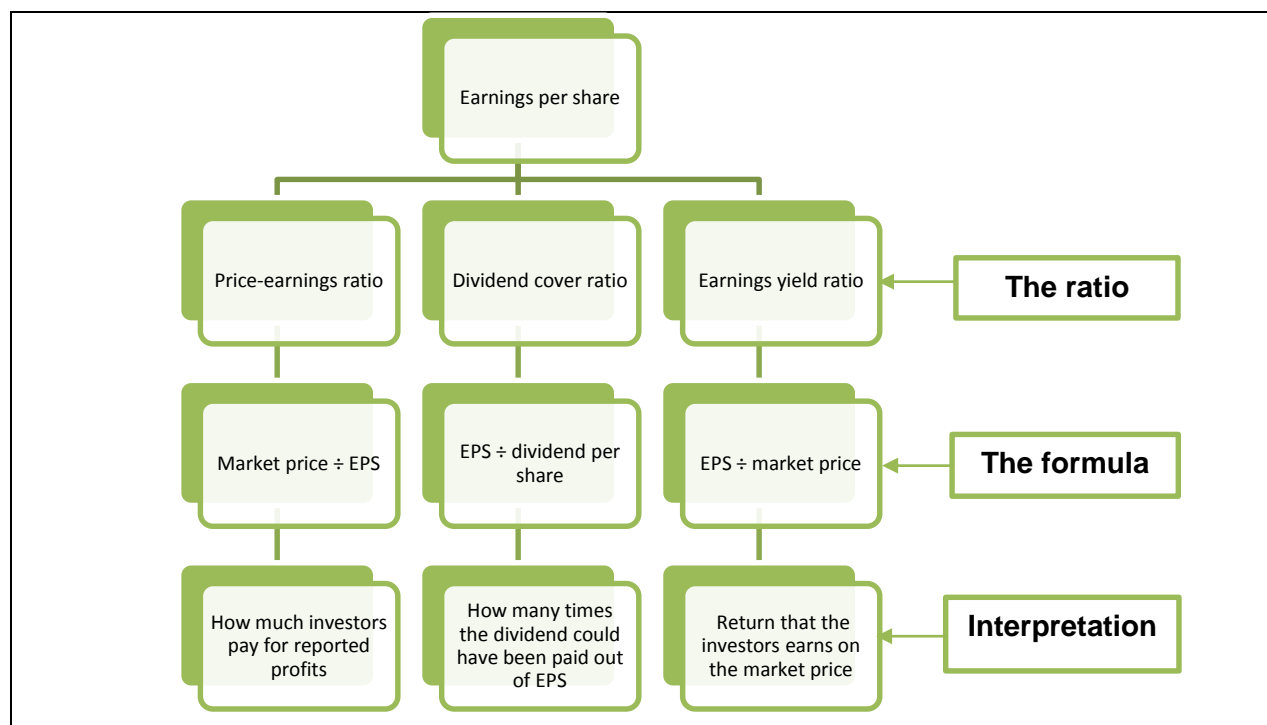
Source: Own research

It is posited that EPS is a useful accounting factor. EPS is a frequently used financial measure in the assessment of company performance (Stainbank & Harrod, 2007:91). Earnings is an indicator of the performance of an entity (Dechow, 1994:4), and the measurement of earnings is strongly associated with stock returns (Dechow, 1994:35). Shareholders also use EPS to measure the stewardship by the managers and directors of a firm (Stainbank & Harrod, 2007:92).

Nichols and Wahlen (2004:263) argued that earnings is a 'bottom-line' accounting measurement and indicated that there are three links between earnings and share prices:

- Current earnings provide information to predict future earnings;
- Earnings develop expectation about future dividends; and
- Earnings provide information to determine share value, which is the present value of expected future returns.

In their study, Nichols and Wahlen (2004:285) found a strong association between earnings and returns, which explains why investors, auditors, directors, financial press and security regulators place importance on accounting earnings information. In an earlier study, Campbell and Shiller (1988:672) suggested that earnings help to forecast real dividends and that it is a powerful predictor of future returns. Real dividends refer to dividend amounts that have been adjusted for the purposes of inflation (Moles *et al.,* 2011:424). Consequently, earnings can be associated with returns and future income, indicate company performance and represent the stewardship of management. Although earnings contribute to the preceding positive factors, it is also submitted that earnings information has limitations.

One such limitation is that accounting policies could be changed, which could lower expenditure, influence earnings and cause year-on-year profits to be incomparable (Correia *et al.,* 2011:5-9). Furthermore, earnings can be fraudulently manipulated by management and employees (Elmaleh, 2006:1). Elmaleh (2006:1) identified six main areas of common accounting fraud that inflate accounting earnings:

1. Accounts receivable, because the amount that will be collected is mostly estimated. Fictitious debtors can be created, leading to increased sales and higher earnings;
2. Accounts payable, because management can understate expenses by understating amounts that are owed to creditors;
3. Deferred revenue, because the treatment of deferred revenue as actual revenue causes earnings to be inflated;
4. Prepaid expenses, because the recognition of current expenses as prepaid could lead to higher earnings;
5. Fixed assets, because management can understate depreciation expenses by overestimating the useful life of the asset; and
6. Inventory, because the overstatement of the value of closing inventory will lead to higher gross profits.

The question of why earnings information is often manipulated then arises. In their study, Dechow *et al.* (1996:31) argued that managers manipulate profits in order to raise external financing, because higher earnings serves as motivation for shareholders and

money lenders to invest in the entity. In a study, Bergstresser and Philippon (2004:2) explained that share-based compensation to directors led to the manipulation of different entities' reported earnings, because the fulfilment of earnings targets usually lead to share-based compensation for management. It is clear that earnings can be manipulated by way of changing accounting policies or committing fraud in order to obtain financing or to maximise incentives to management. Unfortunately, audit reports only provide reasonable assurance to investors that financial information is free from material misstatement (Marx *et al.,* 2011:1-3). Therefore, it is submitted that investors cannot determine whether increases in EPS arise from misstatements or actual improved performance.

It would seem that EPS has a number of limitations. Yet, many studies have investigated the relationship between EPS and share prices, and despite the identified limitations, EPS was considered as a worthy associate of share price behaviour. Table 2.3 provides a summary of 15 previous studies in which the relationship between EPS and share prices was tested. These studies were included in the literature review, because they are often cited by other researchers and also by one another.

Table 2.3: Previous research on the relationship between EPS and share prices

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
1989	Lev, B.	USA	The usefulness of accounting earnings was questioned by this study. The research objective was to assess the usefulness of accounting earnings to investors. The researcher argued that earnings usefulness was significant, because it was of importance to investors, accounting practitioners and regulators. It was suggested that many valuation models use expected future earnings as a variable when determining the outcome of stock prices. Earnings should, therefore, be useful in order to ensure accurate forecasts of future returns.	Through the application of regression modelling, the study found that the correlation between earnings and stock returns was very low. It was concluded that the usefulness of accounting information was limited. Earnings was expected to make a modest contribution in the prediction of stock prices. The researcher suggested that low correlations could be the consequence of poor accounting earnings quality due to the many biases in the application of accounting measurements and valuation models.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
1995	Demsetz, H.	USA	The objective was to propose a method that could be applied when measuring the relationship between share prices and EPS. The study used t-statistics associated with multiple regressions to analyse the relationship between EPS and share prices of manufacturing American companies. There were, however, some shortcomings to the statistics, because the sum of the t-statistics was unknown and the researcher failed to indicate asymptotic results for the study, while no standard errors were calculated for the sample.	A sample of 489 manufacturing firms was selected and t-statistics were drawn up from 1962 to 1981. The researcher constructed a multiple linear regression for each year. Each regression contained 20 variables – a contemporaneous EPS variable and 19 other lag and lead EPS variables. It was concluded that contemporaneous EPS variables had a greater impact on share prices than lag or lead EPS variables.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/ Research question(s)	Findings
1998	Balsam, S. and Lipka, R.	USA	In accordance with American accounting practices during the period of the study, American firms were required to publish primary, basic and diluted EPS figures. The researchers were of the opinion that earnings figures could explain stock prices and wanted to determine which EPS figure was most relevant to investment decision making. The hypothesis posited that diluted EPS took additional accounting information into account and that this EPS figure should, ultimately, have a greater explanatory power with regard to share prices. Three research questions were set out: 1) Are EPS figures equally important? 2) Are EPS figures incrementally informative? 3) Which earnings measure is most informative?	A sample size of 3 646 firms was selected and the relationship between primary EPS, basic EPS, diluted EPS and share prices were analysed from 1975 to 1993. The researchers suggested that basic and primary EPS were equally informative, while diluted EPS was most informative. Furthermore, primary and basic EPS possessed incremental information about each other. Diluted EPS was most incrementally useful. It was concluded that the best measure of performance to the investor is diluted EPS.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2000	Auret, C.J. and De Villiers, J.U.	South Africa	The researchers identified both EPS and dividends per share as factors that influence share prices. The main objective of the study was to determine which factor had more explanatory power with regard to share prices. It was argued that both factors could potentially signal firm value and affect share prices. The researchers applied the basic research method of Demsetz (1995) to South African firms in order to determine whether one factor should be considered pre-eminent by investors.	Applicable data were obtained from the I-Net data base. A total of 67 industrial companies were selected from the JSE, and financial information between 1981 and 1997 was analysed. Multi-regression analysis was applied. The results suggested that EPS was a better explanatory variable than dividends per share. It seemed, therefore, appropriate for investors to rely on earnings analysis when share prices were being predicted. It was concluded that EPS was a meaningful accounting measurement.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2003	De Villiers, J.U., Hamman, W.D., Joubert, C. and Le Roux, N.J.	South Africa	The researchers suggested that EPS and cash flow per share can explain share price behaviour. The research question was as follows: 'Should analysis focus on accounting profits, cash flow or another accounting measure?' Demsetz (1995) developed a technique to determine the relationship between accounting profits and share prices. Bootstrap methodology was applied in this study, in which the method of Demsetz (1995) was used, but improved upon by calculating standard errors, percentiles for distributions and confidence coefficients for the selected sample.	A total of 64 industrial firms were selected from the JSE as a sample. All applicable data were selected between 1980 and 1999. T-statistics were applied and empirical results indicated that changes in EPS could better explain changes in share prices than cash flow per share. Therefore, cash flow per share showed less explanatory power than EPS. The study confirmed that the publication of EPS was meaningful, despite the criticism against it.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2004	Nichols, D.C. and Wahlen, J.M.	USA	The study aimed to analyse the relationship between earnings information and stock returns. The objectives were as follows: 1. To demonstrate the relationship between changes in earnings and stock returns and compare the relationship between earnings and stock prices with the relationship between cash flow from operations and stock prices. 2. Demonstrate the impact of earnings persistence on stock prices. 3. Assess the efficiency with which capital markets impound earnings information into share prices.	Samples were collected from the New York Stock Exchange, AMEX and NASDAQ. For the period 1988 to 2002, 90 470 observations were recorded. The results indicated that stock returns were significantly related to earnings and that stock prices responded strongly to earnings information. Operating cash flow presented a weaker relationship to stock prices. Furthermore, greater returns were associated with higher earnings persistence and vice versa. Share prices reacted rapidly to new earnings information, but when extreme earnings surprises occurred, market reactions were incomplete.

Table 2.3: Previous research on the relationship between EPS and share prices (continued

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2007	De Wet, J.H.V.H. and Du Toit, E.	South Africa	The study identified six performance indicators of a firm: EVA, ROE, EPS, dividend per share, interest bearing debt to total assets and cash flow from operations. The objective was to determine which performance indicator would best correlate with shareholders returns (that is dividends plus change in market price per year). The researchers were of the opinion that ROE is a poor measure of corporate performance and attempted to identify a superior performance measure within the South African business environment.	A sample of 83 industrial listed companies were selected for the empirical study and data for the period 1996 to 2005 were collected. The linear regression between the six performance indicators and shareholders returns were measured and the results indicated that none of the performance measures displayed a strong relationship to shareholders return. The dividend per share measure correlated less poorly with the shareholder returns, which could be expected, because dividends were included in the calculation of these returns.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2008	Chang, H., Su, C., Chen, Y. and Chang, Y.	Taiwan	The researchers were of the opinion that earnings information contained great informative content which could be related to stock price behaviour. The objective of the study was to investigate the relationship between stock prices and EPS of electronic firms listed on the Taiwan Stock Exchange. Furthermore, the study aimed to determine the degree to which the stock prices responded to the EPS figure and whether a firm's growth rate could impact the relationship between stock prices and EPS.	A sample of 75 listed electronic firms was selected for the study. Relevant information was collected for the period 1997 to 2006. A null hypothesis was used to analyse information, and the results indicated that stock prices moved with EPS in the long run, but not necessarily at the same rate. Furthermore, an inverse relationship was found between growth rates in operating revenue and the EPS impact on share prices. When growth rates in operating revenue were higher, EPS trends correlated better with share prices.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2010	Erasmus, P.D.	South Africa	The value of a company's share price can be influenced by many factors. Among these factors are EPS, dividends per share and cash flow per share. The study aimed to determine the relationship between share prices and volatilities in EPS, dividends per share and cash flow per share, in order to determine which of the three factors correlated best with share price behaviour. These three factors were identified in a literature review and further studied by means of empirical research.	A total of 236 firms were selected as a sample from the JSE. Relevant information for the period 2000 to 2009 was obtained from the McGregor database. The researcher performed both a Spearman Rank Order Correlation Analysis and a multiple regression analysis. The results indicated a significant relationship between share prices and volatility of EPS and dividends per share, where EPS delivered the highest correlation coefficients. Cash flow per share volatility did not have a significant relationship with share prices. It was concluded that both EPS and dividends per share were important considerations to the investor.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2011	Sharma, S.	India	This study considered previous literature and identified seven variables that could influence share prices: • Book value per share; • Dividend per share; • EPS; • Price–earnings ratio; • Dividend yield, • Dividend pay-out; and • Size of the firm in terms of sales and net worth. The objective of the study was to determine the relationship between share prices and the seven variables above, in order to establish financial factors that are useful to investors in India.	A sample of companies was selected from the Bombay Stock Exchange. A total of 73 companies were identified within the following sectors: engineering, cotton textile, chemical, and iron and steel. Variables were analysed for the period 1993 to 2009. A linear multiple regression model was constructed and results indicated that EPS and dividend per share were able to correlate best with share prices. The researcher concluded that both dividends and earnings contained explanatory power with regard to share price changes.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2012	Menaje, P.M.	Philippines	Share prices can often have a volatile nature. The main objective of the study was to identify financial measures that have a significant impact on share prices in the Philippines. Two variables were selected for the study: • EPS; and • ROA. The relationship between share price and these factors was studied. The researcher was of the opinion that such research would benefit investors, financial market analysts, professors and students of finance courses.	A total of 50 listed firms in the Philippines were selected as a sample. The researcher performed an analysis on the 2009 financial reports. Information was collected from the OSIRIS data base. A Spearman Rank Order Correlation and a multiple regression model were applied and the results indicated that 73% of changes in share prices could be explained by means of EPS. The researcher concluded that EPS had a significant impact on share prices, while ROA correlated negatively with share prices. Therefore, the application of EPS in the prediction of share prices was justified.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2013	Haque, S. and Faruquee, M.	Bangladesh	The objective of the study was to identify fundamental performance indicators and to determine which indicator could best determine share prices on the Dhaka Stock Exchange. The following performance indicators were identified: • EPS; • Dividend per share; • ROE; • ROA; and • Fixed assets to total assets.	A total of 14 pharmaceutical companies listed on the Dhaka Stock Exchange were selected as a statistical sample. Secondary data were collected for the period 2005 to 2011. A multiple regression analysis was applied. The study indicated that neither one of the five performance indicators correlated with share prices. Therefore, none of the indicators proved to have a significant relationship to share price changes. The researchers concluded that stock prices were influenced by factors other than performance indicators.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2014	Almumani, M.A.	Saudi Arabia	The researcher identified six variables that could influence share prices: • Dividends per share; • Dividend pay-outs; • EPS; • Book value per share; • Price–earnings ratio; and • Size, measured in terms of the natural logarithm of total assets. The objective of the study was to identify the quantitative factor that influences share prices of Jordanian Banks listed on the Amman Stock Exchange.	A sample of 49 observations was collected for the period 2005 to 2011. The researcher obtained an empirical relationship by constructing a linear multi-regression model. From the results, it became evident that EPS had the highest correlation coefficient and, therefore, influenced share prices most. Book value per share and the price–earnings ratio also produced a significant correlation, but lower that EPS. Dividend per share and dividend pay-outs correlated least with share prices and were, therefore, considered unable to influence share prices significantly.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2014	Menike, M.G.P.D. and Prabath, U.S.	Sri Lanka	The main objective was to provide guidance on a company's performance to the users of financial information. Three indicators of company performance was identified: • EPS; • Dividend per share; and • Book value per share. The researcher aimed to investigate the impact of the performance indicators on the stock prices of firms. It was hypothesised that all three the above factors had the potential to influence the share prices of firms listed on the Colombo Stock Exchange.	A total of 100 companies were selected from the Colombo Stock Exchange. Relevant information was collected for the period 2008 to 2012. A multi-regression model was compiled and the findings indicated that dividend per share was most useful in predicting share prices, followed by EPS and book value per share. In the above study, 37% of movements in stock prices remained unexplained.

Table 2.3: Previous research on the relationship between EPS and share prices (continued)

Year	Name of researcher(s)	Location	Research objective/Research question(s)	Findings
2015	Iqbal, A., Ahmed, F., Zaidi, S.S.Z. and Raza, H.	Pakistan	The study aimed to identify variables that determine stock prices of companies in the oil and gas, and cement industry, listed on the Karachi Stock Exchange. The research objective was to consider basic financial ratios as determinants of stock prices. These ratios included: • EPS; • Book value per share; • Dividend per share; • Price–earnings ratio; • Dividend yield; and • Company size, measured in terms of total asset turnover.	The sample of the study consisted of 31 companies. Data were collected for the period 2008 to 2013. A multiple regression model was constructed. The results suggested that EPS was a significant determinant of stock prices in the industries that were researched. The researchers concluded that shares should be evaluated at the hand of EPS in both the oil and gas, and cement industries of the Karachi Stock Exchange.

Source: Researchers listed above

When considering the findings of the preceding studies in Table 2.3, it is apparent that the indicated researchers have formed different opinions on the relationship between EPS and share prices. Table 2.4 is constructed in order to obtain an objective view of arguments from these studies:

Table 2.4: Summary of findings

Findings	Number of studies	% of studies
The association between share prices and EPS is low.	1	6.67%
The association between share prices and EPS is significant.	8	53.33%
The association between dividends and share prices/shareholder returns is significant.	2	13.33%
There is an association between both dividends and share prices and EPS and share prices.	2	13.33%
There are no association between share prices and any performance indicators.	2	13.33%
	15	**100%**

Source: Own research

The majority (53.33%) of these studies indicated that the relationship between EPS and share prices is significant. It would, therefore, seem that the relationship between EPS and share price behaviour is substantial, despite the limitations that were identified.

In summary, the publication of EPS enables the measuring of firm performance (Dechow, 1994:4), serves as a possible indicator of future investment returns (Campbell & Shiller, 1988:672) and assists in the estimation of future stock value (Nichols & Wahlen, 2004:263). It is an indicator that is closely observed by investors, because it is an overall indication of corporate success (Brigham & Ehrhardt, 2007:45). In addition, 53.33% of

previous studies applied in Table 2.3 indicated that the relationship between EPS and share prices is significant. Evidently, it seems from prior research that EPS can be of great value to investors.

Because EPS is a popular financial indicator, definite regulations have been developed for the application and calculation of EPS (Service, 2014:1044). Below follows a discussion of the accounting standard that regulates EPS, namely IAS 33.

2.4.   HISTORY, OBJECTIVE, SCOPE AND MEASUREMENT OF IAS 33

EPS are determined and interpreted in accordance with IAS 33 (Bogdan & Balaciu, 2007:129). In the next section, the history (par. 2.4.1), objective (par. 2.4.2), scope (2.4.3) and measurement (par. 2.4.4) of IAS 33 will be discussed.

2.4.1 History of IAS 33

IAS 33 has a relatively short history. The first Exposure Draft of the Standard was compiled in January 1996 (Deloitte, 2015:1), but was issued by the International Accounting Standard Board (IASB) Committee only during February 1997 (IFRS, 2014a:A1185). Then, IAS 33 was adopted by the IASB in April 2001 (IFRS, 2014a:A1185). IAS 33 was similar to the Financial Accounting Standard (FAS) 128, which was issued by the Financial Accounting Standard Board (FASB) and applied to enterprises active in the field of financial markets (Bogdan & Balaciu, 2007:129). Both of these Standards focus on the computation, presentation and publication of EPS (Bogdan & Balaciu, 2007:129).

During July 2001, the IASB announced that a number of Standards were to be improved, including IAS 33 (IFRS, 2014b:B1973). The IASB's main objective was to remove any redundancies and conflicts between accounting standards and, by May 2002, the IASB published proposed changes in an Exposure Draft (IFRS, 2014b:B1973). Deloitte (2002:1) indicated that the following amendments were made to IAS 33 during 2002:

- Basic and diluted EPS were to be presented for:
  - Profit and loss from continuing operations; and
  - Net profit or loss.

- A potential ordinary share is dilutive when its conversion into an ordinary share causes a decrease in EPS from continuing operations;

- For contracts that may be settled in cash or shares, it must be assumed that shares will always be issued;

- Should an entity purchase its own preference shares for more that their carry value, the excess (above carry value) should be treated as a preferred dividend; and

- Other minor issues were to be revised, including guidance regarding the calculations for contingent issuable shares, potential ordinary shares of subsidiaries, joint ventures and associates, participation securities, written put options, and purchased call and put options.
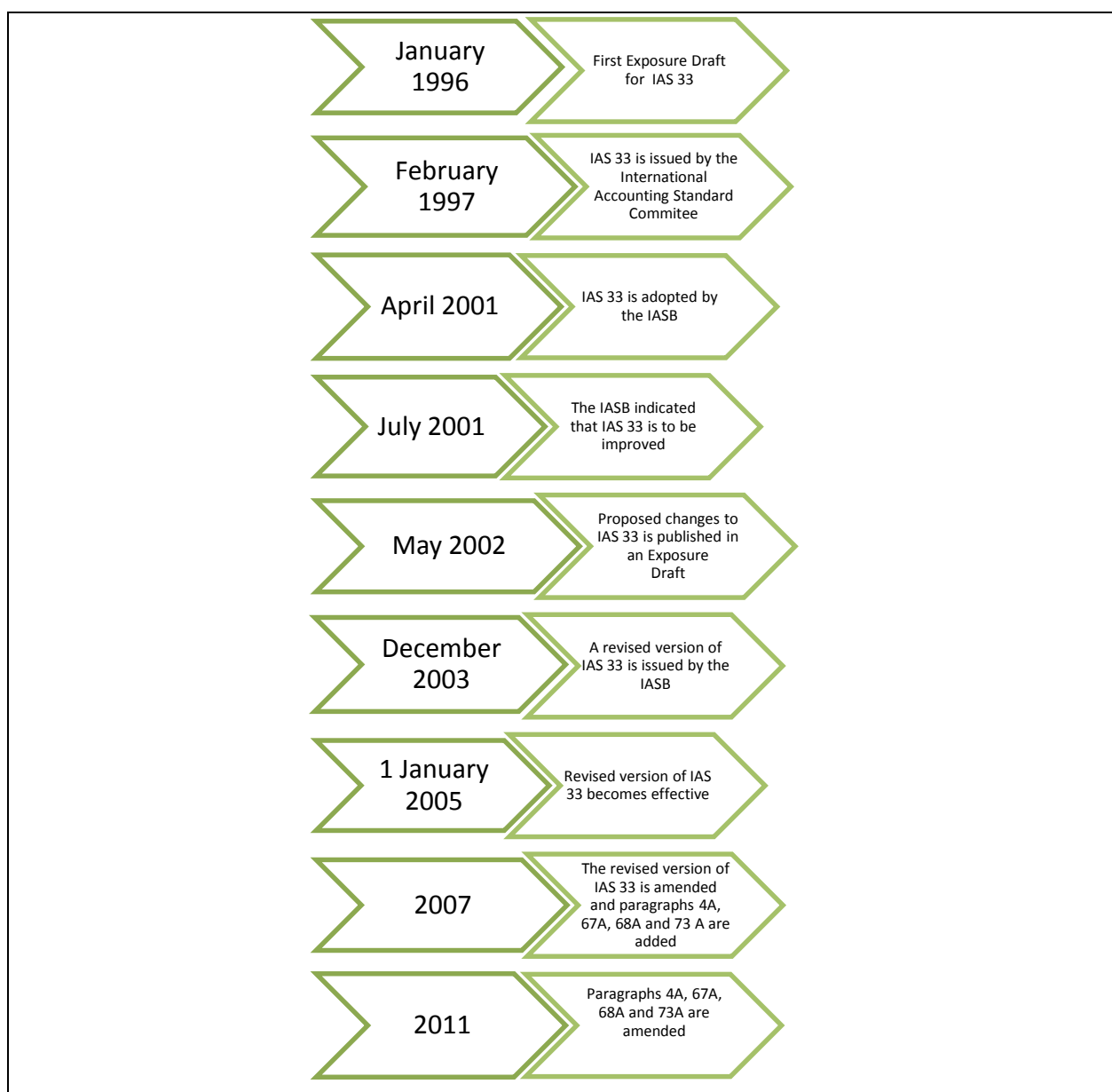
On 18 December 2003, a revised version of IAS 33 was issued by the IASB (Deloitte, 2015:1), but the revised Standard became effective only as from 1 January 2005 (BDO, 2014:1).

The Standard was, however, updated again during 2007. According to the European Commission (EC) (2012:11), the following paragraphs were added: 4A, 67A, 68A and 73A. These paragraphs were incorporated in order to make provision for IAS 1 (Presentation of Financial Statements) (EC, 2012:11). The application of these paragraphs became effective on 1 January 2009 (Deloitte, 2015:1), but was amended again in 2011 (IFRS, 2014a:A1190). The paragraphs were finally presented as follows:

- Paragraph 4A: If an entity presents profit and loss in a separate statement, EPS will only be presented in such a separate statement (IFRS, 2014a:A1190);

- Paragraph 67A: If an entity presents profit and loss in a separate statement, basic and diluted EPS should be presented in the separate statement (IFRS, 2014a: A1202);

- Paragraph 68A: If an entity presents profit and loss in a separate statement, basic and diluted EPS from discontinued operations should be presented in the separate statement or in the notes (IFRS, 2014a:A1203); and

- Paragraph 73A: Indicated that Paragraph 73 would also be applicable to entities that present additional amounts per share using a reported item of profit and loss other than required by the Standard (IFRS, 2014a:A1204).

Illustratively, the history of IAS 33 can be presented as follows:

Figure 2.6: The history of IAS 33

January 1996	First Exposure Draft for IAS 33
February 1997	IAS 33 is issued by the International Accounting Standard Commitee
April 2001	IAS 33 is adopted by the IASB
July 2001	The IASB indicated that IAS 33 is to be improved
May 2002	Proposed changes to IAS 33 is published in an Exposure Draft
December 2003	A revised version of IAS 33 is issued by the IASB
1 January 2005	Revised version of IAS 33 becomes effective
2007	The revised version of IAS 33 is amended and paragraphs 4A, 67A, 68A and 73 A are added
2011	Paragraphs 4A, 67A, 68A and 73A are amended

Source: Own research

Ernest & Young (2008:1) was of the opinion that the amendments to IAS 33 clarified and simplified the calculation of EPS, while the European Financial Reporting Advisory Group (EFRAG) (2008:1) argued that the changes to IAS 33 maintained convergence with the FASB. In the section to follow, the objective of the Standard is investigated.

2.4.2 The objective of IAS 33

The IFRS (2014a:A1189) stated the objective as follows:

> The objective of the Standard is to prescribe principles for the determination and presentation of earnings per share, so as to improve the performance comparisons between different entities in the same reporting period and between different reporting periods for the same entity.

Even though EPS data have limitations because of the different accounting policies that can be applied in determining earnings, the consistent calculation of a denominator enhances financial reporting. The focus of this Standard is on the denominator of the EPS calculation.

Bogdan and Balaciu (2007:129) contended that the IASB wanted to provide a standardised manner in which EPS must be calculated by all entities that are prescribed to do so. Deloitte (2015:1) posited that the publication of EPS must, ultimately, assist the users of financial information to compare the performance of the entity with both itself and other entities. It can, therefore, be reasoned that IAS 33 ensures that investors are able to compare the EPS figures of different entities with one another, and that these comparisons are justified, because the exact same method was applied in calculating EPS.

It would seem that the main objective of IAS 33 is bilateral: to provide a standard method for calculating EPS and to ensure that users of financial statements are provided with comparable earnings information.

In the next section, it will be indicated which type of entities are required to disclose EPS figures in accordance with IAS 33.

2.4.3 The scope of IAS 33

In paragraph two of IAS 33, the IFRS (2014a:A1189) indicated the Standard to apply to the following:

- The separate or consolidated financial statements of an entity whose ordinary shares or potential ordinary shares trade on public markets, or is in the process of

filing with regulatory organisations in order to issue ordinary shares in public markets;

- Should the entity publish consolidated and separate financial statements, the Standard needs to be presented only in the consolidated statements; and

- If an entity voluntarily presents its EPS, and published both separate and consolidated statements, it shall present its EPS only in the separate financial statements.

Three of the Big Five audit and advisory firms commented on the application of the scope of IAS 33. Deloitte (2015:1) and BDO (2014:1) both posited that an entity can choose to present EPS information voluntarily, but is then obligated to provide disclosures in accordance with IAS 33, while PwC (2013:1) stated that entities listed on a stock exchange will, ultimately, be targeted by the Standard.

In short, the scope of IAS 33 includes entities that trade their shares publically or intend to trade shares on public markets in future, or entities that willingly present EPS information to the users of their financial information.

In the section to follow, the methods by which EPS must be calculated, will be explored.

2.4.4 Measurement of IAS 33

PwC (2013:1) indicated that IAS 33 measures two categories of EPS: basic and diluted. According to the IFRS (2014a:A1191), basic EPS is calculated by dividing profit or loss attributable to ordinary shareholders by the weighted average number of outstanding ordinary shares. The weighted average number of shares will take into account all existing ordinary shares, newly issued shares and mandatory convertible instruments (BDO, 2014:1). Furthermore, the weighted average number of shares can also be influenced by capitalisation issues, rights issues, share splits and share buybacks (Koppeschaar *et al.,* 2013:607)*.* Basic EPS will be applicable to all entities that disclose EPS, because even the simplest form of capital structuring will accommodate the basic EPS (Vaidya, 2014:1). The objective of basic EPS is to provide a measurement of each ordinary share in the performance of an entity during the reporting period (IFRS, 2014a:A1191).

Diluted EPS is calculated by adjusting profit or loss attributable to the ordinary shareholders and the weighted average number of shares for effect of all dilutive potential ordinary shares (IFRS, 2014a:A1195). Diluted EPS is applicable to companies that have complex capital structures, because it requires the entity to hold instruments such as convertible preference shares, convertible debentures, contingently issuable shares and options before diluted EPS can be calculated (Vaidya, 2014:1).

In calculating diluted EPS, the information required for basic EPS can be used as a starting point (Vaidya, 2014:1). The average weighted number of shares is adjusted for any potential ordinary shares that can be issued as a result of convertible instruments or share options (IFRS, 2014a:A1191). The total basic earnings are adjusted for any after-tax savings that would arise when convertible instruments are exchanged for ordinary shares (BDO, 2014:1). According to the IFRS (2014a:A1195), after-tax savings include the following:

- Any dividends that are related to dilutive potential ordinary shares;
- Any interest that is related to dilutive potential ordinary shares; and
- Any changes in income or expenses that result from the conversion of dilutive potential ordinary shares.

The objective of dilutive EPS is to provide a measurement of each ordinary share in the performance of an entity in the reporting period, after the effect of all potentially dilutive ordinary shares has been taken into account (IFRS, 2014a:A1195).

From the preceding information, Figure 2.7 summarises the objective, scope and measurement of IAS 33:

Figure 2.7: The objective, scope and measurement of IAS 33
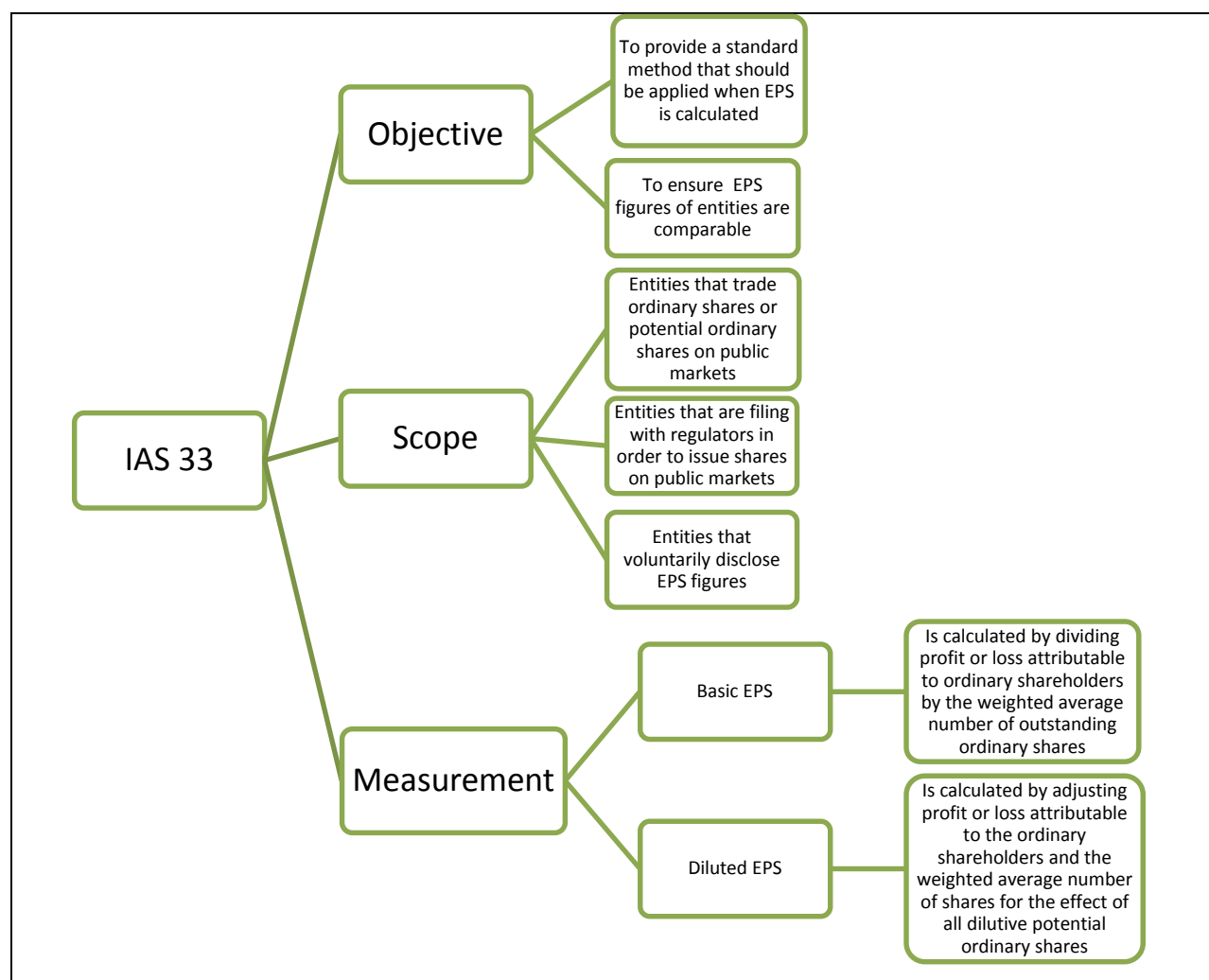
Source: Adapted from IAS 33 (IFRS, 2014a:A1189-A1201)

Figure 2.7 provides an overview of the objective, scope and measurement of IAS 33. The objective is to provide a method to calculate EPS to ensure EPS figures of entities are comparable. The scope indicates that the Standard is applicable to companies that trade ordinary shares or potential ordinary shares, companies that are in the process of issuing shares on public markets, or companies that are voluntarily disclosing EPS information. The measurement indicates that IAS 33 measures both basic and diluted EPS.

It is important to note that headline EPS does not fall within the measurement of IAS 33 and is, thus, not prescribed by the Standard (SAICA, 2013:4). Headline EPS is prescribed

by the JSE, and is a requirement with which JSE listed entities must comply (SAICA, 2013:4).

Because headline earnings does not form part of IAS 33, it will discussed separately. In par. 2.5, which follows, the method of calculating and the use of headline EPS will be explored.

2.5 THE MEASUREMENT AND PRACTICALITY OF HEADLINE EARNINGS PER SHARE

In 1997, the JSE began to use headline EPS as a JSE statistic, and listed entities were obliged to display this category of EPS in their financial statements (Stainbank & Harrod, 2007:92). If listed entities failed to present headline EPS, the JSE used the McGregor Information Service to calculate a headline EPS from available information (Stainbank & Harrod, 2007:92). Normally, headline EPS is calculated by using basic EPS and adding back or deducting any separately identifiable re-measurements from the earnings of the firm (Steenkamp, 2013:1). According to the South African Institute of Charted Accountants (SAICA) (2013:9), examples of items that are specifically excluded from headline EPS include:

- Goodwill impairments;
- Gain on bargain purchase;
- Impairments and impairment loss reversals relating to property plant and equipment;
- Gains and losses on the disposal of property plant and equipment;
- Gains and losses due to sale and leaseback transactions;
- Fair value adjustments on financial assets measured through other comprehensive income;
- Gains and losses on the disposal of an associate or joint venture; and
- Fair value adjustments on investment property on date of transfer.

From these examples, it is evident that a gain or loss, resulting from changes in the carry value of a liability or asset, is excluded from the earnings used to calculate headline EPS (Steenkamp, 2013:1) if such a gain or loss does not fall within the normal trading activities of the entity (SAICA, 2013:6).

There is no requirement for headline EPS to be disclosed on the face of the Statement of Profit or Loss and Other Comprehensive Income, however, headline EPS is disclosed in the notes to the financial statements (Vaidya, 2014:1).

The calculation of headline EPS is based on the Statement of Investment Practice No. 1, a statement used in the United Kingdom which addresses the definition, calculation and interpretation of headline EPS (Stainbank & Harrod, 2007:92). Stegmann (2006:1) explored the importance of headline EPS and used an empirical study to prove that 40% of respondents to his survey considered headline EPS as a more relevant measure than diluted EPS. According to Stegmann (2006:1), empirical evidence indicated that respondents ranked headline EPS as the most useful performance measurement among the categories of EPS, while basic EPS was ranked secondly (Suliman, 2000:86). These findings were in line with a study conducted by Stainbank and Harrod (2007:111) where it was concluded that 95% of entities disclosed headline EPS, that one-third of companies overstated their headline EPS, and that financial managers were of the opinion that headline EPS is the most important measure among per-share measurement instruments. Therefore, it can be argued that users of per-share measurement instruments attach value to the concept of headline EPS.

From the preceding paragraphs, it is apparent that IAS 33 establishes the objective, scope and measurement of EPS. EPS information must be calculated in accordance with IAS 33, which ensures uniformity among all firms that are required to disclose an EPS number. Headline EPS does not fall within the measurement of IAS 33, but remains a JSE disclosure requirement. Although headline EPS is not regulated by IAS 33, it is considered as the most important per-share measurement.

2.9   CHAPTER SUMMARY

The main objective of this chapter was to address secondary research objectives 1 to 4 as discussed in Chapter 1, par. 1.4.2.1.

The chapter commenced with an explanation of why investments are of economic importance. It was found that investments enable investors to earn investment returns and increase their savings. From an economic point of view, investment leads to higher

national income, employment, greater production, reduced poverty and an increase in general living standards. It was, furthermore, indicated that FDI could be employed in order to stimulate investment potential if countries lack the capacity to generate local investments in order to increase national income.

The factors that influence investment decisions were analysed and it was posited that accounting factors are essential to the investment decision process. Three important accounting factors were identified: key ratios, dividend pay-outs and EPS. The identified accounting factors were analysed and the limitations of each were indicated. Fifteen studies were analysed in order to highlight that EPS is a better associate of share prices, despite any recognised limitations. On the other hand, studies by De Wet and Du Toit (2007), Menaje (2012), Haque and Faruquee (2013) and Iqbal *et al.* (2015) were unable to prove a significant relationship between ratios and share prices. Furthermore, Table 2.2 indicated that ratio analysis has a number of important shortcomings. For this reason, ratios will not be considered in the empirical study in the chapters to follow.

In studying the significance of dividend pay-outs, researchers such as Chiang *et al.* (1997) and Auret and De Villiers (2000) indicated that EPS was a better predictor of share prices than dividend pay-outs. Because these researchers have already concluded that dividends are not as effective in associating with share prices as EPS, the empirical chapter will not measure any relations among dividends and share prices.

After confirming that EPS is a useful indicator of performance, return, future earnings and share price behaviour, the Standard which regulates EPS figures, namely IAS 33, was discussed. It was found that IAS 33 provides a clear objective, scope and measurement for EPS figures. It was furthermore noted that IAS 33 has limited its measurement requirements to basic and diluted EPS, while headline EPS was found to be a JSE listed requirement. Despite the fact that headline EPS is not prescribed by IAS 33, it is still considered as an important per-share measurement.

From preceding arguments, only EPS categories were considered in empirical analysis in order to achieve the empirical objectives, because EPS has proven to be a reliable indicator of share price behaviour. In the chapter that follows, the research design and methodology with regard to the empirical study will be discussed.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

"Behind every stock is a company. Find out what it is doing." – Peter Lynch

3.1   INTRODUCTION

Research involves the application of scientific methods and procedures, without consideration of personal opinions or views (Welman *et al.*, 2005:2). It is of great importance to apply proper research methods and techniques in order to ensure the accuracy of research outcomes (Welman *et al.*, 2005:2-3). For this reason, a research method should be selected only if it can provide proper explanations for the problem that is being investigated (Layder, 2013:6). The purpose of this chapter is to provide a complete understanding of the research design and methodology which were applied in this study. The research methodology was formulated with the aim to answer the research question in Chapter 1, par. 1.3, and fulfil the research objectives set out in Chapter 1, par. 1.4.

The chapter provides explanations of terminology that is used when research is conducted and indicates the research question, research design, the population of the study, how the sample of the study was selected and how data were collected and analysed. It also considers the reliability and validity of data and indicates applicable ethical considerations. The chapter commences with an explanation of how research procedures should be organised.

3.2   MANAGEMENT OF THE RESEARCH PROCESS

The term 'research' is regularly used in everyday life and covers a broad spectrum of meanings (Leedy & Ormrod, 2001:3). From a narrowed perspective, 'research' can be defined as the systematic collection and analysis of information in order to increase the understanding of a phenomenon that the researcher is concerned about or interested in (Leedy & Ormrod, 2001:4). The Oxford English Dictionary (2015b) defines 'research' as 'the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions,' while the Hampshire College (2015:1) posits that

'research' is a process of systematic inquiry that entails the collection, documentation, analysis and interpretation of information by applying suitable research methodologies. From these interpretations, the following description of the term 'research' can be formulated: Research is the systematic collection, documentation, analysis and interpretation of information that enable the researcher to reach new conclusions and increase the understanding of the phenomenon that is being investigated.

According to Mouton (2011:56), research can be divided into four stages: identifying the research problem, formulating the research design, ascertaining the research methodology to be applied and documenting the research findings. The stages of research is illustrated by Figure 3.1:

Figure 3.1: The stages of research management
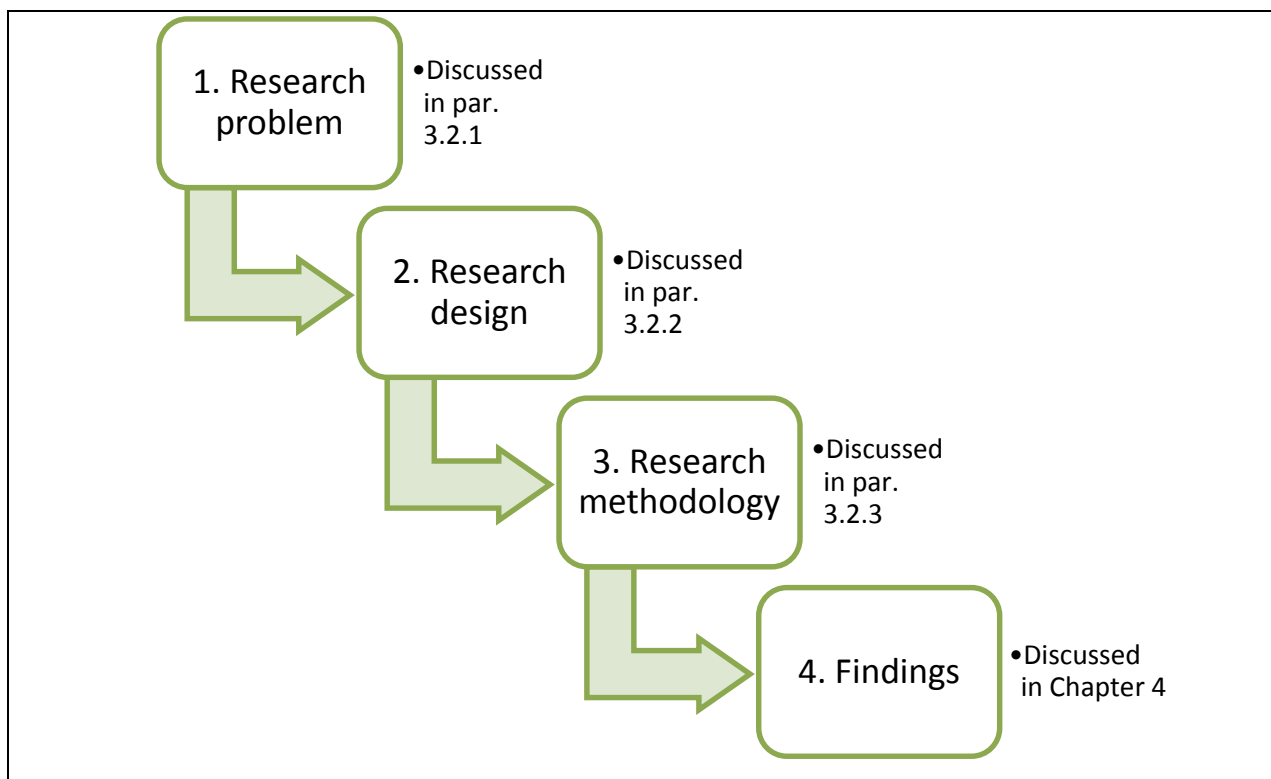
Source: Adapted from Mouton (2011:56)

The format of this chapter will be outlined in terms of the identified research stages.

3.2.1 The research problem

A research problem is often expressed as a general question about the relationship among variables (Bless *et al.,* 2006:29). A research problem should be narrowly defined in order to shift focus to a particular problem that is specific enough to be thoroughly investigated (Welman *et al.,* 2005:13). Greener (2011:27) adds by suggesting that a research problem should state exactly what the research will achieve and that it should extend focus to the study. According to Leedy and Ormrod (2001:52), research problems are identified in three ways:

- By reading and studying literature;
- By attending professional conferences that focus on the discipline under review; and
- By seeking the advice of experts who are actively involved in similar research activities.

In this study, the research problem was stated in Chapter 1, par. 2, in the form of the question: 'Which category of EPS has the greatest effect, if any, on the share price behaviour of the top 40 JSE listed companies?' It aimed to determine the relationship between share prices and the different categories of EPS by establishing which category of EPS can best associate with share price behaviour of the top 40 JSE listed companies in South Africa. This research problem was identified by seeking the counsel of expert academics and researchers employed in the School of Accounting of North-West University's Vaal Triangle Campus.

Below, in accordance with stage two of research management (Figure 3.1), the design of the research will be explained.
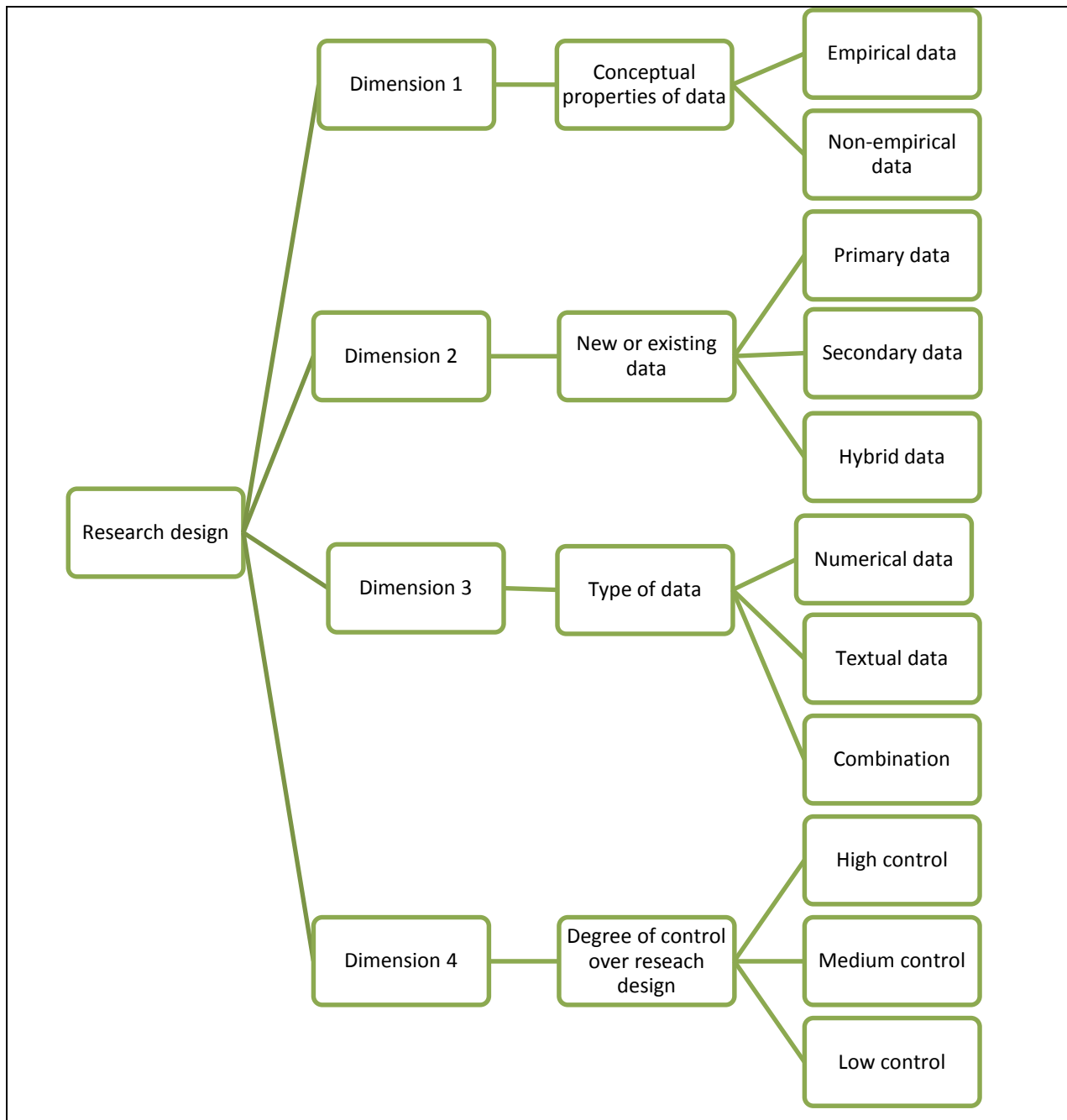
3.2.2 Research design

Tan (2008:25) explained that a research design is a strategy for analysing and understanding events of the proposed research to be conducted. Mouton (2011:55) argued that a research design is 'a blueprint of how the researcher intends to conduct research'. Bless *et al.* (2006:71) contended that research design is 'the specification of adequate operation to be performed in order to reach a certain outcome under given conditions'. It can, therefore, be submitted that a research design is the specification of a

strategy that indicates how a researcher intends to analyse events that are applicable to proposed outcomes under given conditions.

Mouton (2011:146) identified four dimensions of research design. These dimensions can be explained by means of the following illustration:

Figure 3.2: The dimensions of research design

Source: Adapted from Mouton (2011:146)

Figure 3.2 indicates that a research design can be divided into four dimensions. Dimension 1 describes the conceptual properties of the research and is indicative of whether a study is empirical or non-empirical in nature. Empirical studies rely on experimentation and observation without due regard for theory (Merriam Webster Online Dictionary, 2015b), while non-empirical studies are theory driven without being directly reliant on data (WordNik, 2015).

Dimension 2 of research design concerns itself with whether required data already exist or whether data collection is required. Primary data refer to 'first-hand' data that is collected by the researcher him/herself, while secondary data require the researcher to obtain information from others' work or existing sources (Greener, 2011:2). Furthermore, Figure 3.2 indicates that a hybrid design can be used, which combines the use of primary and secondary data.

Dimension 3 aims to determine whether data are textual or numerical. Again, the researcher can opt to apply a combination of textual and numerical data in a study. Textual data refer to information that is presented in written word (Barbour, 2008:10), while numerical data typically involve numbers and statistical information (Barbour, 2008:12).

Dimension 4 indicates the degree of control that the researcher has over a research design. There are three levels of possible control: high, medium or low control (Mouton, 2001:146). The researcher's control over a study is influenced by the nature of variables that are being studied (Welman *et al.,* 2005:115).

Should the dimensions of research design be applied to this specific study, the results can be summarised as follows:

Table 3.1: Application of research design dimensions

Dimension	Description	Application
Dimension 1	Conceptual properties	The study consisted of an empirical analysis, because data were collected and analysed to ensure fulfilment of the primary objective of the study.
Dimension 2	Using new or existing data	This study relied on secondary data, because both the literature review and empirical study made use of existing information.
Dimension 3	Using textual or numerical data	The study used numerical data to fulfil its primary objective. Empirical evidence was collected in the form of numerical information and statistically analysed for the primary objective to be fulfilled.
Dimension 4	Level of control over research design	The level of control over the research design was medium. The researcher's judgement can be applied in the selection of sources and methods, but the study relied on secondary data which cannot be influenced by the researcher.

Source: Own research

From Table 3.1, it is evident that this is a medium controlled empirical study that relies on secondary data, which is numerical of nature. In accordance with stage three of research management (Figure 3.1), the research methodology of the study will be set out below.

3.2.3 Research methodology

Research methodology explores and compares different research methods in order to determine the knowledge that these methods can produce (Greener, 2011:5). Adams *et al.* (2009:25) described 'research methodology' as the research behind all research in respect of both science and philosophy. According to Mouton (2011:56), research

methodology should emphasise the tools and procedures to be applied to a study, while focusing on the individual steps of the research process. It can, therefore, be posited that the term 'research methodology' refers to the specific research methods, tools and procedures that are applied in the research process to enable the generation of scientific or philosophical knowledge.

To analyse the research methodology in detail, the following is considered:

- The type of research (par. 3.2.3.1);
- Population selection and sampling method (par. 3.2.3.2);
- Data collection (par. 3.2.3.3);
- Techniques for data analysis (par. 3.2.3.4);
- Validity and reliability of data (par. 3.2.3.5); and
- Ethical considerations (par. 3.2.3.6).

3.2.3.1 Types of research

Researchers differentiate between different types of research. Durrheim (2006:44) identified three different types of research:

- Exploratory, descriptive and explanatory research;
- Quantitative and qualitative research; and
- Applied and basic research.

The different types of research are analysed in the paragraphs to follow.

Exploratory, descriptive and explanatory research

In research cases where little is known about the research topic, an exploratory approach is followed (Bless *et al.*, 2006:43). This type of research aims to discover areas for future research by developing questions for further investigation (Cooper & Schindler, 2008:146). Exploratory research is also carried out to investigate the possibility of undertaking a particular research study (Kumar, 2011:11). From these interpretations, it is submitted that exploratory research takes place when researchers aim to discover little known research areas in order to establish new questions and investigate the possibility of further research.

Descriptive research is interested in describing a phenomenon (Bless *et al.*, 2006:43). It involves the collection of data and investigation of how many times a characteristic can be observed within a data set (Brynard & Hanekom, 2008:7-8). The observations made during a descriptive study can be investigated further by means of explanatory research (Blumberg, 2008:11). Therefore, descriptive research is performed when researchers are concerned with describing a phenomenon by means of the observation of its characteristics within a data collection.

Explanatory research provides proof of relationships between variables by demonstrating that a change in one variable causes a change in another variable (Bless *et al.*, 2006:43). Kumar (2011:11) supports this view by suggesting that explanatory research is undertaken to clarify the relationship among aspects or phenomena. It is, therefore, submitted that explanatory research explains relations among research subjects in order for these associations to be clarified. Explanatory research was performed in this study, because the study aimed to determine the relationship among EPS figures and share price changes.

Quantitative and qualitative research

Quantitative research excels at identifying statistically significant relationships among variables which demonstrate the distributions and associations among these variables (Barbour, 2008:11). Maree (2010:145) argued that quantitative research uses numerical data obtained from a research sample and generalises results to the field that is being explored. Adams *et al.* (2009:26) concluded that this type of research is performed by means of statistical analysis. Thus, quantitative research is performed when numerical data are collected and statistically analysed to identify relationships among variables which can be generalised to the sample field. According to Leedy and Ormrod (2001:101), quantitative research is also referred to as traditional, experimental or positivist research approaches.

Research is qualitative in nature when it involves language, words and sentences (Bless *et al.*, 2006:44). Brynard and Hanekom (2008:37) argued that qualitative research requires experiences and perceptions to be put in writing. Qualitative research provides more sensitive and meaningful ways of recording experiences (Bless *et al.*, 2006:44).

This approach provides an in-depth descriptive report of an event or activity (Gast, 2010:16). The usefulness of qualitative research lies in the fact that it serves as a source for the generation of research questions (Gast, 2010:16). Furthermore, qualitative research considers explanations or accounts for links that have been observed by means of quantitative research (Barbour, 2008:11). From these arguments, it can be asserted that qualitative research is performed when experiences and perceptions are documented by means of language in order to describe events or activities. Qualitative research can provide explanations for observations that are recorded in quantitative studies.

For the purpose of this study, quantitative research methods were used to study and demonstrate the effect of EPS categories on share price behaviour. Chapter 4 provides the statistical analysis of the quantitative data.

Applied and basic research

Applied research is performed when a researcher is concerned with solving a particular problem that a specific community faces (Bless *et al.,* 2006:44). It aims to enhance decision making and problem solving (Durrheim, 2006:45). Applied research normally refers to the application of basic research findings in order to overcome particular challenges (Bless *et al.*, 2006:45). From these interpretations, it can be suggested that applied research takes place when researchers solve specific problems through the application of basic research in order to enhance decision making and problem solving.

Basic research enhances knowledge about the world we live in (Durrheim, 2006:45) and contributes to the understanding of a phenomenon by gathering facts and information which develop and challenge existing theories (Bless *et al.,* 2006:45). It also involves the testing of theories and hypotheses that are intellectually challenging (Kumar, 2011:10). According to these interpretations, basic research is collecting facts and information to understand or challenge existing theories and phenomena.

Applied research was conducted in this study, because the findings can affect the investment decisions taken by investors.

Next, par. 3.2.3.2 will indicate the population and sample of the study.

3.2.3.2 Population and sampling

A population is a defined group of elements or characteristics (Adams *et al.,* 2009:96). Welman *et al.* (2005:52) explained that a population 'encompasses the total collection of all units which the researcher wishes to draw conclusions from'. Burns (2000:83) described a population as the entire group of research objects or events that share at least one general characteristic. It can, therefore, be posited that a population is the total collection of all research objects or events from which the researcher draws conclusions. The population of this study was the top 40 JSE listed companies in South Africa, because these entities represented the research objects from which the study aimed to draw conclusions.

Sampling can be defined as a method that is applied in order to select a small group out of a total population (Brynard & Hanekom, 2008:54). Fink (1995:1) described a sample as a miniature version of a total population which is able to best represent the characteristics of the population in its entirety. Welman *et al.* (2005:55) indicated that a sample is a representative group selected from a population to which results can be generalised. Therefore, a sample can be viewed as a small group selected from a population to represent the characteristics of the specified population. Sampling methods can be divided into two main groups: probability sampling and non-probability sampling (Fink, 1995:9).

Probability sampling occurs when the likelihood of including an element of the population in the sample is determinable (Bless *et al.,* 2006:100). Probability sampling ensures that each element of the population has an equal chance of selection (Adams *et al.,* 2009:89). There are four categories of probability sampling: simple random sampling, systematic sampling, stratified sampling and cluster sampling. Table 3.2 will explain each of these categories of probability sampling:

Table 3.2: Categories of probability sampling

Category	Explanation
Simple random sampling	This category is based on the idea that all bias should be removed when a sample is selected. It provides an equal and independent opportunity for all elements to be selected, which supports the principle that no bias can occur. It is done on a 'random' basis, meaning that no criteria for selection exist. It is the most commonly used sampling method in the application of probability sampling. Normally, computers are used to select random objects or individuals from a population.
Systematic sampling	Systematic sampling requires the selection of a random starting point. From the starting point, elements are selected systematically. This could, for example, entail the selection of every tenth unit. It is similar to simple random sampling, but requires the application of the researcher's judgement.
Stratified sampling	Stratified sampling is applied by dividing a population into segments of characteristics that are key to the study. These characteristics might include age, gender, race or any other important characteristic. Each category is randomly sampled within the segment. Stratified sampling is more reliable than simple random sampling, because sample selection can be linked to the research question.
Cluster sampling	Cluster sampling is used in large surveys. The population is divided into clusters. Clusters are randomly selected and all elements within a selected cluster are included in the sample. Cluster sampling can reduce the cost and time required to collect data.

Sources: Fink (1995:10-15), Bless *et al.* (2006:101-105), Greener (2011:62-64), Kumar (2011:203)

Non-probability sampling cannot determine the probability that a research element will be selected (Welman *et al.*, 2005:56). Non-probability sampling is mostly used for the sake of economy and convenience (Welman *et al.,* 2005:56). There are four categories of non-probability sampling: convenience sampling, snowball sampling, quota sampling and focus groups (Fink, 1995:23). An explanation of each of the non-probability sampling methods are provided is Table 3.3.

Table 3.3: Categories of non-probability sampling

Category	Explanation
Convenience sampling	Convenience sampling is when the units or elements that are readily available are used. It is a practical method of selecting a sample from a large population, because it limits the sample to a part of the population that can easily be accessed.
Snowball sampling	Snowball sampling occurs when previously identified members of a group identify other members of the population. The disadvantages of the method includes that it produces a bias sample and that the researcher has little control over selections. This method can be applied in social science research, where sampling can be difficult.
Quota sampling	Quota sampling requires the division of the population into subgroups such as age, gender, demographic origin, etc. A sample is then selected based on the proportions of subgroups required to represent the proportions in the population. This method is considered to be the non-probable equivalent of stratified sampling.
Focus groups	Groups of 12 to 20 individuals are selected to serve as representatives of a population. There is no valid evidence that the small group will be able to reflect characteristics of a total population. This method is, however, useful in guiding survey development.

Sources: Fink (1995:17-23), Bless *et al.* (2006:105-107), Greener (2011:65-67)

The sample selected for this study was the top 40 JSE listed companies during the year 2013. The top 40 in 2013 was selected, because information was analysed from 2005 until 2013 (Chapter 1, par 1.5.2.4). Furthermore, non-probability sampling in the form of convenience sampling was applied. This sample was selected because the financial information of the top 40 JSE listed companies was easily accessible for the purpose of conducting research. These entities also had the highest market capitalisations in South Africa. The sample is indicated by Table 3.4:

Table 3.4: Sample for the study

	Company name	Market capitalisation as at 30 June 2013
1	British American Tobacco Plc	R1.11 trillion
2	SABMiller Plc	R845.49 billion
3	BHP Billiton Plc	R604.78 billion
4	Compagnie Fin Richemont	R470.48 billion
5	Anglo American Plc	R318.90 billion
6	MTN Group Ltd	R322.19 billion
7	Naspers Ltd	R295.03 billion
8	Sasol Ltd	R288.52 billion
9	Standard Bank Group Ltd	R177.81 billion
10	Vodacom Group Ltd	R168.88 billion
11	Kumba Iron Ore Ltd	R154.55 billion
12	FirstRand Ltd	R153.63 billion
13	Old Mutual Plc	R145.55 billion
14	ABSA Group Ltd	R103.06 billion
15	Sanlam Ltd	R99.96 billion

	Company name	Market capitalisation as at 30 June 2013
16	Shoprite Holdings Ltd	R96.00 billion
17	Remgro Ltd	R91.24 billion
18	Nedbank Group Ltd	R88.22 billion
19	Aspen Pharmacare Holdings Ltd	R85.68 billion
20	Anglo American Platinum Ltd	R85.76 billion
21	Bidvest Group Ltd	R78.87 billion
22	AngloGold Ashanti Ltd	R65.22 billion
23	Impala Platinum Holdings Ltd	R64.11 billion
24	Woolworths Holdings Ltd	R57.53 billion
25	Mediclinic International	R56.89 billion
26	Tiger Brands Ltd	R56.38 billion
27	Exxaro Resources Ltd	R54.88 billion
28	RMB Holdings Ltd	R52.08 billion
29	Growthpoint Properties Ltd	R50.50 billion
30	Intu Properties Plc	R50.19 billion
31	Discovery Ltd	R47.73 billion
32	Gold Fields Ltd	R45.54 billion
33	Mondi Plc	R46.98 billion
34	Assore Ltd	R45.83 billion
35	Steinhoff International Holdings Ltd	R45.00 billion

	Company name	Market capitalisation as at 30 June 2013
36	Investec Plc	R42.03 billion
37	Massmart Holdings Ltd	R41.33 billion
38	Imperial Holdings Ltd	R41.12 billion
39	Truworths International	R37.03 billion
40	African Rainbow Minerals Ltd	R36.55 billion

Sources: Courtney Capital (2015)

After the sampling process is completed, relevant data must be collected (Adams *et al.*, 2009:87). The next section explains how data were collected for the study.

3.2.3.3 Data collection

Data should be collected in a way that is directed towards answering the research question (Bless *et al.,* 2006:112). The nature of the collected data should enable the researcher to measure applicable variables that are relevant to the research problem (Welman *et al.,* 2005:135-137). Such measurement involves the assignment of numbers to reflect characteristics and attributes that explain outcomes (Welman *et al.,* 2005:136). The researcher should, therefore, be able to answer the research question by collecting the type of data that would enable the measurement of variables and the application of methods that explain results. Below follows a detailed description of how the applicable data were collected for the study. The study required the collection of two data sets: EPS figures and share prices.

Selection of EPS figures

The categories of EPS served as variables to the empirical study. EPS information was sourced from the McGregor BFA (2015) database, which is a recognised research database.

As discussed in Chapter 1, par. 1.5.2.4, EPS figures were selected for a period of nine years, 2005 until 2013, because IAS 33 became effective only on 1 January 2005 (BDO,

2014:1). Also, entities publish financial statements within six months after financial year-end (Companies Act 71 of 2008), which implies that all financial information pertaining to the 2014 year-end was not available when the empirical research was conducted.

In addition, it must be noted that some of the companies included in the sample were listed on the JSE only after 2005. Therefore, EPS information relating to the periods before the listing dates of these companies was not publically available. As a result, EPS information in some years were not analysed for certain companies. The following table serves as a summary of the research sample and years included or excluded in the empirical analysis. In cases where certain information was excluded, the date of listing is indicated as motivation for the exclusion. The number of observations is also indicated for statistical purposes.

Table 3.5: Years that were included and excluded in the empirical study

Name of the company	2005	2006	2007	2008	2009	2010	2011	2012	2013	Date of listing	Number of observations (n)
ABSA Group Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
African Rainbow Minerals Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Anglo American Plc	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
AngloGold Ashanti Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Anglo American Platinum Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Aspen Pharmacare Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Assore Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
BHP Billiton Plc	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
The Bidvest Group Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9

Name of the company	2005	2006	2007	2008	2009	2010	2011	2012	2013	Date of listing	Number of observations (n)
British American Tobacco Plc	✗	✗	✗	✓	✓	✓	✓	✓	✓	17 October 2008	6
Compagnie Fin Richemont	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Discovery Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Exxaro Resources Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
FirstRand Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Gold Fields Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Growthpoint Properties Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Impala Platinum Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Imperial Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9

Name of the company	2005	2006	2007	2008	2009	2010	2011	2012	2013	Date of listing	Number of observations (n)
Intu Properties Plc	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Investec Plc	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Kumba Iron Ore Ltd	✗	✓	✓	✓	✓	✓	✓	✓	✓	20 November 2006	8
Massmart Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Mediclinic International Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Mondi Plc	✗	✗	✓	✓	✓	✓	✓	✓	✓	29 May 2007	7
MTN Group Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Naspers Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Nedbank Group Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Old Mutual Plc	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Remgro Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9

Name of the company	2005	2006	2007	2008	2009	2010	2011	2012	2013	Date of listing	Number of observations (n)
RMB Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
SABMiller Plc	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Sanlam Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Sasol Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Shoprite Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Standard Bank Group Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Steinhoff International Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Tiger Brands Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9
Truworths International Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9

Name of the company	2005	2006	2007	2008	2009	2010	2011	2012	2013	Date of listing	Number of observations (n)
Vodacom Group Ltd	✗	✗	✗	✗	✓	✓	✓	✓	✓	20 January 2009	5
Woolworths Holdings Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓		9

Source: McGregor BFA (2015) database

As can be observed from Table 3.5, four companies were listed after 2005: British American Tobacco Plc, Kumba Iron Ore Ltd, Mondi Plc and Vodacom Group Ltd. Applicable information for these companies was not analysed for the total period under review (that is 2005 to 2013). As a result, the number of observations totalled 350 (n = 350). The following section indicates how the share prices for the study were selected.

Selection of share prices

Share prices represent another essential variable in the study. Share prices used in the study were sourced from the McGregor BFA (2015) database. Furthermore, closing share prices on selected dates were employed in the study. This is in line with similar research conducted by De Villiers *et al.* (2003) and Auret and De Villiers (2000).

As discussed in Chapter 1, par. 1.5.2.4, three different share prices were selected in measuring correlations among EPS categories and share prices. The first share price was selected 20 days before publication of financial statements, the second share price was selected on the day of financial statement publication, and the last share price was selected 20 days after the publication of financial statements. In selecting three share prices, the study takes into account that market participants could react to EPS information prematurely, immediately or later.

This method of share price selection was employed by Chabalala (2014) and was supported by Swart and Hoffmann (2013:32), who argued that investors react to earnings announcement between 20 and 40 days after proclamation. The dates of financial statement publication were sourced from the Sens (2015) database. The following figure represents the procedures that were applied in order to collect share prices:

Figure 3.3: Procedures for the collection of share price data

Identified the company and financial year for which share data had to be collected.

Accessed the Sens database and obtained the dates on which financial statements were published.

Identified the three applicable dates for share prices: 20 days before publication, date of publication and 20 days after publication.

Accessed the McGregor BFA database and obtained share prices on selected dates.

Included share prices in the database.

Source: Own research

After the EPS and share prices information was gathered, the information was analysed. Paragraph 3.2.3.4 indicates the techniques of data analysis used in the study.

3.2.3.4   Techniques applied in data analysis

When quantitative research is performed, the researcher attempts to make sense of a phenomenon by analysing numerical data (Leedy & Ormrod, 2001:252). In this study, two statistical methods were applied:

- Correlation modelling by means of calculating the Pearson product moment coefficients and R square; and
- Paired t-testing.

According to Field (2009:167), correlation coefficients describe the relationship between variables by indicating whether they are positively related, negatively related or unrelated to one another. Levin (1987:508) posited that correlation determines the nature and strength of relationships among variables. For the purpose of this study, correlation was measured by means of applying two methods: the Pearson product moment coefficient and an R square. The Pearson product moment coefficient (r) is also known as the standardised covariance, which assists in the measurement of relationships (Field, 2009:170). Correlation coefficients evaluate relations by providing

a score between –1 and 1, where –1 represents the perfect negative relationship and 1 the perfect positive relationship (Field, 2009:170). A correlation coefficient above .5 indicates a large correlation (Field, 2009:170). The Pearson product moment coefficient can be used to calculate an R square. R square is indicative of the shared variance between variables (Pallant, 2013:171-172). It suggests how much of the variance in a variable can be explained by another variable (Pallant, 2013:172). R square is a useful measure, because it can determine the substantive importance of an effect among correlated variables (Field, 2009:179). For the purpose of this study, Pearson product moment correlation coefficients and R squares will be calculated among EPS categories and selected share prices (as indicated in par. 3.2.3.3).

Paired t-testing compares the mean scores obtained when different tests are performed on one group of participants (Huizingh, 2007:272). It assumes a null hypothesis that there are no differences in mean scores of outcomes (Huizingh, 2007:272). Paired t-tests indicate whether there are statistically significant differences between mean scores of data sets (Pallant, 2013:253). Should a result be obtained where $p < .05$, it can be accepted that a significant difference in mean scores exist and that differences did not occur by chance (Pallant, 2013:254). For the purpose of this study, tests were performed on the top 40 JSE listed companies. T-testing was applied to correlation coefficients obtained for the period 2005 to 2013. This provides an indication of which correlations delivered higher mean scores.

When correlation modelling and t-testing are performed, an important statistical assumption should be made, namely that the variables are normally distributed (Pallant, 2013:61). After collecting the data in this study, it was discovered that the variables were not normally distributed. For this reason, the data had to be transformed. The transformation of data enables a researcher to obtain distributions that look more normal (Pallant, 2013:96). Transformation does not influence the relationship among variables, but all variables should be converted in the same manner (Field, 2009:154). There is a number of transformations: log transformation, square root transformation, inverse transformation and reciprocal transformation (Field, 2009:155). For the purpose of this study, variables were transformed into natural logarithmic format. Transformations for each year are illustrated in Chapter 4.

In analysing similar studies (Chapter 2, par. 2.3.2.3), it became apparent that several researchers, such as Sharma (2011), Erasmus (2010) and Iqbal *et al.* (2015), applied multiple regression to their data. It must be noted that multiple regression could not be applied to this study, because the categories of EPS are all related to one another, as demonstrated by Figure 1.2 in Chapter 1. This leads to multicollinearity. Multicollinearity refers to a relationship among independent variables (Pallant, 2013:157). Multicollinearity does not contribute to an effective model (Pallant, 2013:157) and, for this reason, EPS categories should not be applied as independent variables in a multiple regression model that predicts share prices.

It is submitted that the selected statistical methods are sufficient to determine the impact that EPS categories have on share price behaviour. The selection of these statistical methods are in line with similar studies performed by Erasmus (2010) and De Villiers *et al.* (2003).

In applying the relevant statistical methods, the BMI SPSS Statistics Software (Version 22.0 for Windows) was used. SPSS enabled the researcher to obtain all relevant statistics to be included in Chapter 4. In the next section, the validity and reliability of data are considered.

3.2.3.5 Validity and reliability of data

According to Bless *et al.* (2006:156), validity strives to determine what an instrument measures and what the results really mean. Henning *et al.* (2009:147) posited that validity measures whether a researcher is actually investigating what he/she claims to be investing. In the same vein, Welman *et al.* (2005:142) contended that validity is the extent to which research findings accurately represent an actual situation. Furthermore, validity of research should be documented to enable the measurement of the research instrument's accuracy (Litwin, 1995:34). From these interpretations, it can be suggested that validity refers to the capacity of a research instrument to precisely measure what it purports to measure.

Reliability measures the uniformity and precision of research instruments (Bryman & Bell, 2007:162). Reliability should determine how accurate and consistent a research instrument is (Bless *et al.,* 2006:156). Brynard and Hanekom (2008:48) explained that an instrument must produce the same results under similar circumstances in order to

be reliable. It can, therefore, be posited that reliability refers to the ability of a research instrument to accurately and consistently measure research results.

Reliability of data can also be tested statistically. Cronbach's alpha is a widely used scale of reliability which splits data items into two, in every possible way they can be divided, and computes correlations for every possible split (Field, 2009:674). An outcome of .7 or more is an indication of reliable variables (Field, 2009:674). Cronbach's alpha was applied to the selected variables of this study and the outcomes were as follows:

Table 3.6: Cronbach's alpha

Year	Cronbach's alpha
2005	0.930
2006	0.925
2007	0.950
2008	0.950
2009	0.909
2010	0.932
2011	0.940
2012	0.938
2013	0.925

Source: Own research

Table 3.6 displays the Cronbach's alpha obtained for the data of each year. As can be observed, this measure ranged from .91 to .95 for all the years included in the study. It would seem that all scores were above the statistical benchmark of .7 and it can be posited that the selected variables were classified as statistically reliable.

For the purpose of this study, the audited financial statements of the top 40 JSE listed companies were obtained. Data were processed in order to fulfil the empirical research objectives set out in Chapter 1, par. 1.4.2.2, by applying the same statistical methods to the financial information of all the companies involved. The statistical variables obtained proved to be reliable when Cronbach's alpha was applied. In collecting applicable data, the McGregor BFA database and the Sens database were used. Both these databases are recognised as reliable research instruments. Furthermore, data

were analysed by employing the SPSS Software Package. SPSS is able to analyse data accurately by applying any selected statistical technique. In addition, an independent qualified statistician assisted in the data analysis and advised on the compilation of the statistical evidence. The data collection and analysis could, therefore, be considered to be valid and reliable.

3.2.3.6   Ethics in research

Research often has an ethical impact on research participants (Greener, 2011:143). For this reason, research must be performed ethically (Greener, 2011:143).

Ethics requires for action to be taken in an honest and responsible manner which reflects integrity (Adams *et al.,* 2009:35). Ethics in research is concerned with what is right or wrong in the conduct of research (Mouton, 2011:238). Researchers should strive to maintain objectivity and integrity by adhering to ethical standards in research, indicating the limitations of their findings, expressing their judgements accurately and justly, and presenting their findings in a manner that does not misrepresent the findings (Mouton, 2011:240).

Welman *et al.* (2005:181) stated that research should be concerned with honesty and respect for the rights of participants. According to Bless *et al.* (2006:142-143), the following are important guidelines when research is conducted:

- Participants must provide informed consent with regard to their participation in research;
- Information provided by participants must be treated confidentially;
- If a participant's well-being is compromised as a result of research, the participant must be referred to a counselling centre or medical facility; and
- Participants must be given the assurance that participation in the research may be discontinued at any time.

For the purpose of this study, minimal possible ethical issues were present. The study did not rely on surveying and did not require contributions by research participants. Secondary data were used, which are considered public knowledge. Furthermore, the ethics committee of the North-West University (Vaal Triangle Campus) approved the conducting of the research. The researcher had to, however, report research findings and judgements in an objective fashion. The latter was purposefully done in this study.

3.3   CHAPTER SUMMARY

The purpose of this chapter was to provide a complete overview of the research design and methodology applied in the study, hence addressing the last theoretical objective (Chapter 1, par. 1.4.2.1).

The chapter commenced with a description of the process of research management, which indicated four important stages: identifying the research problem, determining the research design, defining the research methodology and obtaining research findings. The research problem was discussed and it was indicated how the problem was identified and constructed.

Four dimensions of research design were pointed out, and it was indicated that the study used empirical information, relied on secondary data, employed numerical information and that the researcher had medium control over the research design.

With regard to research methodology, it was stated that explanatory and applied research were conducted in this study. Furthermore, it was indicated that quantitative research methods were applied in the study. The population and sample of the study were specified, while indicating that non-probability sampling was applied in the form of convenience sampling.

Two sets of data were gathered: EPS figures and share prices. Information was collected from the BFA McGregor and Sens databases. Collected data were analysed by employing the SPSS software package.

The validity and reliability of the data were established and it was concluded that reliable and accurate research instruments were employed. Lastly, it was indicated that the study was performed on an ethically sound basis. In Chapter 4, the research findings of the study are presented and analysed in detail.

CHAPTER 4
EMPIRICAL RESEARCH FINDINGS

"In the end, all business operations can be reduced to three words: people, product and profits." – Lee Lacocca

4.1   INTRODUCTION

EPS figures provide a link between accounting information and the market's own estimation of share values (Moles *et al.*, 2011:332). For this reason, EPS is able to influence share price behaviour (Ahmed, 2006:1). For the purpose of measuring EPS, IAS 33 has made provision for two categories of EPS, namely basic EPS and diluted EPS, while the JSE requires the publication of headline EPS (BDO, 2014:1), as discussed in Chapter 2. However, it remains unclear which category of EPS influences share prices to the greatest extent.

The primary objective of the study is to determine which category of EPS (basic EPS, diluted EPS or headline EPS) best associate with share prices of the top 40 JSE listed companies. The primary objective is supported by the identification of secondary objectives set out in Chapter 1, par. 1.4.2. Among these secondary objectives, the following empirical objectives were identified:

- Determining which category of EPS (basic EPS, diluted EPS or headline EPS) correlates best and least with the changing behaviour of share prices on the JSE from 2005 to 2013;
- Making recommendations towards which category of EPS, or combination thereof, investors should ultimately consider when making an investment decision; and
- Making recommendations towards the category of EPS that is least useful to investors.

This chapter attempts to determine the category of EPS that can best relate to share prices of the top 40 JSE listed companies by fulfilling the empirical objectives listed previously. These empirical objectives are achieved through the application of quantitative research methods. The following statistical methods are applied in this chapter, as discussed in Chapter 3, par. 3.2.3.4:

- ✓ Correlation modelling in order to calculate:
  - The Pearson product moment correlation coefficient; and
  - R square, to indicate the value of shared variance.
- ✓ Paired t-testing, in order to calculate mean scores and statistical significance of correlation coefficients obtained.

Statistical information was obtained by using the SPSS software package. Statistical methods were applied to the top 40 JSE listed companies as identified in Chapter 3, par. 3.2.3.2. A large number of observations were included in the sample (n = 350), for the period 2005 to 2013. These observations were summarised in Chapter 3, Table 3.5. The number of observations per separate year is indicated by Table 4.1:

Table 4.1: Number of observations per year

Year	Number of observations
2005	36
2006	37
2007	38
2008	39
2009	40
2010	40
2011	40
2012	40
2013	40
Total	**350**

Source: Own research

Table 4.1 indicates that not all years included a total of 40 observations. Reasons for missing observations were discussed in Chapter 3, par. 3.2.3.3. The following section provides a detailed discussion of the organisation of the findings that were obtained by means of the statistical methods to the previously indicated observations.

4.2 ORGANISATION OF EMPIRICAL FINDINGS

Bless *et al.* (2006:3) posited that research is empirical in nature when the observations that are being made constitute knowledge. Empirical methods are justified only when supported by fact (Bless *et al.,* 2006:3). Empirical findings entail that a researcher has discovered or confirmed the existence of a phenomenon (Mouton, 2011:113). For the purpose of this study, the relationship between share price behaviour and the different categories of EPS was observed in order to elaborate on the phenomenon that EPS figures can associate with share price behaviour. In order for knowledge to be generated, statistical observations were organised in an orderly manner. The following figure indicates how the empirical findings were organised:

Figure 4.1: Organisation of empirical findings
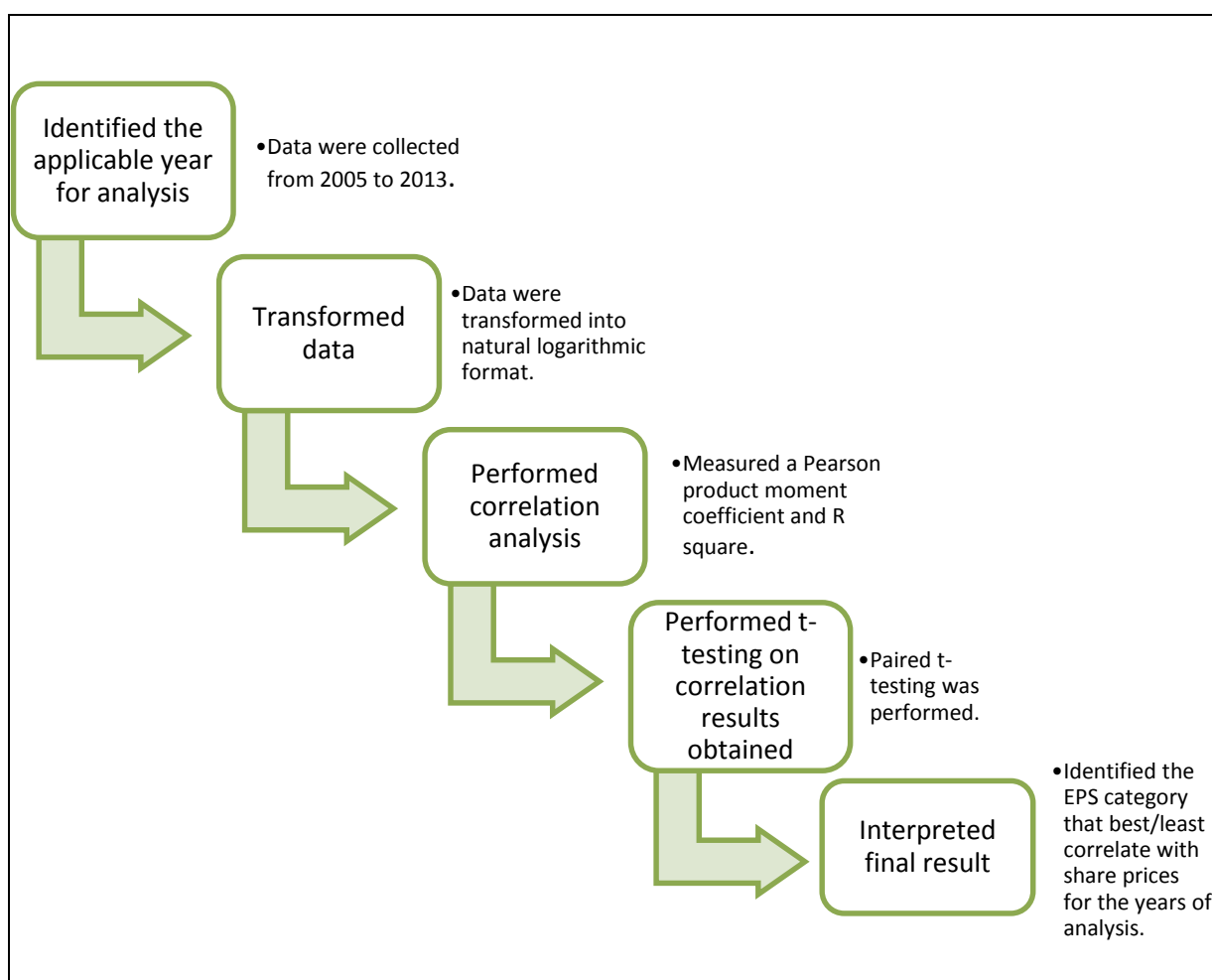
Source: Own research

Figure 4.1 indicates how the statistical observations are organised in the paragraphs to follow. Measurements are performed for the top 40 JSE listed companies per

separate year (2005 to 2013). The figure continues to indicate that data must be transformed to logarithmic format in order for distributions to be rendered normal and for statistical methods to be applied subsequently. After the transformation, the correlations were measured and a Pearson product moment correlation coefficient (r) was determined. When a correlation coefficient is measured, it should be interpreted as indicated by Table 4.2:

Table 4.2: Interpretation of correlation coefficients

Range	Interpretation
$0.1 < r < 0.29$	Correlation is weak
$0.3 < r < 0.49$	Correlation is medium
$0.5 < r < 1$	Correlation is strong

Source: Pallant (2013:139)

After the calculation of a Pearson product moment correlation coefficient, an R square can be calculated by multiplying the Pearson coefficient by itself. R square measures the amount of variance in one variable that is shared by the other (Field, 2009:179). When both the Pearson coefficient and R square had been calculated in the study, correlation results were applied in a paired t-test. The t-test served as an indication of whether differences between correlation measures were significant. Significance is reached if $p < .05$ (Pallant, 2013:254). Then, results were interpreted in order to determine the effect of EPS categories on share prices.

4.3 THE EMPIRICAL RESEARCH FINDINGS

Once research has been conducted, results must be interpreted (Welman *et al.*, 2005:241). This requires that information be described and conclusions drawn from such descriptions (Welman *et al.,* 2005:241). Research results should ideally resolve the research question or problem (Mouton, 2011:53). The correlations for the top 40 JSE listed companies from 2005 to 2013 are presented in the paragraphs to follow, in order for conclusions to be drawn from the data.
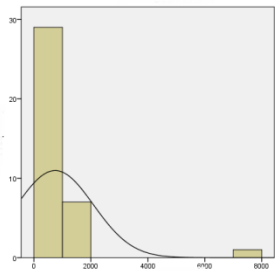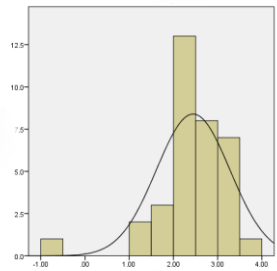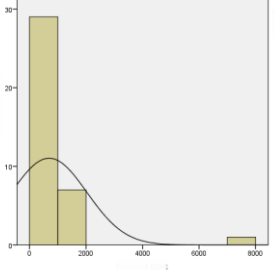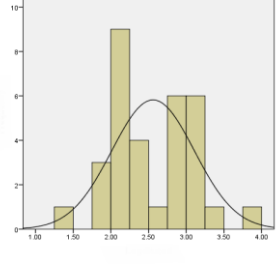
4.3.1 Correlations for the top 40 JSE listed companies during 2005

The analysis of the research findings commenced with the investigation of correlations during 2005. As indicated by Figure 4.1, the data had to be transformed before the application of statistical methods. Variables were mathematically adjusted in order for statistical methods to be applied successfully, because transformation assists data in better meeting assumptions set out by parametric statistical approaches. Only after meeting these parametric approaches, can statistical analysis be performed. Paragraph 4.3.1.1 illustrates the transformation of the data for 2005.
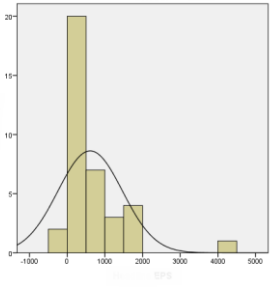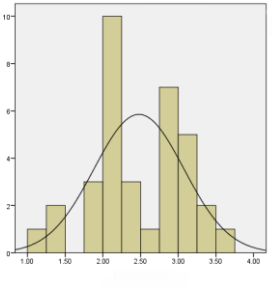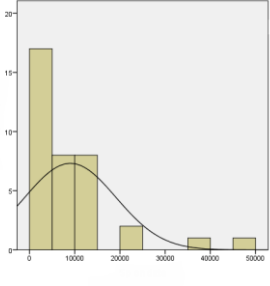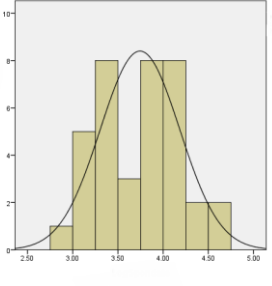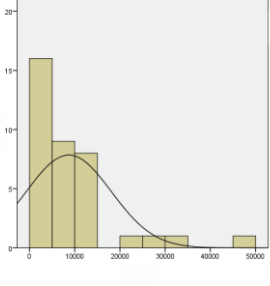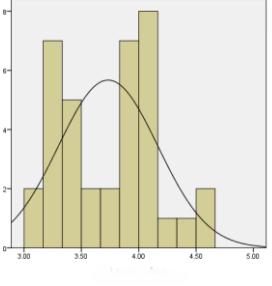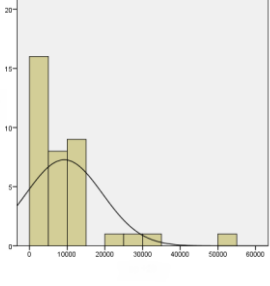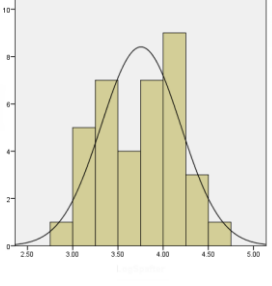
4.3.1.1 Transformation of 2005 data

Table 4.3 demonstrates how the data were converted to logarithmic format in order for normality to be reached. The table illustrates the data distributions before and after conversion in order for transformations to be observed.

Table 4.3: Transformation of 2005 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted EPS	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Headline EPS		LogHeadline EPS	
Share price on date		LogShare price on date	
Share price 20 days before		LogShare price 20 days before	
Share price 20 days after		LogShare price 20 days after	

Source: Own research

As made evident by Table 4.3, new variables were calculated: LogBasic EPS, LogDiluted EPS, LogHeadline EPS, LogShare price on date, LogShare price 20 days

before and LogShare price 20 days after. These newly calculated variables were applied in the statistical analysis, which is described next.

4.3.1.2   Statistical analysis for 2005 data

In accordance with Figure 4.1, the statistical analysis required the measurement of a Pearson coefficient and R square. In this paragraph, the statistical analysis is demonstrated and interpreted. The research findings include the Pearson coefficient (r), the number of included observations (n), the level of statistical significance (p) and the R square (R^2). Table 4.4 is used to exemplify the statistical findings for the year 2005.

Table 4.4: Empirical findings for 2005

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	p	R^2	r	n	p	R^2	r	n	p	R^2
LogShare price on publication date	.54**	36	.001	.292	.52**	36	.003	.267	.46**	36	.007	.207
LogShare price 20 days before	.54**	36	.001	.291	.52**	36	.003	.270	.46**	36	.006	.211
LogShare price 20 days after	.53**	36	.001	.284	.51**	36	.004	.257	.45*	36	.008	.198

**Correlation is significant at the .01 level (two tailed)

Source: Own research

Table 4.4 indicates a positive significant relationship between LogBasic EPS and LogShare prices. A two-tailed test suggests a 99% probability of significance. According to the interpretation of Table 4.2, the correlations are strong. As can be observed, r = .54, n = 36 and p < .01 for LogShare price on publication date. R square = .292, which indicates that 29.2% of changes in LogShare price on the date is attributable to changes in the LogBasic EPS. For LogShare price 20 days before, r =.54, n = 36 and p < .01. Here, an R square of .291 is recorded and it can be posited that 29.1% of changes in the LogShare price 20 days before occurred due to changes in LogBasic EPS. Lastly, r = .53, n = 36 and p < .01 for LogShare prices 20 days after. R square = .284, which indicates that a shared variance of 28.4% exists between LogBasic EPS and LogShare prices 20 days after.

For LogDiluted EPS and LogShare prices, positive significant correlations were obtained. Correlations were computed at a confidence level of 0.01 (two tailed), indicating a probability of 99% significance. Correlation coefficients indicated a strong correlation. LogDiluted EPS and LogShare prices on publication date delivered r = .52, n = 36 and p < .01. An R square of .267 was recorded, indicating a shared variance of 26.7%. LogShare prices 20 days before supplied an outcome of r = .52, n = 36 and p < .01. A shared variance of 27% was obtained. For LogDiluted EPS and LogShare price 20 days after, r = .51, n = 36 and p < .01. Similarly, an R square of .257 was obtained, implying a shared variance of 25.7%. It is, therefore, apparent that LogDiluted EPS was best associated with the LogShare price 20 days before publication of financial statements.

LogHeadline EPS was also significantly linked to LogShare prices. Medium correlations were obtained for this EPS category, while variables proved to move in the same direction (positive association). LogHeadline EPS and LogShare price on publication date provided a 99% probability of significance, resulting in r = .46, n = 36 and p < .01, while a shared variance of 20.7% was recorded. LogHeadline EPS and LogShare price 20 days before similarly proved to be significant at a probability level of 99% (two tailed). Correlation modelling delivered an outcome of r = .46, n = 36 and p < .01. The share variance of 21.1% was verified. Lastly, LogHeadline EPS and LogShare price 20 days after were significantly associated with a probability of 99% statistical significance. Correlations delivered r = .45, n = 36 and p < .01. R square = .184 and it would seem that 19.8% changes in the LogShare price 20 days after were attributable to changes in LogHeadline EPS.

From the above interpretations, it is apparent that LogBasic EPS was able to provide the highest correlation coefficient and R square. It would seem that LogBasic EPS provided the greatest association with the indicated share prices during 2005. On the other hand, LogHeadline EPS delivered the smallest correlations. It is, therefore, posited that LogHeadline EPS was able to least associate itself with the identified share prices during 2005.

After investigating outcomes in 2005, the next section continues to investigate the research findings for 2006.
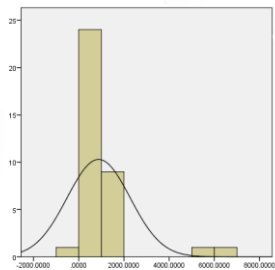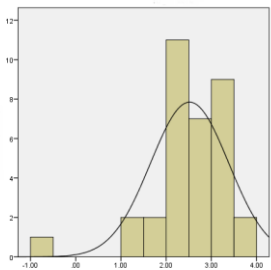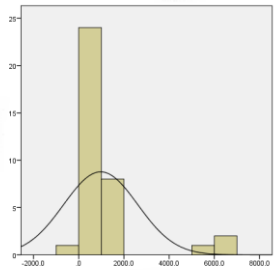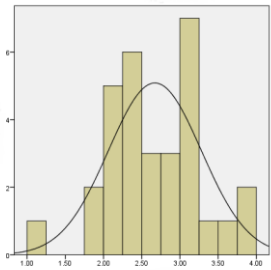
4.3.2 Correlations for the top 40 JSE listed companies during 2006
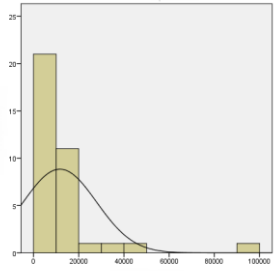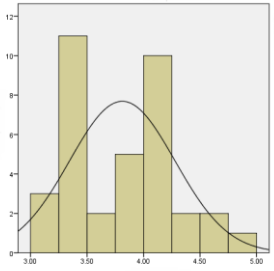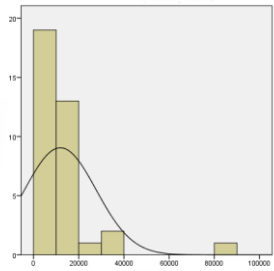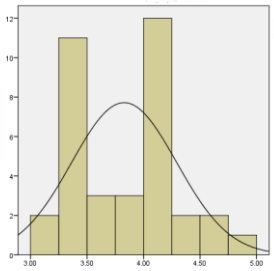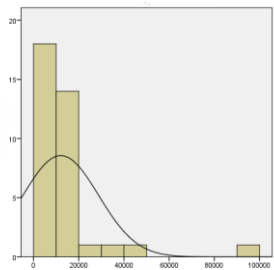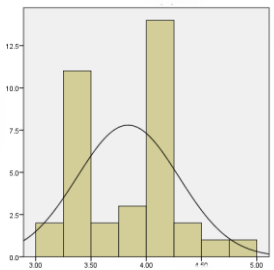
It has become evident that LogBasic EPS delivered the highest correlation during 2005. The paragraphs to follow will analyse data that relate to the 2006 year in accordance with Figure 4.1.

4.3.2.1 Transformation of 2006 data

Data for 2006 were transformed to natural logarithmic format. It must be noted that all variables were converted similarly in order to prevent distortion of statistical conclusions. Field (2009:154) also prescribed that the same transformation be applied to all selected variables. The outcomes of the conversion for 2006 are indicated in Table 4.5.

Table 4.5: Transformation of 2006 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted EPS	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price on date		LogShare price on date	
Share price 20 days before		LogShare price 20 days before	
Share price 20 days after		LogShare price 20 days after	

Source: Own research

In accordance with Table 4.5, new variables were, again, calculated: LogBasic EPS, LogDiluted EPS, LogHeadline EPS, LogShare price on date, LogShare price 20 days before and LogShare price 20 days after. The newly calculated variables were applied in the statistical analysis explained below.

4.3.2.2 Statistical analysis for 2006 data

In performing the statistical analysis, the Pearson coefficient and R square were calculated, similar to the analysis performed in 2005. Information was analysed in the

exact same manner over different time periods in order for outcomes from different years to be compared effectively. Table 4.6 indicates the statistical findings for 2006.

Table 4.6: Empirical findings for 2006

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	p	R^2	r	n	p	R^2	r	n	p	R^2
LogShare price on publication date	.49**	37	.003	.239	.42*	37	.016	.179	0.35*	37	.041	.120
LogShare price 20 days before	.60**	37	.000	.360	.58**	37	.000	.341	0.48**	37	.003	.231
LogShare price 20 days after	.61**	37	.000	.368	.57**	37	.001	.329	0.50**	37	.002	.250

**Correlation is significant at the .01 level (two tailed)

*Correlation is significant at the .05 level (two tailed)

Source: Own research

Table 4.7 indicates a positive and significant association among LogBasic EPS and identified share prices. Correlation coefficients ascertained both medium and strong correlations in accordance with Table 4.1. By applying a two-tailed test, statistical outcomes proved to have a probability of 99% significance. LogBasic EPS and LogShare prices on publication date delivered r = .49, n = 37 and p < .01. A shared variance of 23.9% was obtained, which implies that 23.9% of changes in the LogShare price on publication date were attributable to changes in LogBasic EPS. For LogBasic EPS and LogShare price 20 days before, correlation modelling indicated r = .60, n = 37 and p <.01. R square = .360, suggesting a share variance of 36%. This is an excessively worthy shared variance. LogBasic EPS and LogShare price 20 days after indicated an association of r = .61, n = 37 and p < .01. A shared variance of 36.8% was recorded. Again, a very high shared variance was recorded, implying that almost 37% of changes in LogShare price 20 days after publication were attributable to changes is LogBasic EPS. It would seem that LogBasic EPS was best able to associate with the share price 20 days after publication. This is in line with arguments of Swart and Hoffmann (2013:32), who posited that investors respond best to earnings information within 20 days after proclamation.

LogDiluted EPS and LogShare prices were also significantly related. The association among variables proved to be between medium and strong, moving in the same direction. For LogDiluted EPS and LogShare on publication date, $r = .42$, $n = 37$ and $p < .05$. A shared variance of 17.8% was obtained. For LogDiluted EPS and LogShare price 20 days before, $r = .58$, $n = 37$ and $p < .01$. R square $= .341$, indicating that a high shared variance of 34.1% was recorded. LogDiluted EPS and LogShare price 20 days after delivered $r = .57$, $n = 37$ and $p < .01$. LogDiluted EPS was able to explain 32.9% of changes in LogShare price 20 days after.

LogHeadline EPS and identified share prices were significantly connected. Again, associations were medium to strong. LogHeadline EPS and LogShare price on publication date were significantly correlated at a 0.05 level (two tailed). Correlation modelling resulted in $r = .35$, $n = 37$ and $p < .05$. A share variance of 12% was recorded. LogHeadline EPS and LogShare price 20 days before obtained a probability of 99% significance. Correlation proved $r = .48$, $n = 37$ and $p < .01$. The shared variance equalled 23.1% in accordance with the R square. For LogHeadline EPS and LogShare prices 20 days after, $r = .50$, $n = 37$ $p < .01$, while a confidence level of 0.01 (two tailed) was applied. Lastly, LogHeadline EPS could explain 25% of changes in the LogShare prices 20 days after.

It is evident from previous interpretations that LogBasic EPS could best correlate with share prices in 2006, while LogHeadline EPS proved to have the poorest correlation with identified share prices. These observations are in line with conclusions drawn in par. 4.3.1.2.

In the next section, the analysis of the data relating to 2007 is provided. An analysis similar to the above was performed on data collected for the 2007 year.
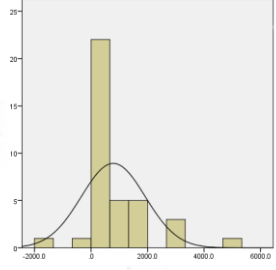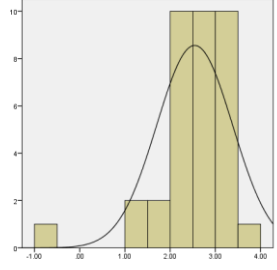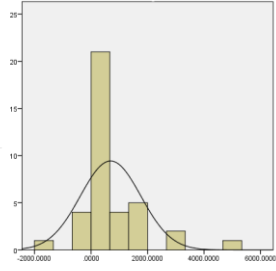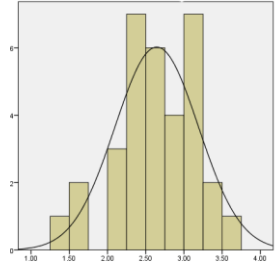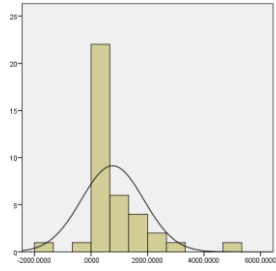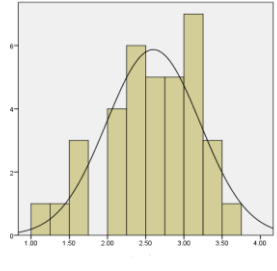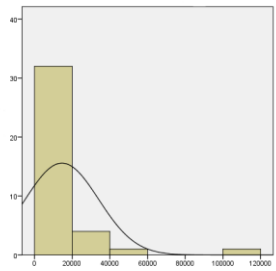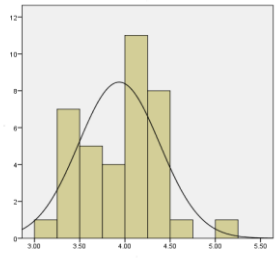
4.3.3 Correlations for the top 40 JSE listed companies during 2007

In sections to follow, the analysis of data for the 2007 year is set out. Analysis was performed in accordance with Figure 4.1.
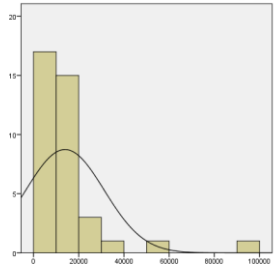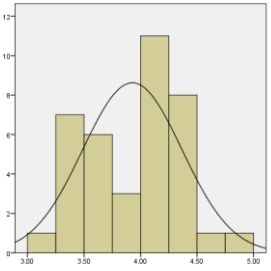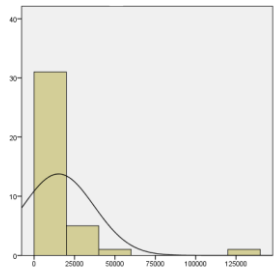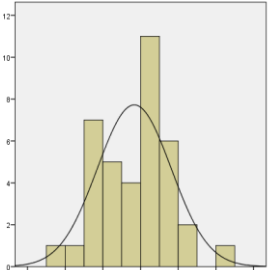
4.3.3.1 Transformation of 2007 data

Again, data were converted to natural logarithmic format. Transformation was performed before statistical analysis was performed. Table 4.7 indicates the distribution of data before and after transformation took place.

Table 4.7: Transformation of 2007 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted EPS	
Headline EPS		LogHeadline EPS	
Share price on date		LogShare price on date	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price 20 days before		LogShare price 20 days before	
Share price 20 days after		LogShare price 20 days after	

Source: Own research

From Table 4.7, it is apparent that new variables were measured. Variables which were obtained after transformation were included in the statistical analysis.

4.3.3.2 Statistical analysis for 2007 data

Statistical analysis was performed on data relating to 2007. Similar to previous years, analysis was performed to determine which category of EPS associates best with selected share prices. Table 4.8 demonstrates the statistical results.

Table 4.8: Empirical findings for 2007

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	p	R^2	r	n	p	R^2	r	n	p	R^2
LogShare price on publication date	.60**	38	.000	.365	.59**	38	.000	.345	.53**	38	.001	.278
LogShare price 20 days before	.60**	38	.000	.358	.58**	38	.000	.336	.52**	38	.001	.266
LogShare price 20 days after	.66**	38	.000	.434	.60**	38	.000	.355	.58**	38	.000	.332

**Correlation is significant at the .01 level (two tailed)

Source: Own research

Table 4.8 reveals a positive, significant relationship between LogBasic EPS and selected share prices. Correlations were above .5 and proved to be strong. A probability of 99% statistical significance was obtained (two tailed). For LogBasic EPS and LogShare price on date of publication, r = .60, n = 38 and p < .01. An R square of .365 was recorded, which implies a large shared variance of 36.5%. LogBasic EPS and LogShare price 20 days before delivered a correlation r = .60, n = 38 and p < .01. A shared variance of 35.8% was obtained. For LogBasic EPS and LogShare price 20 days after, r = .66, n = 38 and p < .01. An R square of .434 was recorded, indicating that 43.4% of changes in the LogShare price 20 days after were due to changes in LogBasic EPS. This is a particularly high shared variance.

LogDiluted EPS and indicated share prices were positively associated. Correlations were all significant at a probability level of 99% (two tailed). Correlations for LogDiluted EPS and LogShare price on publication date were r = .59, n = 38 and p < .01. R square = .345, implying a shared variance of 34.5%. For LogDiluted EPS and LogShare price 20 days before publication r = .58, n = 38 and p < .01. A shared variance of 33.6% was obtained. Correlations between LogDiluted EPS and LogShare price 20 days after, r = .60, n = 38 and p < .01. R square = .355, indicating that 35.5% of changes in the LogShare price 20 days after were attributable to changes in the LogDiluted EPS.

LogHeadline EPS was significantly related to selected share prices. Positive, strong associations were displayed. LogHeadline EPS and LogShare price on publication

date delivered a correlation of r = .53, n = 38 and p < .01. A significance level of 99% was obtained, while the shared variance between these variables was 27.8%. For LogHeadline EPS and LogShare price 20 days before publication correlations were slightly lower, r = .52, n = 38 and p < .01. A shared variance of 26.6% was obtained. LogHeadline EPS and LogShare price 20 days after publication provided correlations of r = .58, n = 38 and p < .01. A shared variance of 33.2% was measured.

In accordance with preceding interpretations, it is clear the LogBasic EPS could best be associated with identified share prices. During 2007, LogBasic EPS could explain up to 43.4% of variance in share price behaviour. The lowest correlation was obtained from LogHeadline EPS. Although it could explain up to 33.2% of variance in share price behaviour, it delivered the smallest association. These observations are in line with the conclusions in par. 4.31.2 and 4.3.2.2.

Below follows the analysis and interpretation of data relating to 2008.
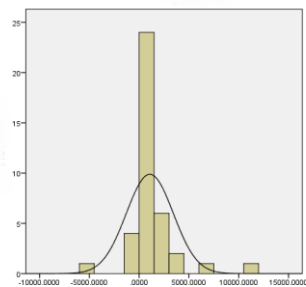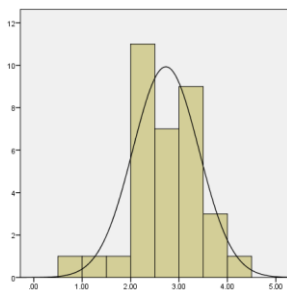
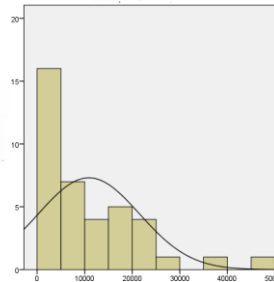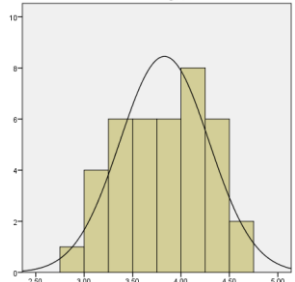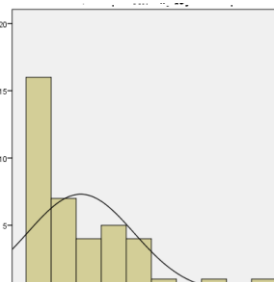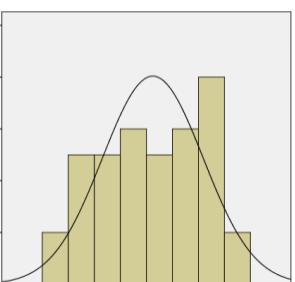### 4.3.4 Correlations for the top 40 JSE listed companies during 2008
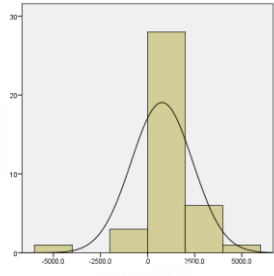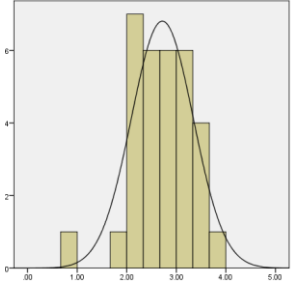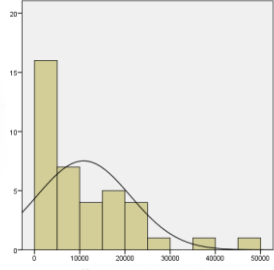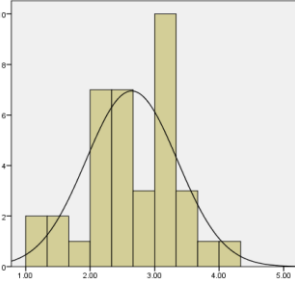
The sections to follow will study correlations during the 2008 year. Analysis was, again, performed in accordance with Figure 4.1.
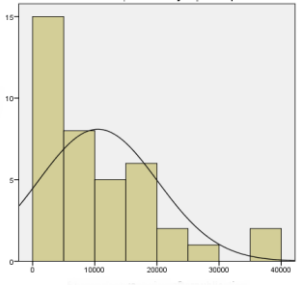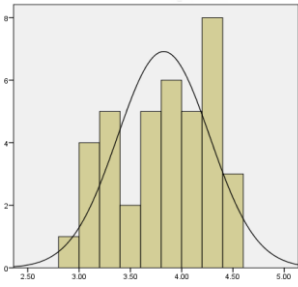
4.3.4.1 Transformation of 2008 data

Transformation of data was done in order to obtain natural logarithmic variables. Transformations can be observed in Table 4.9.

Table 4.9: Transformation of 2008 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Diluted EPS		LogDiluted EPS	
Headline EPS		LogHeadline EPS	
Share price on date		LogShare price on date	
Share price 20 days before		LogShare price 20 days before	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price 20 days after		LogShare price 20 days after	

Source: Own research

Table 4.9 displays the log variables that were computed. The analysis of these newly computed variables is provided in par. 4.3.4.2.

4.3.4.2   Statistical analysis for 2008 data

Statistical analysis was based on the methods that were applied for 2005, 2006 and 2007. The objective of statistical analysis was to determine the association between variables and to, ultimately, indicate which EPS category affect share prices the most during 2008. Table 4.10 is a summary of empirical findings that were obtained through the application of analysis.

Table 4.10: Empirical findings for 2008

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	p	R^2	r	n	p	R^2	r	n	p	R^2
LogShare price on publication date	.65**	39	.000	.421	.67**	39	.000	.451	.64**	39	.000	.412
LogShare price 20 days before	.58**	39	.000	.333	.59**	38	.000	.352	.58**	39	.000	.333
LogShare price 20 days after	.64**	39	.000	.403	.66**	38	.000	.437	.63**	39	.000	.396

**Correlation is significant at the .01 level (two tailed)

Source: Own research

Table 4.10 illustrates a significantly strong relationship among LogBasic EPS and identified share prices. The association between these variables proved to have a probability of 99% significance (two tailed), while moving in the same direction. For LogBasic EPS and LogShare price on publication date, $r = .65$, $n = 39$ and $p < .01$. Furthermore, 42.1% of changes in the LogShare price on publication date could be explained by means of changes in LogBasic EPS. LogBasic EPS and LogShare price 20 days before publication were significantly related as well, at a confidence level of 0.01. Measured correlations indicated that $r = .58$, $n = 39$ and $p < .01$. A shared variance of 33.3% was measured. For LogBasic EPS and LogShare prices 20 days after publication, $r = .64$, $n = 39$ and $p < .01$. Evidently, the variables, too, were strong and significantly connected at a confidence level of 0.01. The share variance of 40.3% was recorded.

The outcome for LogDiluted EPS and share prices was significant at a statistical probability level of 99% (two tailed). For LogDiluted EPS and LogShare price on date of publication, associations were strong and positive, resulting in $r = .68$, $n = 39$ and $p < .01$. A very large shared variance of 45.1% implies that almost half of changes in the share price on publication date could be attributed to changes in LogDiluted EPS. This is a particularly high percentage. LogDiluted EPS and LogShare price 20 days before publication produced a correlation of $r = .59$, $n = 39$ and $p < .01$. These variables were significantly related through strong associations. A shared variance of 35.2% was

computed. For LogDiluted EPS and LogShare price 20 days after publication, r = .66, n = 39 and p < .01. A shared variance of 43.7% was obtained which, again, shows a particular large influence between variables.

LogHeadline EPS and selected share prices moved in the same direction, while measuring significance at a 99% probability level. LogHeadline EPS and LogShare price on date of publication proved to have strong correlations where r = .64, n = 39 and p < .01. A variance of 41.2% implied a large influence between variables. For LogHeadline EPS and LogShare price 20 days before publication r =.58, n = 39 and p < .01. Evidently, the relationship was strong and positive. A shared variance of 33.3% was obtained. For LogHeadline EPS and LogShare prices 20 days after publication, r = .63, n = 39 and p < .01. The shared variance proved that 39.6% of changes in LogShare prices 20 days after publication were attributable to LogHeadline EPS.

From these interpretations, it is evident that LogDiluted EPS was best able to associate with share prices. This is not in line with the findings for 2005, 2006 or 2007. This deviation from previous findings must be placed in economic perspective. During 2008, great economic instability prevailed due to an international financial crisis. It would seem that investors placed greater value on diluted EPS measurements during this time. Possibly, investors acted 'overly careful' with regard to their investments, leading to the preference of the diluted EPS measurement, because diluted EPS provides an earnings figure after all dilutive potential in earnings value has manifested itself. Investors could, furthermore, have anticipated that a company would convert financial instruments into ordinary shares for the sake of saving on interest and preference dividends during a time of financial pressure. It is also clear that LogDiluted EPS could best correlate with the share price on date of publication. This could serve as an indication that investors had acted upon financial information speedily.

The lowest correlation was, again, obtained for LogHeadline EPS. This finding is line with the findings for 2005, 2006 and 2007. In the section to follow, the analysis for 2009 is discussed.
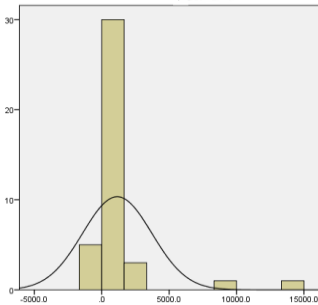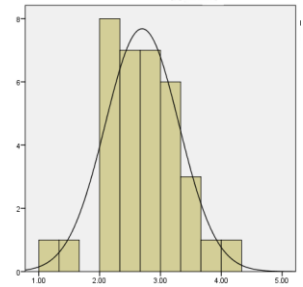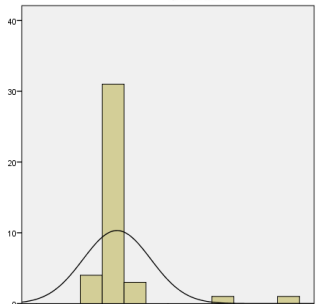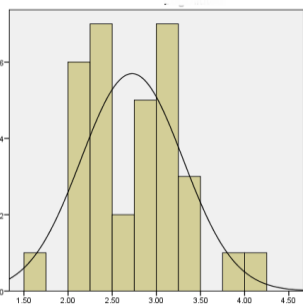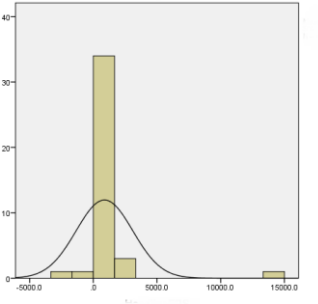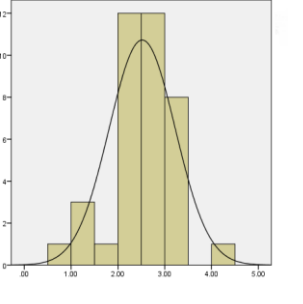
4.3.5 Correlations for the top 40 JSE listed companies during 2009

With regard to 2009, analysis was performed in accordance with Figure 4.1. As indicated, par. 4.3.5.1 commences with a presentation of data conversion.
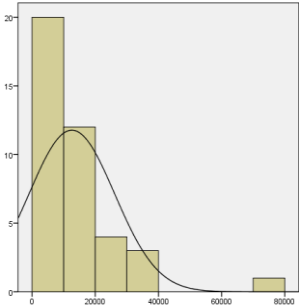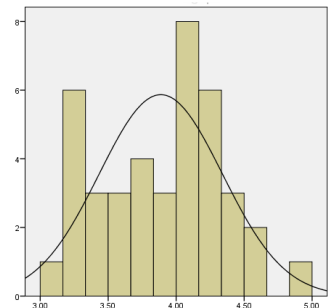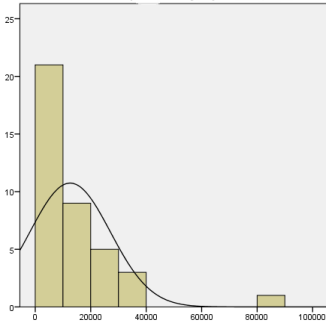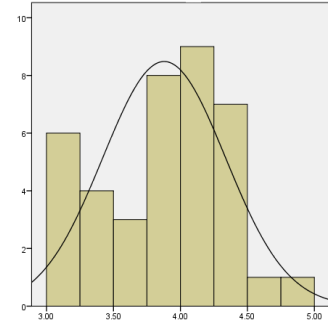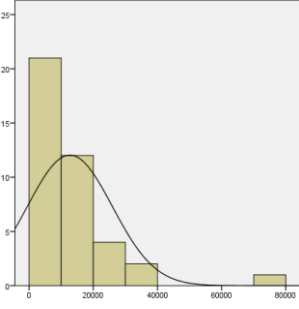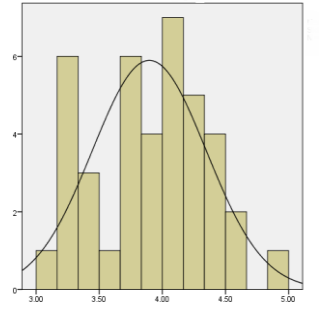
4.3.5.1 Transformation of 2009 data

Similar to the above analyses, data were transformed into natural logarithmic format. All variables were converted similarly to ensure that no statistical distortion of data analysis occurred. Table 4.11 demonstrates the distributions of data before and after transformation.

Table 4.11: Transformation of 2009 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted EPS	
Headline EPS		LogHeadline EPS	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price on date		LogShare price on date	
Share price 20 days before		LogShare price 20 days before	
Share price 20 days after		LogShare price 20 days after	

Source: Own research

For the purpose of statistical analysis, log variables were analysed. Paragraph 4.3.5.2 presents the outcome after the application of statistical methods.

4.3.5.2 Statistical analysis for 2009 data

The statistical analysis for 2009 is presented by means of Table 4.12. Again, the table serves as a summary of the Pearson coefficient, number of observations, statistical significance and shared variance.

Table 4.11: Empirical findings for 2009

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	P	R^2	r	n	p	R^2	r	n	p	R^2
LogShare price on publication date	.51**	40	.001	.261	.48**	40	.004	.23	.42*	40	.016	.172
LogShare price 20 days before	.51**	40	.001	.257	.48**	40	004	.23	.41*	40	.017	.171
LogShare price 20 days after	.51**	40	.001	.259	.49**	40	.003	.24	.42*	40	.014	.180

**Correlation is significant at the .01 level (two tailed)

Source: Own research

Table 4.11 demonstrates that LogBasic EPS was significantly linked to LogShare prices. Strong correlations were obtained for this EPS category, while variables proved to move in the same direction. LogBasic EPS and LogShare price on publication date provided a 99% probability of significance, resulting in r = .51, n = 40 and p < .01, while a shared variance of 26.1% was recorded. LogBasic EPS and LogShare price 20 days before publication similarly proved to be significant at a probability level of 99% (two tailed). Correlation modelling delivered an outcome of r = .51, n = 40 and p < .01. The share variance of 25.7% was verified. Lastly, LogBasic EPS and LogShare price 20 days after was significantly associated with a probability of 99% statistical significance. Correlations delivered r = .51, n = 40 and p < .01. R square = .259, and it would seem that 25.9% changes in the LogShare price 20 days after were attributable to changes in LogBasic EPS.

LogDiluted EPS and LogShare prices were also significantly related. A probability of 99% significance was obtained. The association among variables proved to be positive and medium. For LogDiluted EPS and LogShare on publication date, r = .48, n = 40 and p < .01. A shared variance of 22.9% was obtained. For LogDiluted EPS and LogShare price 20 days before, r = .48, n = 40 and p < .01. R square = .228, indicating that a shared variance of 22.8% was recorded. LogDiluted EPS and LogShare price 20 days after delivered r = .49, n = 40 and p < .01. LogDiluted EPS was able to explain 23.7% of changes in LogShare price 20 days after.

LogHeadline EPS was significantly related to selected share prices. Positive, medium associations were displayed. LogHeadline EPS and LogShare price on publication date delivered a correlation of $r = .42$, $n = 40$ and $p < .05$. A significance level of 95% was obtained, while the shared variance between these variables was 17.2%. For LogHeadline EPS and LogShare price 20 days before publication, correlations were slightly lower, $r = .41$, $n = 40$ and $p < .05$. A shared variance of 17.1% was obtained. LogHeadline EPS and LogShare price 20 days after publication provided correlations of $r = .42$, $n = 40$ and $p < .05$. A shared variance of 18% was measured.

From preceding interpretations, it is apparent that LogBasic EPS could best correlate with share prices during 2009. It would seem that the economic crisis of 2008 had no longer affected investor behaviour by the end of 2009. This is in line with the findings for 2005, 2006 and 2007. Again, LogHeadline EPS provided the lowest correlation coefficients. This, too, is in line with the findings for 2005, 2006, 2007 and 2008.

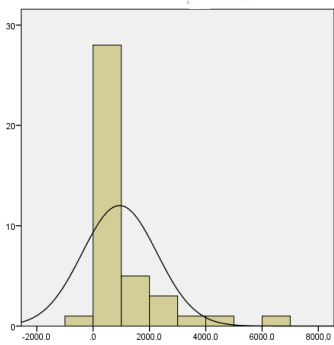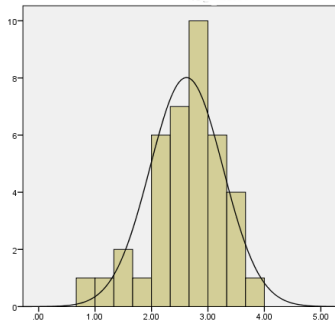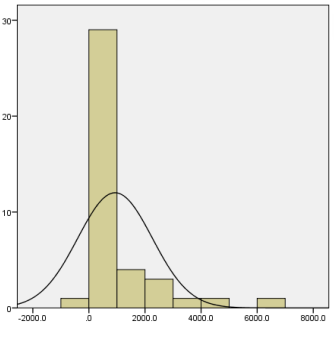The correlation modelling performed for the 2010 year is provided below.
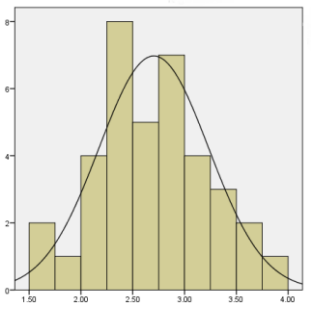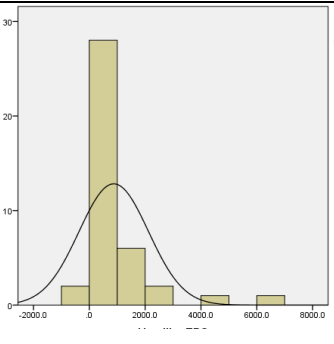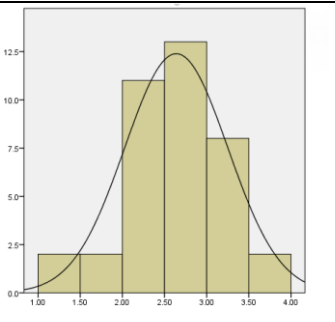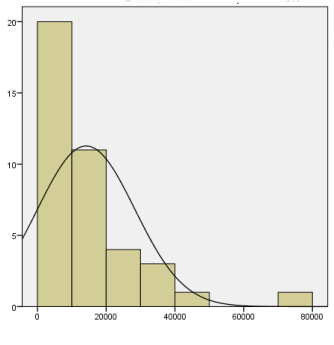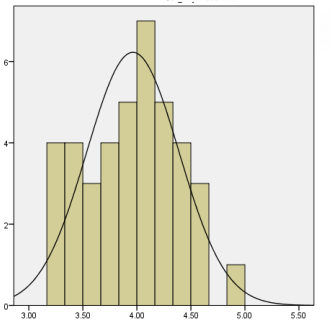
4.3.6   Correlations for the top 40 JSE listed companies during 2010
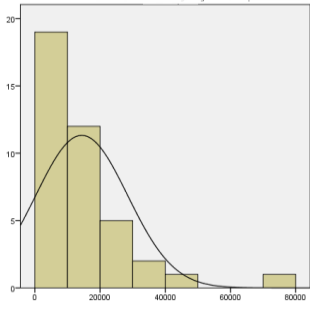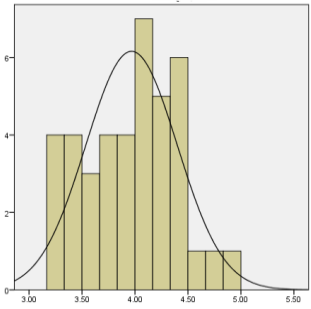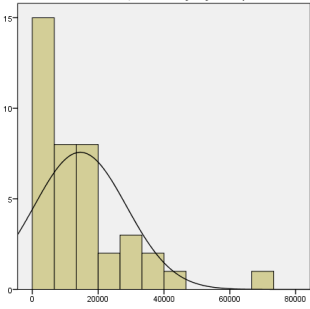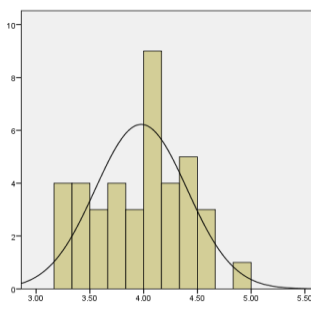
As indicated in the empirical objectives, par. 4.1, data were analysed for 2005 to 2013. Having covered 2005, 2006, 2007, 2008 and 2009, data relating to 2010 will be investigated in the next section, in accordance with the process indicated in Figure 4.1.

4.3.6.1   Transformation of 2010 data

Transformation of data was performed in accordance with methods applied in previously identified years, in order for statistical outcomes to be comparable among different years. Transformations were performed through the conversion of variables to natural logarithmic format in order for distribution to be rendered normal. Table 4.12 indicates the distributions of selected variables before and after transformation. From these illustrations, it is obvious that the distributions of variables were improved after conversion had taken place.

Table 4.12: Transformation of 2010 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted EPS	
Headline EPS		LogHeadline EPS	
Share price on date		LogShare price on date	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price 20 days before		LogShare price 20 days before	
Share price 20 days after		LogShare price 20 days after	

Source: Own research

Table 4.12 shows the log variables that were calculated. These variables were applied in statistical analysis, which is discussed in par. 4.3.6.2.

4.3.6.2   Statistical analysis for 2010 data

After transformation of data, statistical analysis could be performed. Statistical analysis was based on the methods that were applied during previously analysed years. The objective of statistical analysis was to determine the association between variables and to, ultimately, indicate which EPS category affects share prices the most during 2010. These variables included: LogBasic EPS, LogDiluted EPS, LogHeadline EPS, LogShare price on date of publication, LogShare price 20 days before publication and LogShare price 20 days after publication. As can be observed, all variables were obtained from transformation in par. 4.3.6.1. In Table 4.13 to follow, empirical results for 2010 are summarised.

Table 4.13: Empirical findings for 2010

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	P	R^2	r	n	p	R^2	r	n	p	R^2
LogShare price on publication date	.62**	40	.000	.387	.60**	40	.000	.359	.53**	40	.001	.284
LogShare price 20 days before	.62**	40	.000	.384	.60**	40	.000	.355	.53**	40	.001	.280
LogShare price 20 days after	.63**	40	.000	.390	.60**	40	.000	.364	.54**	40	.001	.291

**Correlation is significant at the .01 level (two tailed)

Source: Own research

According to Table 4.13, there is a positive significant relationship between LogBasic EPS and LogShare prices. A two-tailed test suggests a 99% probability of significance. In accordance with Table 4.2, correlations are strong. As can be observed, r = .62, n = 40 and p < .01 for LogShare price on publication date. R square = .387, which indicates that 38.7% of changes in LogShare price on date were attributable to changes in the LogBasic EPS. For LogShare price 20 days before, r =.62, n = 40 and p < .01. Here, an R square of .384 is recorded and it can be posited that 38.4% of changes in the LogShare price 20 days before occurred due to changes in LogBasic EPS. Lastly, r = .53, n = 40 and p < .01 for LogShare prices 20 days after. R square = .390, which indicates a shared variance of 39% between LogBasic EPS and LogShare prices 20 days after.

LogDiluted EPS and selected share prices moved in the same direction, while measuring significance at a 99% probability level. LogDiluted EPS and LogShare price on date of publication proved to have strong correlations where r = .60, n = 40 and p < .01. A variance of 35.9% implied a large influence between variables. For LogDiluted EPS and LogShare price 20 days before publication r =.60, n = 40 and p < .01. Evidently, the relationship was strong and positive. A shared variance of 35.5% was obtained. For LogDiluted EPS and LogShare prices 20 days after publication r = .6, n = 40 and p < .01. The shared variance proved that 36.4% of changes in LogShare prices 20 days after publication were attributable to LogDiluted EPS.

LogHeadline EPS and indicated share prices were positively associated. Correlations were all significant at a probability level of 99% (two tailed). Correlations for LogHeadline EPS and LogShare price on publication date were r = .53, n = 40 and p < .01. R square = .284, implying a shared variance of 28.4%. For LogHeadline EPS and LogShare price 20 days before publication r = .53, n = 40 and p < .01. A shared variance of 28.0% was obtained. Correlations between LogDiluted EPS and LogShare price 20 days after, r = .54, n = 40 and p < .01. R square = .291, indicating that 29.1% of changes in the LogShare price 20 days after were attributable to changes in the LogHeadline EPS.

From these interpretations, it is submitted that LogBasic EPS could best correlate with share prices during 2010. It delivered a shared variance up to 39%. Again, this observation is in line with findings for 2005, 2006, 2007 and 2009. LogHeadline EPS, again, provided the lowest correlation among variables, but it was able to provide a shared variance up to 29.1%. Below follows the analysis for the 2011 year.
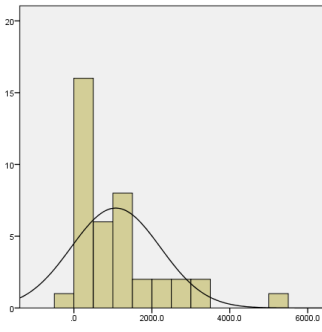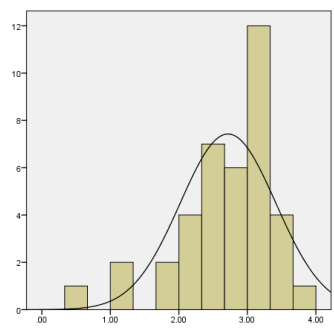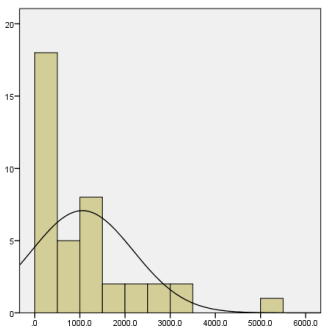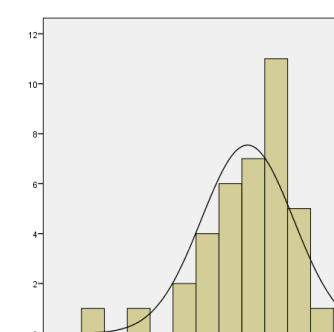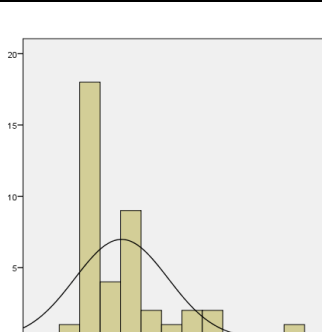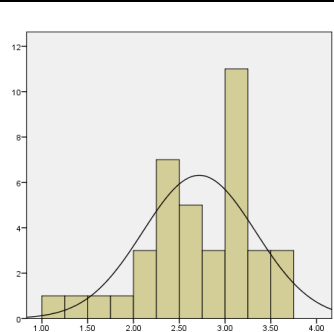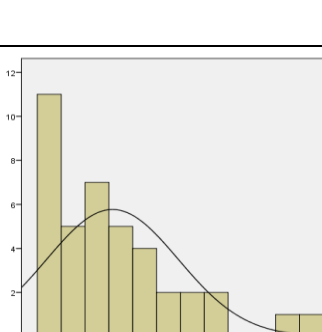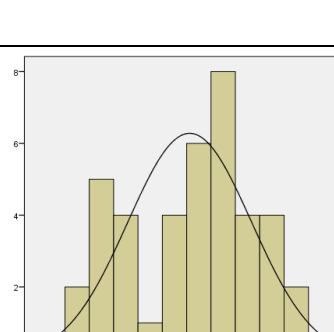
4.3.7 Correlations for the top 40 JSE listed companies during 2011

After completing analysis for 2010, an analysis for 2011 was performed, again, in accordance with Figure 4.1.
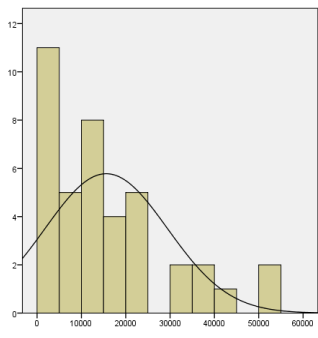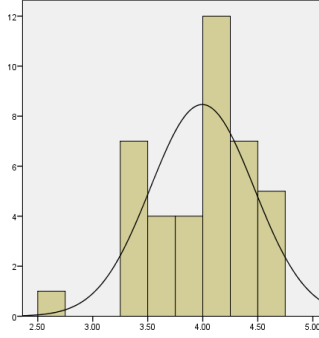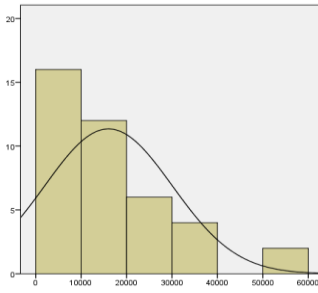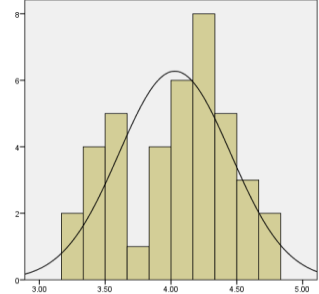
4.3.7.1 Transformation of 2011 data

Selected variables were converted to natural logarithmic format, as done in previous years. All variables were converted similarly to ensure that data remain comparable without distortion. Variables were mathematically adjusted in order for statistical methods to be applied successfully, because transformation assists data in better meeting assumptions set out by parametric statistical approaches. Only after meeting these parametric approaches can statistical analysis be performed. In Table 4.14, distributions before and after transformation are illustrated clearly to show how they were converted. From this table, it is evident that distributions were adapted logarithmically, and new variables were assigned to each new distribution.

Table 4.14: Transformation of 2011 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted EPS	
Headline EPS		LogHeadline EPS	
Share price on date		LogShare price on date	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price 20 days before		LogShare price 20 days before	
Share price 20 days after		LogShare price 20 days after	

Source: Own research

4.3.6.2   Statistical analysis for 2011 data

Statistical analysis was, again, performed for the sake of determining which category of EPS can best associate with selected share prices. Similarly to previous years, data were presented and interpreted in order to reach conclusions about relations that were proven to exist during the 2011 year. Empirical analysis included the demonstration of four statistical elements: r, n, p and R square. Each of these elements are included in discussions to follow. Table 4.15 serves as a summary of the statistical data that could be obtained from SPSS. The summary includes an analysis of all relevant selected variables to the study.

Table 4.15: Empirical findings for 2011

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	p	R^2	r	n	p	R^2	R	n	p	R^2
LogShare price on publication date	.66**	40	.000	.440	.59**	40	.000	.342	.57**	40	.000	.319
LogShare price 20 days before	.62**	40	.000	.380	.51**	40	.000	.259	.49**	40	.000	.241
LogShare price 20 days after	.67**	40	.000	.443	.58**	40	.000	.340	.56**	40	.000	.315

**Correlation is significant at the .01 level (two tailed)

Source: Own research

From Table 4.15, it can be posited that LogBasic EPS and selected share prices proved to have a significant relation. All correlation coefficients were strong and positive with a probability of 99% significance. For LogBasic EPS and LogShare price on date of publication, r = .66, n = 40 and p < .01. An R square of .44 was obtained, indicating that a large shared variance of 44% was obtained between variables. For LogBasic EPS and LogShare price 20 days before publication, r = .62, n = 40 and p < .01. A lower shared variance of 38% was achieved. For LogBasic EPS and LogShare price 20 days after publication proved to have the highest correlation where r = .67, n = 40 and p < .01. A high shared variance of 44.3% indicated that 44.3% of changes in LogShare price 20 days after publication were attributable to changes in LogBasic EPS.

LogDiluted EPS was significantly related to selected share prices. Positive, strong associations were displayed. LogDiluted EPS and LogShare price on publication date delivered a correlation of r = 59, n = 40 and p < .01. A significance level of 99% was obtained, while the shared variance between these variables was 34.2%. For LogDiluted EPS and LogShare price 20 days before publication, correlations were slightly lower, r = .51, n = 40 and p < .01. A shared variance of 25.9% was obtained. LogDiluted EPS and LogShare price 20 days after publication provided correlations of r = .58, n = 40 and p < .01. A shared variance of 34.0% was measured.

There was a significantly strong relationship among LogHeadline EPS and identified share prices. The association between these variables proved to have a probability of 99% significance (two tailed), while moving in the same direction. For LogHeadline EPS and LogShare price on publication date, r = .57, n = 40 and p < .01. Furthermore, 31.9% of changes in the LogShare price on publication date could be explained by means of changes in LogDiluted EPS. LogHeadline EPS and LogShare price 20 days before publication were significantly related as well, at a confidence level of 0.01. Measured correlations indicated that r = .49, n = 40 and p < .01. A shared variance of 24.1% was measured. For LogHeadline EPS and LogShare prices 20 days after publication, r = .56, n = 40 and p < .01. Evidently, the variables were strong and significantly connected at a confidence level of 0.01. The share variance of 31.5% was recorded.

From preceding interpretations, it can be posited that LogBasic EPS was able to best correlate with share prices during 2011 with a maximum shared variance of 44.3%, 20 days after publication of financial statements. This finding is in line with similar findings for 2005, 2006, 2007, 2009 and 2010. On the other hand, LogHeadline EPS delivered the smallest correlation with a maximum shared variance of 31.9% on the date of financial statement publication. Again, this observation is in line with findings for 2005, 2006, 2007, 2008, 2009 and 2010.

After determining the correlations in 2011, the paragraphs to follow provide the data analysis collected for 2012.
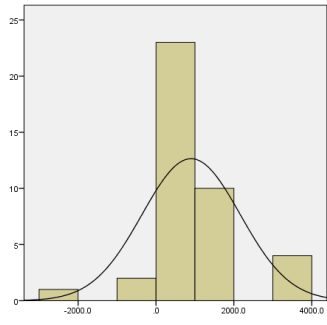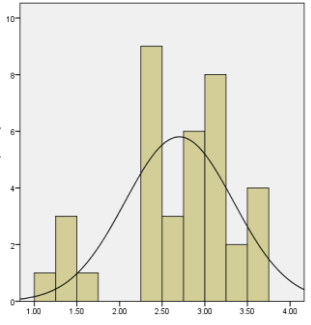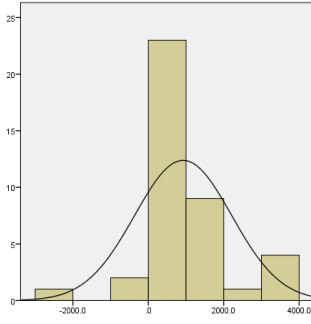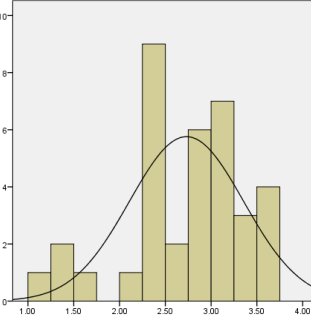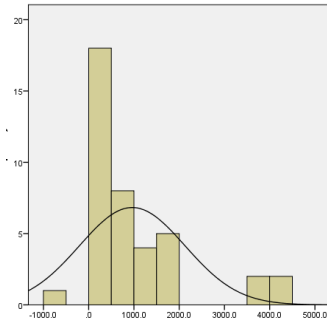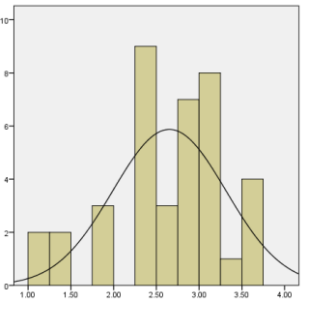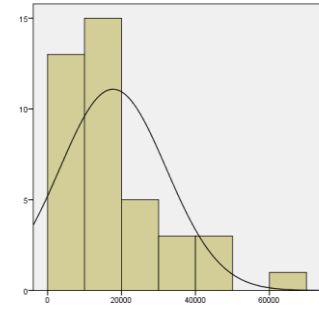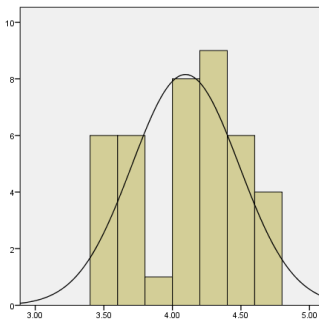
4.3.8 Correlations for the top 40 JSE listed companies during 2012
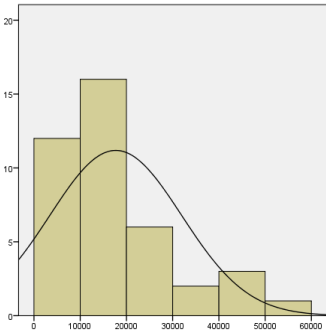
In this section, data will be analysed for 2012. Similar to previous analyses, the starting point for analysis was the transformation of data that relate to 2012, as indicated by Figure 4.1.

4.3.8.1 Transformation of 2012 data

For 2012, too, data were transformed to natural logarithmic format. All variables were converted in order to ensure homogeneity. From the transformations it can be observed that the distribution of share prices was especially skewed before conversion had taken place. Table 4.16 is used to graphically indicate how transformation corrected distributions of selected variables.

Table 4.16: Transformation of 2012 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted PS	
Headline EPS		LogHeadline EPS	
Share price on date		LogShare price on date	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price 20 days before		LogShare price 20 days before	
Share price 20 days after		LogShare price 20 days after	

Source: Own research

Table 4.16 clearly indicates the distributions of newly computed log variables. These variables were applied in the statistical analysis explained below.

4.3.8.2   Statistical analysis for 2012 data

Statistical analysis was applied to determine correlations among variables during 2012. This section presents and discusses the analysis in detail in order to determine which category of EPS best associates itself with selected share prices. As done in previous analyses, the Pearson coefficient was calculated, the number of observations included, the statistical significance level verified and the share variance among variables presented. Table 4.17 was constructed to serve as a summary of the data analysis performed by applying the SPSS.

Table 4.17: Empirical findings for 2012

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	r	n	p	R^2	r	n	p	R^2	R	n	p	R^2
LogShare price on publication date	.62**	40	.000	.379	.61**	40	.000	.370	.60**	40	.000	.354
LogShare price 20 days before	.61**	40	.000	.377	.61**	40	.000	.371	.59**	40	.000	.352
LogShare price 20 days after	.62**	40	.000	.379	.61**	40	.000	.375	.59**	40	.000	.350

**Correlation is significant at the .01 level (two tailed)

Source: Own research

The outcomes presented by Table 4.17 point to a statistically significant relationship among LogBasic EPS and selected share prices during 2012. A 99% probability level of significance was obtained, while coefficients above .5 indicated strong associations among variables. For LogBasic EPS and share prices on publication date, r = .62, n = 40 and p < .01. A high shared variance of 37.9% was recorded among these variables. For LogBasic EPS and share prices 20 days before publication of financial statements, r = .61, n = 40 and p < .01. The shared variance in this instance was also high, recorded as 37.7%. LogBasic EPS and LogShare price 20 days after publication seemed to provide identical correlations to LogShare price on publication date. Here, r = .62, n = 40 and p < .01. The shared variance was also recorded as 37.9%.

LogDiluted EPS and selected share prices proved to have slightly lower correlation coefficients than those of LogBasic EPS. Associations among variables were all statistically significant (two tailed), strong and positive. LogDiluted EPS and LogShare prices on publication date proved to have a correlation of r = 61, n = 40 and p < .01, while the shared variance was 37%. For LogDiluted EPS and LogShare price 20 days before publication of financial statements, r = .61, n = 40 and p < .01. A shared variance of 37.1% proved a strong influence among variables. LogDiluted EPS and LogShare price 20 days after publication of financial statements delivered correlations of r = .61 n = 40 and p < .01. A shared variance of 37.5% was recorded. It would seem that LogDiluted EPS associated almost identically to all selected share prices.

When considering the relationship between LogHeadline EPS and share prices, a significant relationship was obtained yet again, with a statistical probability of obtaining error one out of every 100 times. Correlations proved to be strong among these variables. For LogHeadline EPS and LogShare prices on publication date, r = .60, n = 40 and p < .01. The shared variance was 35.4%. For LogHeadline EPS and LogShare price 20 days before publication date, r = .59, n = 40 and p < .01. Here, a shared variance of 35.2% was obtained. For LogHeadline EPS and LogShare prices 20 days after publication date, r = .59 and p < .01. A total of 37.5% of changes in LogShare prices 20 days after publication date were attributable to changes in LogHeadline EPS.

From these interpretations, it is submitted that LogBasic EPS best associated itself with share prices in 2012. Correlations between LogBasic EPS and LogShare prices on date and LogShare prices 20 days after publication were identical. LogHeadline EPS provided the lowest correlations yet again. These findings are similar to those indicated in previous years.

Paragraph 4.3.9 will continue to measure correlations for 2013.

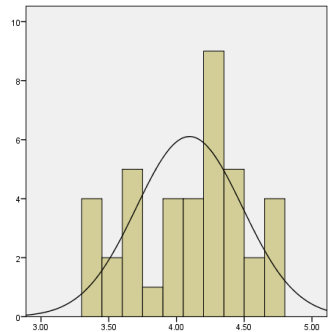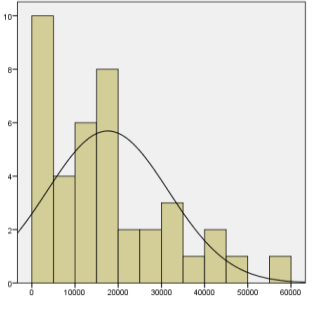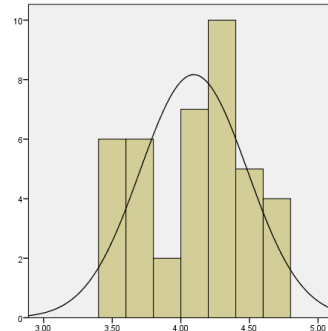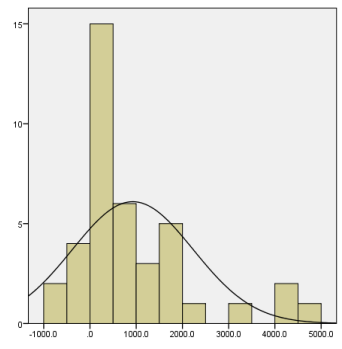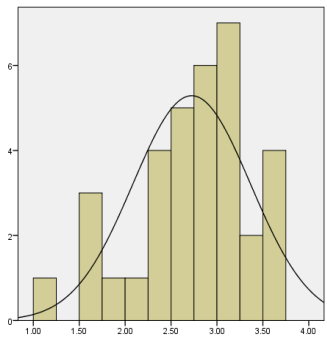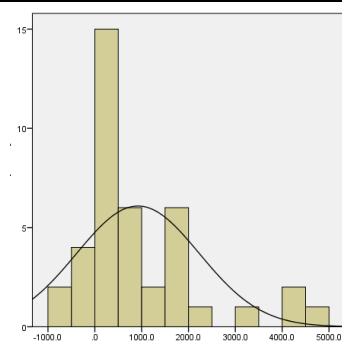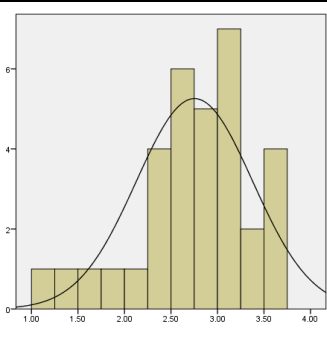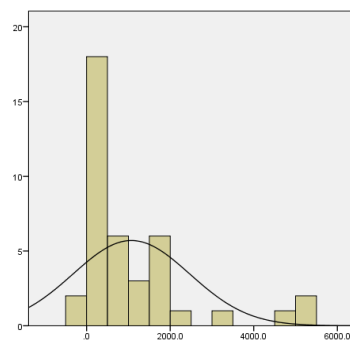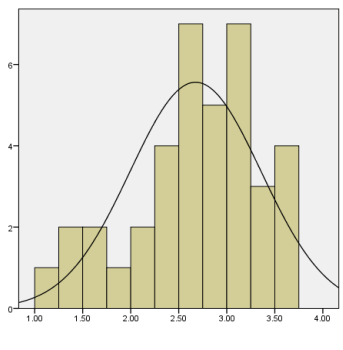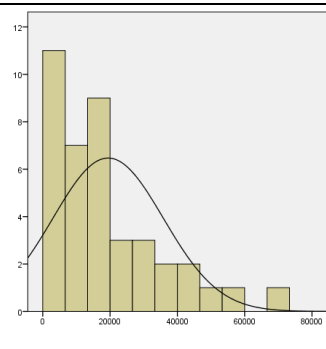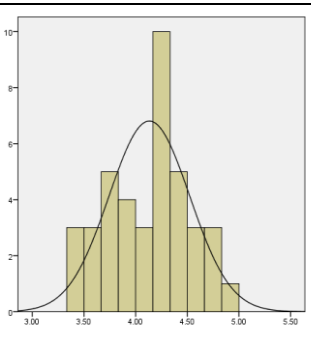### 4.3.9 Correlations for the top 40 JSE listed companies during 2013

The final year to be analysed was 2013. Analysis was, again, performed in accordance with Figure 4.1, as done for years 2005 to 2012.

4.3.9.1 Transformation of 2013 data

All variables were transformed to natural logarithmic format in order to guarantee similarity for the sake of comparison. The transformation of data for all selected years were converted in the exact same manner and, therefore, outcomes among different years can also be compared. Table 4.18 was constructed to serve as a summary of transformations before and after conversions had taken place.

Table 4.18: Transformation of 2013 data

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Basic EPS		LogBasic EPS	
Diluted EPS		LogDiluted EPS	
Headline EPS		LogHeadline EPS	
Share price 20 days before		LogShare price 20 days before	

Data type before transformation	Distribution before transformation	Data type after transformation	Distribution after transformation
Share price 20 days after		LogShare price 20 days after	

Source: Own research

In par. 4.3.9.2, the statistical analysis to this study is presented. The above-indicated log variables were applied in this analysis.

4.3.9.2   Statistical analysis for 2013 data

In this section, the statistical analysis for 2013 is presented. Again, all relevant statistical outcomes were summarised in Table 4.19. This table indicates r, n, p and R square for all selected variables.

Table 4.19: Empirical findings for 2013

	LogBasic EPS				LogDiluted EPS				LogHeadline EPS			
	R	n	p	R^2	r	n	p	R^2	r	n	p	R^2
LogShare price on publication date	.52**	40	.002	.267	.52**	40	.002	.267	.45**	40	.005	.201
LogShare price 20 days before	.53**	40	.001	.285	.53**	40	.002	.279	.50**	40	.003	.246
LogShare price 20 days after	.53**	40	.001	.283	.53**	40	.002	.281	.46**	40	.004	.210

**Correlation is significant at the .01 level (two tailed)

Source: Own research

Table 4.19 indicates that LogBasic EPS was significantly related to share prices, as demonstrated by a 99% probability of significance (two tailed). Correlation coefficients

were strong in accordance with Table 4.1. For LogBasic EPS and LogShare prices on date of publication, $r = .52$, $n = 40$ and $p < .01$. R square $= .267$, implying a shared variance of 26.7%. For LogBasic EPS and LogShare prices 20 days before publication date, $r = .53$, $n = 40$ and $p < .01$. A shared variance of 28.5% was recorded. LogBasic EPS and LogShare prices 20 days after publication proved to have $r = .53$, $n = 40$ and $p < .01$. Here, a shared variance of 28.3% was calculated.

LogDiluted EPS was also significantly related to selected share prices, with a 1% change of obtaining error. Again, strong correlation coefficients were measured. For LogDiluted EPS and LogShare prices on date of publication $r = .52$, $n = 40$ and $p < .01$, with a shared variance of 26.7%. For LogDiluted EPS and LogShare prices 20 days before publication date, $r = .53$, $n = 40$ and $p < .01$. An R square of .279 was calculated, implying a shared variance of 27.9%. LogDiluted EPS and LogShare prices 20 days after publication delivered $r = .53$, $n = 40$ and $p < .01$. Here, the shared variance was 28.1%.

The relationship between LogHeadline EPS and LogShare prices was statistically significant as well. For LogHeadline EPS and LogShare prices on date of publication, $r = .45$, $n = 40$ and $p < .01$. The shared variance of 20.1% was obtained. For LogHeadline EPS and LogShare prices 20 days after publication date, $r = .53$, $n = 40$ and $p < .01$, with a shared variance of 24.6%. For measurements of LogShare price 20 days after publication date, $r = .46$, $n = 40$ and $p < .01$. An influence of 21.0% between variables was obtained.

The preceding interpretations proved that LogBasic EPS could best be associated with selected share prices. It delivered a slightly higher correlation coefficient than LogDiluted EPS could. LogBasic EPS could best correlate with share prices 20 days after publication. The lowest correlations were obtained for LogHeadline EPS. Again, the findings are in line with the findings for previous periods.

From the correlation analysis performed, it became clear that LogBasic EPS delivered higher correlation coefficients and shared variance. It would, however, seem that differences in correlations among selected EPS categories were rather small and that all correlations proved to be statistically significant. Before the research findings were concluded, it had to be determined whether the differences in correlation coefficients were significant. Therefore, paired t-testing was performed on the correlation results.

4.4   T-TESTING PERFORMED ON CORRELATION RESULTS

Paired t-testing is performed when one group of participants are tested under different conditions or circumstances (Pallant, 2013:252). For the purpose of this study, t-testing was applied to only one group of participants: the top 40 JSE listed companies. This group was tested under the conditions of correlation among share prices and EPS categories. A paired t-test is able to indicate whether there is a statistical significant difference between the means of scores (Pallant, 2013:253). The performance of this test could, therefore, indicate whether the mean scores of correlations obtained were statistically different for the years 2005 to 2013. If mean scores among correlations could prove to be significant (that is $p < .05$), it could serve as an indication that one correlation measure was superior to another.

In analysing correlations per t-test, the following steps were followed:

Figure 4.2: Steps to analysing correlations per t-test
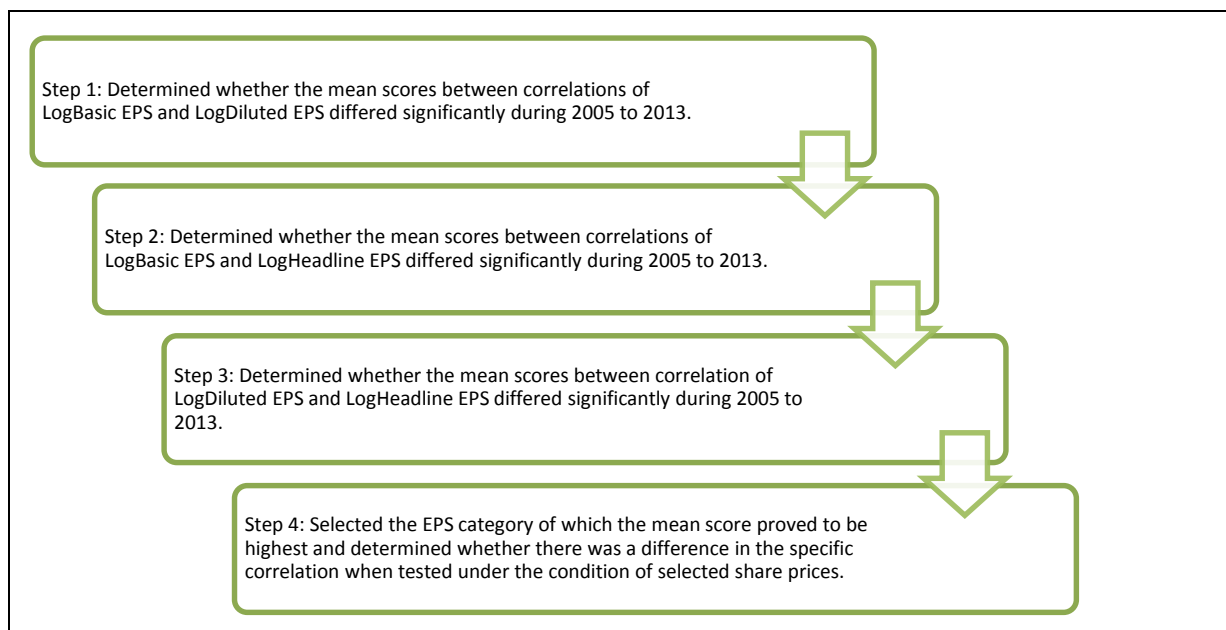
Source: Own research

After indicating the process followed in Figure 4.2, par. 4.4.1 continues to discuss the analysis in accordance with step 1, which was previously indicated.

4.4.1   Testing the mean scores of correlation for LogBasic and LogDiluted EPS

As indicated by Figure 4.2, the statistical significance between the differences of correlations for LogBasic EPS and LogDiluted EPS was tested first. Results obtained from this test are demonstrated by Tables 4.20.

Tables 4.20: T-test performed on correlations of LogBasic and LogDiluted EPS

		Mean	N	Std. Deviation	Std. Error of Mean
1	LogBasic EPS and LogShare price on date	.58	9	.07	.02
	LogDiluted EPS and LogShare price on date	.55	9	.08	.03
2	LogBasic EPS and LogShare price 20 days before	.58	9	.04	.01
	LogDiluted EPS and LogShare price 20 days before	.56	9	.05	.02
3	LogBasic EPS and LogShare price 20 days after	.60	9	.06	.02
	LogDiluted EPS and LogShare price 20 days after	.57	9	.06	.02

		Mean (paired difference)	t	df	Sig. (two-tailed)
Pair 1	LogBasic EPS and LogShare price on date & LogDiluted EPS and LogShare price on date	.02	2.36	8	.036
Pair 2	LogBasic EPS and LogShare price 20 days before & LogDiluted EPS and LogShare price 20 days before	.02	2.03	8	.037
Pair 3	LogBasic EPS and LogShare price 20 days after & LogDiluted EPS and LogShare price 20 days after	.03	2.34	8	.037

Source: Own research

From the tables listed above, it is evident that correlations for LogBasic EPS and LogDiluted EPS differed significantly ($p < .05$).

- On average, correlations between LogBasic EPS and LogShare prices on date ($M = .58$, $SE = .02$) were greater than correlations between LogDiluted EPS and LogShare prices on date ($M = .55$, $SE = .03$), $t(8) = 2.36$, p < .05.

- The mean score of LogBasic EPS and LogShare price 20 days before publication ($M = .57$, $SE = .01$) was greater than that of LogDiluted EPS and LogShare prices days before publication ($M = .56$, $SE = .02$), $t(8) = 2.03$, p < .05.

- Correlations between LogBasic EPS and LogShare price 20 days after publication (M = .60, SE = .02) were greater than correlations obtained for LogDiluted EPS and LogShare prices days after publication (M = .57, SE = .02), t (8) = 2.34, p < .05.

From these interpretations, it is submitted that the mean of correlations for LogBasic EPS differed significantly from correlations obtained for LogDiluted EPS. It is, therefore, posited that differences between LogBasic EPS and LogDiluted EPS were statistically significant and that differences did not occur by chance.

In accordance with Figure 4.2, the mean scores of LogBasic EPS and LogHeadline EPS were tested – the results are provided in par. 4.4.2.

4.4.2 Testing the mean scores of correlation for LogBasic and LogHeadline EPS

This section discusses the test for the statistical significance between the differences of correlations for LogBasic EPS and LogHeadline. The statistical results gathered through t-testing are demonstrated by Tables 4.21.

Tables 4.21: T-test performed on correlations of LogBasic and LogHeadline EPS

		Mean	N	Std. Deviation	Std. Error of Mean
1	LogBasic EPS and LogShare price on date	.58	9	.07	.02
	LogHeadline EPS and LogShare price on date	.50	9	.09	.03
2	LogBasic EPS and LogShare price 20 days before	.58	9	.04	.01
	LogHeadline EPS and LogShare price 20 days before	.50	9	.05	.02
3	LogBasic EPS and LogShare price 20 days after	.60	9	.06	.02
	LogHeadline EPS and LogShare price 20 days after	.52	9	.07	.02

		Mean (paired difference)	t	df	Sig. (two-tailed)
Pair 1	LogBasic EPS and LogShare price on date & LogHeadline EPS and LogShare price on date	.08	5.58	8	.001
Pair 2	LogBasic EPS and LogShare price 20 days before & LogHeadline EPS and LogShare price 20 days before	.08	6.21	8	.000
Pair 3	LogBasic EPS and LogShare price 20 days after & LogHeadline EPS and LogShare price 20 days after	.07	6.34	8	.000

Source: Own research

The above tables indicate that correlations for LogBasic EPS and LogHeadline EPS differed significantly.

- On average, correlations between LogBasic EPS and LogShare prices on date ($M = .58$, $SE = .02$) were greater than correlations between LogHeadline EPS and LogShare prices on date ($M = .50$, $SE = .03$), $t(8) = 5.58$, p < .05.

- The mean score of LogBasic EPS and LogShare price 20 days before publication ($M = .58$, $SE = .01$) was greater than that of LogHeadline EPS and LogShare prices days before publication ($M = .50$, $SE = .02$), $t(8) = 6.21$, p < .05.

- Correlations between LogBasic EPS and LogShare price 20 days after publication ($M = .60$, $SE = .02$) were greater than correlations obtained for LogHeadline EPS and LogShare prices days after publication ($M = .52$, $SE = .02$), $t(8) = 6.34$, p < .05.

From the above interpretations, it is submitted that the mean of correlations for LogBasic EPS was greater and differed significantly from the mean of correlations for LogHeadline EPS. It can, therefore, be posited that differences between these correlations are not attributable to chance.

Paragraph 4.4.3 describes the test for the difference in the mean scores of LogDiluted EPS and LogHeadline EPS.

4.4.3 Testing the mean scores of correlation for LogDiluted and LogHeadline EPS

As indicated by Figure 4.2, it was also tested whether the difference between correlations of LogDiluted EPS and LogHeadline EPS was statistically significant. Results of the t-test performed are summarised in Tables 4.22.

Tables 4.22: T-test performed on correlations of LogDiluted and LogHeadline EPS

		Mean	N	Std. Deviation	Std. Error of Mean
1	LogDiluted EPS and LogShare price on date	.55	9	.08	.03
	LogHeadline EPS and LogShare price on date	.50	9	.09	.03
2	LogDiluted EPS and LogShare price 20 days before	.56	9	.05	.02
	LogHeadline EPS and LogShare price 20 days before	.50	9	.05	.02
3	LogDiluted EPS and LogShare price 20 days after	.57	9	.06	.02
	LogHeadline EPS and LogShare price 20 days after	.52	9	.07	.02

		Mean (paired difference)	t	df	Sig. (two-tailed)
Pair 1	LogDiluted EPS and LogShare price on date & LogHeadline EPS and LogShare price on date	.05	6.56	8	.000
Pair 2	LogDiluted EPS and LogShare price 20 days before & LogHeadline EPS and LogShare price 20 days before	.05	5.98	8	.000
Pair 3	LogDiluted EPS and LogShare price 20 days after & LogHeadline EPS and LogShare price 20 days after	.05	6.08	8	.000

Source: Own research

Tables 4.21 demonstrate that correlations for LogDiluted EPS and LogHeadline EPS differed significantly.

- On average, correlations between LogDiluted EPS and LogShare prices on date (M = .55, SE = .03) were greater than correlations between LogHeadline EPS and LogShare prices on date (M = .50, SE = .03), t (8) = 6.56, p < .05.
- The mean score of LogDiluted EPS and LogShare price 20 days before publication (M = .56, SE = .02) was greater than that of LogHeadline EPS and LogShare prices days before publication (M = .50, SE = .02), t (8) = 5.98, p < .05.
- Correlations between LogDiluted EPS and LogShare price 20 days after publication (M = .57, SE = .02) were greater than correlations obtained for LogHeadline EPS and LogShare prices days after publication (M = .52, SE = .02), t (8) = 6.08, p < .05.

From these interpretations, it can be posited that there is a significant difference between the scores of LogDiluted EPS and LogHeadline EPS. The average correlations obtained for LogDiluted EPS were greater than those of LogHeadline EPS. It can, therefore, be submitted that the difference between LogDiluted EPS and LogHeadline EPS did not occur by chance.

In summary, the following results were obtained from par. 4.4.1, 4.4.2 and 4.4.3:

- The average correlations between LogBasic EPS and LogDiluted EPS differed significantly, where the mean score of LogBasic EPS was greater;
- The average correlations between LogBasic EPS and LogHeadline EPS differed significantly, where the mean score of LogBasic EPS was greater; and
- The average correlations between LogDiluted EPS and LogHeadline EPS differed significantly where the mean score of LogDiluted EPS was the greatest.

It is then clear that LogBasic EPS delivered the highest correlations on average. But an additional question can be raised: Could LogBasic EPS associate itself better with any of the selected share prices? This question is investigated in par. 4.4.4.

4.4.4 Testing the mean scores of correlation for LogBasic EPS and share prices

T-testing was applied in order to determine whether the mean scores of correlations among LogBasic EPS and selected share prices differed. This would serve as an indication of whether LogBasic EPS relates better to a specific share price. Statistical results obtained are displayed in Table 4.23.

Tables 4.23: T-test performed on correlations of LogBasic EPS and share prices

		Mean	N	Std. Deviation	Std. Error of Mean
1	LogBasic EPS and LogShare price on date	.58	9	.07	.02
2	LogBasic EPS and LogShare price 20 days before	.58	9	.04	.01
3	LogBasic EPS and LogShare price 20 days after	.60	9	.06	.02

		Mean (paired difference)	t	df	Sig. (two-tailed)
Pair 1	LogBasic EPS and LogShare price on date & LogBasic EPS and LogShare price 20 days before	.00	.03	8	.974
Pair 2	LogBasic EPS and LogShare price on date & LogBasic EPS and LogShare price 20 days after	-.02	-1.35	8	.213
Pair 3	LogBasic EPS and LogShare price 20 days before & LogBasic EPS and LogShare price 20 days after	-.02	-1.66	8	.068

Source: Own research

According to the above tables, correlations for LogBasic EPS and selected share prices did not differ significantly.

- On average, correlations between LogBasic EPS and LogShare prices on date ($M = .58$, $SE = .02$) were greater than correlations between LogBasic EPS and

LogShare prices 20 days before publication (M = .58, SE = .01), t (8) = .03, p > .05.

- The mean score of LogBasic EPS and LogShare price on date (M = .58, SE = .02) was smaller than that of LogBasic EPS and LogShare prices 20 days after publication (M = .60, SE = .02), t (8) = −1.35, p > .05.

- Correlations between LogBasic EPS and LogShare price 20 days before publication (M = .58, SE = .02) were lower than correlations obtained for LogBasic EPS and LogShare prices 20 days after publication (M = .60, SE = .02), t (8) = −1.66, p > .05.

From these interpretations, it is submitted that none of the selected share prices led to a significant difference in correlations obtained. It is then posited that LogBasic EPS did not associate itself better with one of the selected share prices, because p > .05 for all observations. Although the closest correlation was found between pair 3, this correlation was still insignificant.

It is clear that basic EPS was able to relate best to share price behaviour, but proved to have no preference to one of the selected share prices. Headline EPS provided the lowest correlations and mean scores. Therefore, headline EPS seems to have a poorer relationship to share prices than other EPS categories. A summary of all research findings is provided in the paragraph to follow.

4.5   SUMMARY OF OVERALL RESEARCH FINDINGS

The research findings obtained through the application of statistical methods were discussed extensively in par. 4.3 and 4.4. Nine years of data were illustrated, summarised and explained. The statistical findings with regard to correlation modelling are summarised in Table 4.24.

Table 4.24: Synopsis of statistical findings with regard to correlation modelling

	EPS category with highest correlation		EPS category with the lowest correlation
Year	EPS category type	Maximum shared variance	
2005	Basic EPS	29.20%	Headline EPS
2006	Basic EPS	36.80%	Headline EPS
2007	Basic EPS	43.40%	Headline EPS
2008	Diluted EPS	45.10%	Headline EPS
2009	Basic EPS	26.10%	Headline EPS
2010	Basic EPS	39.00%	Headline EPS
2011	Basic EPS	44.00%	Headline EPS
2012	Basic EPS	37.90%	Headline EPS
2013	Basic EPS	28.50%	Headline EPS

Source: Own research

Table 4.24 indicates that basic EPS provided the highest correlations for years 2005, 2006, 2007, 2009, 2010, 2011, 2012 and 2013. For 2008, the highest correlation was obtained for diluted EPS. The maximum share variances ranged between 26.10% and 44% for basic EPS. When objectively considering this range, it seems to be a rather large effect, because many other factors have an influence on investment decisions, as noted in Chapter 2, par. 2.3. For a single factor (basic EPS) to influence share prices between 26.10% and 44% is a rather significant impact. Headline EPS delivered the poorest correlations for all nine years. Evidently, headline EPS could least associate itself with share prices.

Except for correlation modelling, t-testing was performed. Here, the mean scores of correlations were analysed. Figure 4.3 serves as a rank demonstration of findings obtained by means of t-testing.

Figure 4.3: Ranking EPS categories in accordance with empirical results
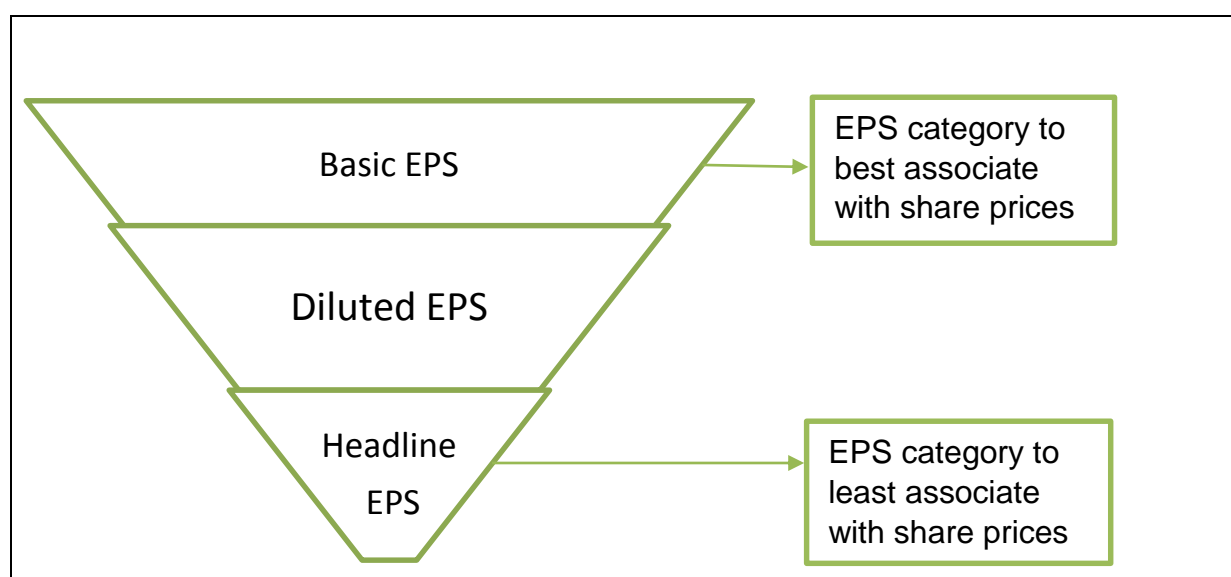
Source: Own research

Figure 4.3 illustrates that the mean scores of the different EPS categories rank these categories as follows: basic EPS to have the greatest mean score, diluted EPS to have the second best mean score and headline EPS to have the lowest mean score, while all correlations among EPS categories differed significantly.

Table 4.25 compares the empirical findings of the study to previous studies (as demonstrated in Chapter 2, Table 2.3):

Table 4.25: Comparisons between research outcomes

Previous study	Difference/similarity in research findings
Lev (1989)	The American study performed by Lev (1989) suggested that the relationship between earnings and share prices is low. The findings of this study are contrary to Lev's (1989), because all categories of EPS proved to be significantly associated with share prices, either at a 1% or 5% statistical confidence level, in accordance with the Pearson product moment coefficient. The study of Lev (1989) was, however, performed in 1989, and findings might be considered as outdated.

Previous study	Difference/similarity in research findings
Demsetz (1995)	The study acknowledged a strong association between earnings and share prices. Demsetz (1995) attempted to express this association statistically through the application of t-statistics. Similar to Demsetz's (1995) study, this study applied t-testing in its empirical analysis. The findings of this study support the arguments of Demsetz (1995).
Balsam and Lipka (1998)	The study by Balsam and Lipka (1998) found that diluted EPS was most informative to investors. This finding is contrary to the empirical findings of this study, because diluted EPS proved to deliver the highest correlation coefficients only during 2008. Balsam and Lipka (1998), however, performed their study in the USA 17 years earlier; therefore, the findings could differ due to differences in economic circumstances and the application of different accounting standards. USA-based entities apply the Statement of Financial Accounting Standard (SFAS) 128 and not IAS 33 as South African entities do.
Auret and De Villiers (2000)	Auret and De Villiers (2000) performed a South African study in order to prove that EPS was a better explanatory variable for share prices than cash flow per share. The findings of the study support the outcomes of this study, because both studies indicate that EPS and share prices are significantly related.
De Villiers *et al.* (2003)	De Villiers *et al.* (2003) determined whether dividends per share was a better explanatory variable for share prices than EPS. The study was able to demonstrated that EPS was a better explanatory variable for share prices. The findings, again, support the outcomes of this study, because EPS categories were significantly associated with share prices in this study.
Nichols and Wahlen (2004)	In their study, Nichols and Wahlen (2004) concluded that stock prices strongly respond to earnings information, because

Previous study	Difference/similarity in research findings
Nichols and Wahlen (2004) continued	earnings convey important clues about future prospects to the investor. The conclusion of Nichols and Wahlen (2004) is in line with this study, because EPS categories were significantly associated with share prices in the empirical analysis of this study.
De Wet and Du Toit (2007)	The study demonstrated that dividends correlated with shareholder returns. This study was not undertaken in order to determine relations to shareholder returns, and findings are not comparable.
Chang *et al.* (2008)	Chang *et al.* (2008) indicated that share prices and EPS move in the same direction. This finding is in line with this study, because correlations obtained were positive, indicating that variables moved in the same direction.
Erasmus (2010)	Erasmus (2010) indicated that both dividends and EPS can associate with share prices. EPS was, however, able to provide the highest correlation coefficients. This study did not test for associations among dividends and share prices, because dividends are dependent upon earnings.
Sharma (2011)	Sharma (2011) found significant correlations between EPS and share prices, as well as dividends per share and share prices. Such findings are not unexpected, because dividends depend upon earnings. This study supports the arguments of Sharma (2011), because both studies indicate that EPS and share prices are related. This study, however, did not test for associations between share prices and dividends per share, because South African studies by De Villiers *et al.* (2003) and Erasmus (2010) indicated that earnings correlate better with share prices than dividends.

Previous study	Difference/similarity in research findings
Menaje (2012)	Menaje (2012) demonstrated that EPS impacts share prices significantly, which is in line with this study. Menaje (2012) also applied natural logarithmic transformation to variables, as done in this study.
Almumani (2014)	Almumani (2014) indicated that EPS is significantly related to stock prices, which is in line with this study.
Menike and Prabath (2014)	The study, performed in Sri Lanka, indicated that dividends could best associate with share prices on the Colombo Stock Exchange. Again, it must be taken into account that the study was performed in another country and that differences in findings are likely to occur when such findings are obtained from information of different stock exchanges.
Iqbal *et al.* (2015)	Iqbal *et al.* (2015) concluded that EPS is a significant explanatory variable of share prices. The finding is in line with this study.

Source: Researchers listed above

From Table 4.25, it is apparent that the majority of the findings of previous studies are in line with the findings of this study. Below follows a summary of the chapter.

4.6   CHAPTER SUMMARY

The objective of the chapter was to provide empirical research findings in order to fulfil the empirical objectives of the study. In order for the empirical objectives to be fulfilled, five steps of analysis were applied to the collected data (Figure 4.1):

1. Identified the year of analysis;
2. Transformed data;
3. Performed correlation analysis;
4. Performed t-test analysis on correlations; and
5. Interpreted the results.

Data were analysed per year, for 2005 to 2013. Data had to be transformed to natural logarithmic format in order for the distributions to be rendered normal. Statistical illustrations of these transformations were displayed graphically. Two basic statistical methods were applied, namely correlation modelling and paired t-testing. Correlation modelling necessitated the calculation of a Pearson product moment coefficient (r), R square (R^2) and a probability score (p). The application of paired t-testing required the indication of a mean score (*M*), standard error of the mean score (*SE*), t-value (t) and probability score (p).

Through the application of selected empirical methods, it was found that basic EPS was the most useful EPS category to investors, followed by diluted EPS. Headline EPS proved to be less useful to investors, because it was ranked last in Table 4.25. This chapter was able to fulfil the primary objective of this study by indicating that basic EPS could best associate with the share prices of the top 40 JSE listed companies. Chapter 4 also fulfilled the empirical objectives of the study by indicating that basic EPS correlated best with share prices behaviour, while headline EPS proved to have the lowest correlations with share prices of the top 40 JSE listed companies between 2005 and 2013. Furthermore, it was established that the findings of this study are similar to the majority of previous studies that were included in the literature review. In the final chapter to follow, the study is concluded and several recommendations are made.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

"There is nothing riskier than the widespread perception that there is no risk."

- Howard Marks

5.1   INTRODUCTION

The word 'risk' is derived from the Italian term *riscare* that means 'to dare' (Garret, 2003:194). From the viewpoint of an investor, investment opportunities are classified as being certain or uncertain (Correia *et al*., 2011:3-3), where uncertainty increases risk as well as required returns (Correia *et al.,* 2011:3-2). A significant indicator of risk is volatile earnings (Blume & Friend, 1978:98), while growth in earnings indicates future potential (Hinman, 2014:17) and minimisation of risk (May, 1968:113).

EPS is an important consideration when making investment decisions (Bogdan & Balaciu, 2007:129). EPS figures are indicative of company performance (Stainbank & Harrod, 2007:91), while increases in EPS are favourably reflected in prices of shares, which constitute the creation of shareholder wealth (Petty *et al*., 1982:582). Researchers such as Auret and De Villiers (2000), De Villiers *et al.* (2003), Menaje (2012) and Almumani (2014) studied the relationship between EPS and share prices and found that changes in EPS are significantly associated with share prices. From these findings, the research question of this study originated.

JSE listed companies are required to publish three categories of EPS: basic, diluted and headline EPS (BDO 2014:1). Similar previous studies have not attempted to determine which category of EPS (basic, diluted or headline EPS) associates best with share price behaviour. For this reason, the following research question was formulated: 'Which category of EPS has the greatest effect, if any, on the share price behaviour of the top 40 JSE listed companies?'

In order for the research question to be answered, primary and secondary research objectives were identified. This chapter will indicate how each of the identified research objectives were reached in an attempt to answer the research question (par. 5.2). The chapter will make recommendations towards the category of EPS that, ultimately, impacts share prices, in fulfilment of secondary objectives 7 and 8. Based on the

research findings, the research limitations (par. 5.3) and suggested areas for further research (par. 5.4) will also be discussed in this chapter.

5.2   RESEARCH OBJECTIVES

Objectives are goals that should be attained through a research study (Kumar, 2011:50). Research objectives are primary or secondary in nature, where a primary objective is the main discovery that should be established, while secondary objectives represent specific aspects that should be investigated (Kumar, 2011:50). The objectives of the study were identified in Chapter 1, par. 1.4. For the purpose of this chapter, these objectives are illustrated by Figure 5.1:

Figure 5.1: Research objectives of the study
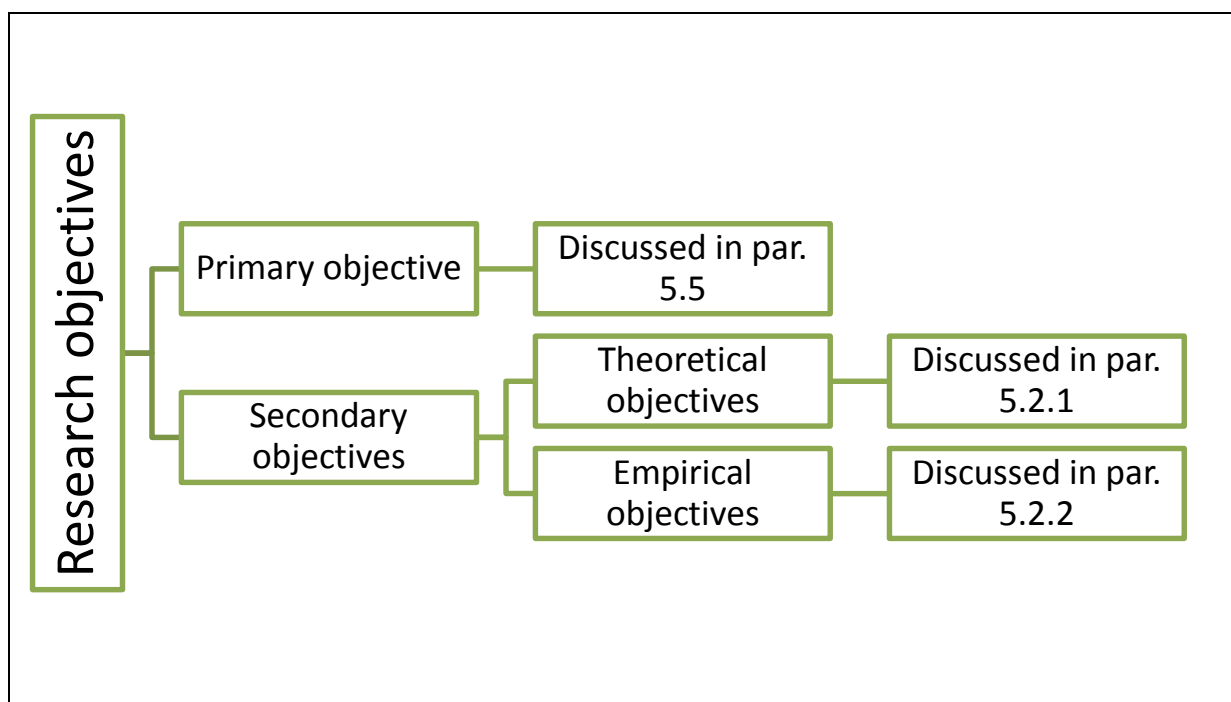
Source: Own research

Figure 5.1 indicates that the study consists of both primary and secondary objectives. The primary objective of the study was to determine which category of EPS (basic EPS, diluted EPS or headline EPS) best associates with share prices of the top 40 JSE listed companies (as indicated in Chapter 1, par. 1.4.1). In order for the primary objective to be fulfilled, secondary objectives were identified. Secondary objectives are divided into two types of objectives: theoretical objectives and empirical objectives. In the following section, each type of secondary objective is indicated, accompanied

by an explanation of how it was fulfilled, after which the achievement of the primary objective is explained in par.5.5.

5.2.1 Theoretical objectives

In accordance with Chapter 1, par. 1.4.2.1, five theoretical objectives were identified. In the paragraphs to follow, each secondary theoretical objective is analysed in order to indicate the fulfilment thereof.

5.2.1.1 Determine the economic importance of making investments

Secondary objective 1 was considered in Chapter 2. Chapter 2, par. 2.2.1, investigated the role of investments in general economic wealth and commenced with an explanation of how the investment process takes place. The process is initiated through an entity's issuance of equity or debt instruments. Capital obtained from such issuance is used to finance capital expenditure of the entity. Capital expenditure leads to the accumulation of profits, from which a return is paid to the investor (Chapter 2, Figure 2.2). Chapter 2, Figure 2.3 indicated that investments stimulate economic processes through increased production, employment, income generation, greater tax obligation, higher consumer spending and greater savings potential. Ultimately, increased investment leads to higher national income (Chapter 2, par. 2.2.1). Economists apply a model, referred to as the 'Investment Multiplier,' which attempts to measure the relationship between changes in investment spending and national income (Chapter 2, par. 2.2.1 and Figure 2.4). Although this model had not proved to be immensely accurate, it provides proof that increases in investments affect national income generation positively (Chapter 2, par. 2.2.1).

Investment spending also affects international alliances in the form of FDI (Chapter 2, par. 2.2.2). Globalisation has led to the initiation of international trade, where foreign investors can obtain interest in local entities. FDI has a positive effect on the capital generation, labour development, export potential and technological advancement of the local economy (Chapter 2, par. 2.2.2). The government plays a significant role in FDI, because it must establish macro- and micro-economic policies that stimulate foreign investment. An important policy is that of investment return taxes. South Africa has introduced section 12T during 2014, which allows investment returns to remain tax free (Chapter 2, par. 2.2.2). This is a clear attempt to stimulate investment in local

activities in order for the advantages of investment to be attained specifically in South Africa.

Secondary objective 1 was attained through the confirmation that investing activities lead to economic growth and prosperity in the form of higher production, employment, greater income, greater spending, increased saving potential and larger tax obligations. These advantages of investment can be generated within a local economy, or generated externally through international trade arrangements which are greatly affected by governmental policies.

In par. 5.2.1.2, secondary objective 2 is addressed.

5.2.1.2 Investigate the accounting factors that investors contemplate when making investment decisions

Secondary objective 2 was considered in Chapter 2, par. 2.3. Here, it was demonstrated that several factors, such as neutral information, self-image and firm-image coincidence, the classic factor, social relevance factor, advocate recommendation factor, personal financial needs factors and accounting information are often considered by investors (Chapter 2, par. 2.3). It was established that accounting information was a primary consideration among these identified factors (Chapter 2, par. 2.3).

Chapter 2, par. 2.3.1, continued to establish the most important sources of accounting information in the Statement of Profit or Loss and Other Comprehensive Income, followed by the Statement of Financial Position. From these sources, three specific accounting factors were obtained: financial ratios, dividend pay-outs and EPS (Chapter 2, par. 2.3.2).

Although six different groups of financial ratios exist, only eight key financial ratios are often used: return on capital employed, net profit margin, total asset turnover, return on equity, price–earnings ratio, return on assets, cash flow per share, and dividend yield (Chapter 2, par. 2.3.2.1). Each of these ratios proved to have both advantages and shortcomings. The overall shortcomings of ratio analysis observed were listed in Chapter 2, Table 2.2. The following shortcomings were identified:

- Ratio analysis requires identified benchmarks in order to be interpreted correctly;

- It is difficult to identify meaningful and effective industry benchmarks with which all entities must comply;

- There are often different variances of the same ratio, which can be applied in ratio analysis;

- When different variances of a ratio are applied, information obtained from these ratios is incomparable;

- Ratios are not necessarily indicative of future expectations;

- Ratio analysis requires application of professional judgement of the analyst; and

- The results of ratio analysis are not necessarily unambiguous. It could be difficult to determine whether a result is 'good' or 'bad'.

From these shortcomings, it is apparent that, although they are often applied by shareholders, ratios can create several challenges for investors.

Dividend pay-outs were studied in Chapter 2, par. 2.3.2.2. It was demonstrated that different dividend policies exist, including the constant dividend pay-out ratio, stable dividend per share, regular dividend plus bonus, and residual policy method. It was established that the selection of a divided policy is based upon the following factors:

- Legal factors;
- Liquidity position of the entity;
- Debt repayment;
- Debt contract restrictions;
- Asset expansion requirements;
- Clientele requirements;
- Stability of dividends;
- Access to capital markets;
- Control and shareholding;
- The tax position of shareholders; and
- Tax on accumulated earnings.

Dividend policies are of great importance, because dividend payments can influence share price volatility (Chapter 2, par. 2.3.2.2). Dividends have been considered as a significant associate of share prices to such an extent that a dividend growth model has been developed. The dividend growth model is used to estimate the market value of shares by basing share value estimates on expected future dividends (Chapter 2, par. 2.3.2.2). However, researchers such as Chiang *et al.* (1997) and Auret and De Villiers (2000) determined that dividends are poorer predictors of share prices than EPS (Chapter 2, par. 2.3.2.2).

In Chapter 2, par. 2.3.2.3, EPS was discussed. It was suggested that EPS provides an indication of how much profit each ordinary share earns. The objective of entities is to increase EPS, because it is positively reflected in stock prices. EPS forms part of three financial ratios: the price–earnings ratio, earnings yield ratio and dividend cover ratio (Chapter 2, par. 2.3.2.3). EPS also provides other important performance clues to investors, including the signalling of future earnings, future dividends and share value. Despite providing important future considerations, EPS also has a number of limitations. Earnings can be influenced by changes in accounting policies and can be manipulated by management (Chapter 2, par. 2.3.2.3).

Secondary objective 2 was fulfilled through identifying several factors that influence investment decisions. The scope of the study was limited to accounting considerations, and it was determined that ratios, dividend pay-outs and EPS figures affect investment decisions greatly. Financial ratios such as return on capital employed, net profit margin, total asset turnover, ROE, price–earnings ratio, ROA, cash flow per share and dividend yield were identified as preeminent among all ratios. These ratios proved to have advantages and disadvantages and due to the identified shortcomings, ratios were not included in the empirical analysis. Dividend pay-outs were addressed secondly. Dividends are regulated through the application of a chosen dividend policy. The application of the correct dividend policy is critical, because dividend pay-outs influence share price stability. Previous South African studies, however, proved that EPS figures correlated better with share price behaviour than dividends, and dividend pay-outs were not included in the empirical study. In accordance with the literature, EPS is greatly valued by investors, because it indicates the financial performance of the entity, creates shareholder wealth, provides clues about future performance and indicates risk. EPS has its limitations, but researchers

have continued to study its relationship to share price behaviour. Paragraph 5.2.1.3 addresses secondary objective 3, which investigated outcomes of previous studies.

5.2.1.3 Summarise previous studies published on the topic and evaluate the results thereof in order to highlight the importance of EPS figures

Secondary objective 3 was explored in Chapter 2, par. 2.3.2.3. A summary was provided of 15 previous studies that have analysed the relationship of EPS to share prices. These studies included findings by the following researchers (Chapter 2, Table 2.3 to 2.17). Table 5.1 provides a brief overview of the outcomes achieved by these studies.

Table 5.1: Summary of included previous studies

Researcher	Study outcome
Lev (1989)	The study concluded that the association between EPS and share prices was low.
Demsetz (1995)	Demsetz (1995) established that EPS greatly impacted the behaviour of share prices.
Balsam and Lipka (1998)	It was found that diluted EPS related best to share price behaviour in the USA.
Auret and De Villiers (2000)	The researchers indicated that EPS figures could better associate with share prices than dividends per share measures could.
De Villiers *et al.* (2003)	De Villiers *et al.* (2003) proved that EPS figures could better associate with share price than cash flow per share could.
Nichols and Wahlen (2004)	It was demonstrated that stock returns were significantly related to share prices.
De Wet and Du Toit (2007)	The study was unable to identify performance indicators that were significantly related to share prices. They suggested that non-financial alternatives

Researcher	Study outcome
De Wet and Du Toit (2007) continued	must be considered in efforts to identify factors that can be applied in order to predict share prices.
Chang *et al.* (2008)	Chang *et al.* (2008) indicated that earnings and share prices moved in the same direction in the long run.
Erasmus (2010)	Erasmus (2010) found that EPS delivered the higher correlations coefficients when a Spearman Rank Order was statistically applied, but concluded that both EPS and dividends were worthy considerations in prediction of share price behaviour.
Sharma (2011)	Sharma (2011) indicated that earnings and dividends were significantly related to share prices.
Menaje (2012)	Menaje (2012) demonstrated that EPS was related to share prices in the prediction of share price behaviour.
Haque and Farquee (2013)	Haque and Farquee (2013) could not identify a performance indicator that associated well with share prices.
Almumani (2014)	Almumani (2014) proved that dividends could best associate with share prices.
Menike and Prabath (2014)	Menike and Prabath (2014) found that dividends best associated with share prices.
Iqbal *et al.* (2015)	Iqbal *et al.* (2015) proved that EPS is significantly related to share prices.

Source: Own research, Table 1.1 and 1.2, Table 2.3 and Table 4.25

From these 15 studies, 53.33% (eight out of 15) indicated that EPS was best able to associate with share price behaviour. Other considerations included financial ratios

and dividends per share. Only 6.67% (one out of 15) of the studies found that the association between EPS and share prices was low. Furthermore, 13.33% (two out of 15) of the studies indicated that dividends were best able to associate with share price changes, while none of the studies were able to identify other financial ratios that could associate well with share prices (Chapter 2, par. 2.3.2.3 and Table 2.18).

Secondary objective 3 was reached by reviewing the 15 previous studies. EPS importance was highlighted, not only by the fact that all studies considered earnings as a statistical variable, but also that more than half of the studies concluded that earnings was the most significant associate to share price behaviour. From these studies, it is evident that EPS is an important investment consideration. It is an indicator that is observed by investors, because it provides an overall indication of corporate success (Chapter 2, par. 2.3.2.3). The popularity of the financial measure has, consequently, led to the development of a regulatory standard (Chapter 2, par. 2.3.2.3).

In par. 5.2.1.4, secondary objective 4 investigates this regulatory factor, as well as headline EPS.

5.2.1.4 Explore IAS 33 and headline EPS

Secondary objective 4 was considered in Chapter 2, par. 2.4. It was indicated that IAS 33 regulates the EPS measurements through the identification of the Standard's history, objective, scope and measurement.

IAS 33 was originally drafted in January 1996, but issued only during February 1997. The Standard was adopted by the IASB in April 2001, but by May 2002 proposed changes had been published in an exposure draft (Chapter 2, par. 2.4.1). A revised version of IAS 33 was issued in December 2003 by the IASB. The implementation of the revised version became effective on 1 January 2005. Since the effective date, paragraphs in the Standard have been revised twice, during 2007 and 2011 (Chapter 2, par. 2.4.1 and Figure 2.6).

The objective of IAS 33 is to provide a standardised method for the calculation of EPS figures and to ensure that all entities publish comparable EPS amounts (Chapter 2, par. 2.4.2). The scope includes three possible types of entities (Chapter 2, par. 2.4.3 and Figure 2.7):

- Entities that trade ordinary shares or potential ordinary shares on public markets;

- Entities that are filing with regulators in order to issue shares on public markets; and

- Entities that voluntarily disclose EPS figures.

The measurement of IAS 33 consists of two different EPS figures: basic EPS and diluted EPS (Chapter 2, par. 2.4.4). Basic EPS is calculated by dividing profit or loss attributable to ordinary shareholders by the weighted average number of shares (Chapter 2, Figure 2.7). Diluted EPS is determined by adjusting profit or loss attributable to ordinary shareholders and the weighted average number of shares for the effect of all potentially dilutive instruments (Chapter 2, Figure 2.7). It is also apparent that headline EPS is excluded from the measurement of IAS 33.

The publication of headline EPS is a JSE listing requirement (Chapter 2, par. 2.5). Headline EPS is calculated by adding back or deducting any separately identifiable re-measurements from earnings of an entity. Headline EPS is disclosed only in the notes to the financial statements (Chapter 2, par 2.5). Researchers such as Stegmann (2006), Suliman (2000) and Stainbank and Harrod (2007) empirically concluded in their surveys that headline EPS was the most useful per-share instrument (Chapter 2, par. 2.5). This study was, however, undertaken in order to generate its own empirical findings.

Secondary objective 4 was fulfilled through the detailed evaluation of IAS 33 and its history, objective, scope and measurements. Furthermore, headline EPS was explored by considering its calculation method and analysing its importance to the users of earnings information.

Next, par. 5.2.1.5 will discuss the research design and methodology applied in this study.

5.2.1.5 Identify the research design and methodology to be applied to this study

Secondary objective 5 was fulfilled in Chapter 3. It investigated both the research design and research methodology that were required in order for empirical objectives to be reached. Research design was analysed through the identification of four different research design dimensions (Chapter 3, Figure 3.2). In Chapter 3, Table 3.1,

it was indicated that each dimension of research design can be applied to the study as follows:

- **Dimension 1:** The study was empirical of nature, because it consisted of a statistical analysis.

- **Dimension 2:** The study was reliant on secondary data, which were collected in order to compile both the literature review and empirical study.

- **Dimension 3:** A collection of numerical data was used in order for the primary objective to be fulfilled.

- **Dimension 4:** Medium control could be applied by the researcher in conducting this study, because sources could be selected by applying own judgement, while data were secondary in nature and remained unaffected by research expectations.

In analysing the research methodology, several factors were investigated. These included: the type of research undertaken, the population and research sample, the collection and analysis of data, the reliability and validity of data, as well as the identification of applicable ethical considerations.

In Chapter 3, par. 3.2.3.1, it was indicated that the research was explanatory in nature, because it aimed to explore the relationship among EPS categories and share price behaviour. It can also be posited that applied research was performed, because the outcome of the study can influence decisions taken by investors. Lastly, the study consisted of quantitative research, because statistical analysis was performed.

For the sake of determining the population and sample to the study, the top 40 JSE listed companies were selected for both instances (Chapter 3, par. 3.2.3.2). The fact that the research sample and population were identical contributed merit to empirical findings obtained. The top 40 entities had the highest market capitalisations (Chapter 3, Table 3.4) and well-established reputations, and their financial information was easily accessible (Chapter 3, par. 3.2.3.2). Non-probability sampling was applied in the form of convenience sampling. The top 40 JSE listed companies were selected due to the convenience of accessing data that were required to perform this study. Two variables were collected during the data-gathering process: EPS figures and share prices. The McGregor BFA (2015) database and the Sens

(2015) database were used for the purpose of data collection. Data were gathered for the period 2005 to 2013. Data that remained uncollected under the period of review were clearly indicated in Chapter 3, Table 3.5. Missing observations were attributed to JSE listings that took place after the 2005 year-end. Share prices were collected on three different occasions: 20 days before publication of financial information, on the date of publication and 20 days after publication of financial information (Chapter 3, par. 3.2.3.2b). Closing share prices were gathered for the purpose of empirical analysis (Chapter 3, par. 3.2.3.2).

Two statistical techniques were applied in the study: correlation modelling and paired t-testing (Chapter 3, par. 3.2.3.4). However, before these techniques could be applied, the selected data variables had to be transformed to natural logarithmic format in order to obtain normal distributions (Chapter 3, par. 3.2.3.4). Thereafter, correlation modelling was applied, which required the calculation of a Pearson product moment coefficient and R square. Correlations indicated the strength of association between variables. Furthermore, paired t-testing was performed to correlation coefficients obtained (Chapter 3, par.3.2.3.4). T-testing indicated whether the mean scores of correlations differed significantly from one another. In addition to the two identified statistical techniques, Cronbach's alpha was calculated in order to prove that statistical data were reliable (Chapter 3, par. 3.2.3.5). The validity of data was established by acknowledging that both McGregor BFA and the Sens databases are recognised sources. Furthermore, EPS figures were collected from published, audited financial statements (Chapter 3, par. 3.2.3.5).

In Chapter 3, par. 3.2.3.6, the ethical considerations to the study were examined. It was indicated that all the data were secondary in nature, as well as publically accessible. For this reason, no ethical limitations were identified.

Secondary objective 5 was fulfilled by providing a detailed analysis of the research design and methodology applied to the study. Chapter 3 analysed the research problem, applicable research design dimensions, types of research applied, population and sample, data collection, and statistical methods and considerations. After establishing the research design and methods, the empirical objectives could be fulfilled.

5.2.2 Empirical objectives

In accordance with Chapter 1, par. 1.4.2.2, three empirical objectives were identified. In the paragraphs to follow, each empirical objective is analysed in order to explain the fulfilment thereof.

5.2.2.1 Determine which category of EPS (basic EPS, diluted EPS or headline EPS) correlates best and least with the changing behaviour of share prices on the JSE from 2005 to 2013

Secondary objective 6 was considered in Chapter 4. Collected variables (that is EPS figures and share prices) were sorted and analysed by the SPSS software package in order to obtain the results per year (2005 to 2013). For the years 2005, 2006, 2007, 2009, 2010, 2011, 2012 and 2013, basic EPS delivered the highest correlation coefficients. During 2008, diluted EPS delivered the highest correlations. It was highlighted that the deviation obtained for the 2008 data could be attributed to the international financial crisis that had prevailed during this period (Chapter 4, par. 4.3.4.2). Headline EPS proved to provide the lowest correlation coefficients for all years under review (that is 2005 to 2013) (Chapter 4, par. 4.3.4.2). The difference obtained in correlation coefficients among EPS categories seemed rather small, and it had to be determined whether the differences were significant. A paired t-test was performed in order to determine whether the differences were statistically significant at a confidence level of 5%. The results indicated that all mean scores of all the EPS categories differed significantly (that is $p < .05$) (Chapter 4, par. 4.4). Basic EPS delivered the highest mean score, indicating that it can best associate itself with share price behaviour (Chapter 4, par. 4.4.1 to par. 4.4.2). Upon these findings, a t-test also indicated that basic EPS did not associate itself better with one of the selected share prices of the study (Chapter 4, par. 4.4.4). Headline EPS delivered the lowest mean score, suggesting that it associates least with share price behaviour (Chapter 4, par. 4.4.2 to par. 4.4.3). In Chapter 4, Figure 4.3 ranked the usefulness of EPS categories as follows, based on the empirical findings:

Figure 5.2: Usefulness of EPS categories
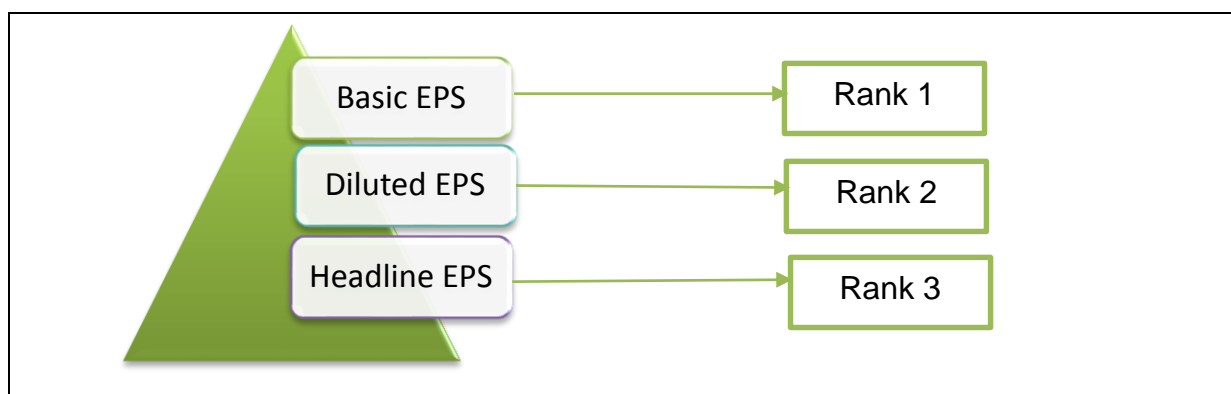
Source: Own research; Figure 4.3

Figure 5.2 illustrates that basic EPS is the most useful EPS category in determining share price associations. Diluted EPS is ranked secondly, while headline EPS proved to provide the lowest associations with share price behaviour.

Secondary objective 6 was reached through the application of the statistical methods identified in Chapter 3. Correlation analysis and paired t-testing were applied and it was statistically demonstrated that basic EPS could best associate with share price behaviour. As established by Figure 5.2, basic EPS correlated best with share prices, while headline EPS correlated least with share prices.

In par. 5.2.2.2, recommendations are provided with regard to the category of EPS that investors should consider.

5.2.2.2   Make recommendations towards which category of EPS, or combination thereof, investors should ultimately consider when making an investment decisions

In Chapter 2, par. 2.3.2.3, it was established that earnings information is of great value to investors due to its ability to provide signs about current and expected corporate performance. From the empirical findings obtained in Chapter 4, the following can be posited:

- Basic EPS associates best with share price behaviour of the selected top 40 companies for the period 2005 to 2013;
- Basic EPS did not prove to correlate better with one type of selected share price, because paired t-testing could not indicate significant differences (at a confidence

level of 5%) for correlations obtained between basic EPS and share prices 20 days before publication, on publication date or 20 days after publication. Basic EPS can, therefore, associate itself equally well with all selected share prices; and

- Statistical evaluation indicated that basic EPS did not provide the highest correlation coefficients during 2008. It would seem that basic EPS is not a main per-share instrument consideration during times of extensive economy pressure, but that diluted EPS is instead considered during periods of financial crisis.

It is submitted that investors should, ultimately, consider basic EPS when investing in the top 40 JSE listed companies. In general, basic EPS associated best with the share price behaviour of these entities. It is, however, recommended for investors to analyse the economic climate when making investments, because diluted EPS seems to be able to provide meaningful associations with share prices in periods of economic recession. These recommendations to investors are contrary to outcomes of surveys performed by South African researchers such as Stainbank and Harrod (2007), Stegmann (2006) and Suliman (2000), who concluded that headline EPS is the most useful per-share instrument to investors.

As noted in Chapter 1, par. 1.2, the top 40 JSE listed entities can also benefit from the findings of the study which can serve as an indication of which category of EPS should enjoy greater attention. From the findings in Chapter 4, entities are advised to pay attention to trends observed in basic EPS, because its interdependence with share prices proved to be the highest. Strategies that influence basic EPS measurements can likely influence share prices up to 44% (Chapter 4, Table 4.24). Again, the top 40 entities should also consider the general economic environment, because investors may focus on diluted EPS figures in times of great economic difficulty. As indicated in Chapter 4, Table 4.24, diluted EPS was able to influence share prices up to 45.10% during 2008. This is quite a significant influence; therefore, the recommendation is made that diluted EPS be monitored during such periods.

In summary, it is recommended for investors and the top 40 JSE listed entities to consider basic EPS trends. During periods of great economic pressure, diluted EPS trends can enjoy preference. Par. 5.2.2.3 will make recommendations regarding the category of EPS that is least useful to the investor.

5.2.2.3 Make recommendations towards the category of EPS that is least useful to investors

Although headline EPS is often considered as an important financial indicator (Chapter 2, par. 2.5), the research findings in Chapter 4 theorised the following:

- Headline EPS is the least useful category of EPS to investors of the top 40 JSE listed entities;
- Headline EPS delivered the lowest correlation coefficients for all years under review (that is 2005 to 2013); and
- Headline EPS provided the lowest correlation mean score in the applications of a paired t-test, while this low average score also differed significantly from the mean score of basic and diluted EPS at significance level of 5%.

From the previously listed findings, it is recommended that investors consider not only headline EPS when making investment decisions, because another EPS category might provide better indications with regard to share price behaviour. This recommendation is in line with the measurement requirements of IAS 33. The Standard does not require for headline EPS to be published, while it would seem that headline EPS does not convey important clues about share price performance of the top 40 JSE listed companies.

It is acknowledged that the top 40 JSE listed entities will continue to disclose headline EPS, seeing that it is a JSE listing requirement. It is, however, not recommended that the publication of headline EPS remain a JSE listing requirement for the top 40 JSE listed entities, because the findings of the study seem to indicate that the publication of the headline EPS category might be of little use to the investor. Furthermore, the top 40 JSE listed entities are not motivated to monitor headline EPS measurements, because other categories of EPS convey more important clues about share price behaviour to the investor.

In summary, it is submitted that headline EPS is least useful to investors of the top 40 JSE listed companies based on the findings of this study. Although it is a JSE listing requirement to publish headline EPS, this EPS category is least able to provide evidence about share price performance. Investors, together with the top 40 JSE listed entities, are not advised to concentrate only on trends observed in this EPS category.

Paragraph 5.3 provides the limitations and shortcomings of the study.

5.3   LIMITATIONS AND SHORTCOMINGS OF THE STUDY

The limitations and shortcomings of the study can be formulated as follows:

- The study measured statistical relations among EPS categories and share prices of the top 40 JSE listed companies. The generalisability of the findings to other companies and countries is, therefore, limited;

- The study faced the challenge of multicollinearity. This created the limitation that EPS categories could not be used to predict share prices. However, it did not influence the ability to determine associations among variables;

- The study accommodated nine years of financial information under its literature review. Empirical findings could be altered if financial information were to be analysed for significantly longer periods; and

- The study relied on the accurate measurement of EPS figures. Earnings information can, however, be manipulated (Elmaleh, 2006:1). Such manipulations can distort the empirical findings.

5.4   SUGGESTIONS FOR FURTHER RESEARCH

The following areas for further research have been identified:

- Duplicate this study and test whether the share prices of different JSE sectors can be influenced by different categories of EPS;

- Perform an identical analysis on the top 40 JSE listed companies within another time frame and determine whether findings are significantly altered when a different period is taken under review;

- Apply a similar analysis to companies listed on other stock exchanges (such as the NASDAQ) and observe whether similar findings are obtained; and

- Investigate how the manipulation of earnings information can lead to increases in share prices based on inflated EPS figures.

5.5   CHAPTER SUMMARY AND FINAL REMARKS

The purpose of this chapter was to provide an overview of the study and discuss how each of the research objectives of this study was achieved. Recommendations were provided to researchers, investors and other affected stakeholders regarding which

category of EPS, or combination thereof, investors should ultimately consider when making an investment decisions, as well as which category of EPS is least useful to investors. The limitations of the study were also acknowledged.

In Chapter 1, par. 1.4.1, the primary objective to the study was identified. The primary objective was to determine which category of EPS (basic EPS, diluted EPS or headline EPS) best associates with share prices of the top 40 JSE listed companies.

After the application of statistical methods indicated in Chapter 3, par. 3.2.3.4, the primary objective was empirically fulfilled through statistical demonstrations provided in Chapter 4, par. 4.3.1 to 4.4.4. It was found that basic EPS delivered the highest correlation coefficients during 2005, 2006, 2007, 2009, 2010, 2011, 2012 and 2013. During 2008, however, diluted EPS supplied the highest correlation measurement. The latter showed that the current economic climate in a specific year can affect share prices and share price behaviour. A paired t-test was performed, which indicated that the average correlations obtained for basic EPS differed significantly (at a statistical confidence level of 5%) from other EPS categories, while the mean score for basic EPS was highest. From these quantitative findings, the primary objective of the study was fulfilled by indicating that basic EPS related best to share prices of the top 40 JSE listed companies.

The fulfilment of the primary objective also answered the research question of the study. In Chapter 1, par. 1.3, the research question was stated as: 'Which category of EPS has the greatest effect, if any, on the share price behaviour of the top 40 JSE listed companies?' From the findings of this study, it can be submitted that basic EPS has the greatest effect on the share price behaviour of the top 40 JSE listed companies.

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