

**AN ANALYSIS OF THE DEMAND FOR NEW
PASSENGER VEHICLES IN SOUTH AFRICA (1995-
2005)**

Sonwabo Zide

(Student number: 22557962)

**A research mini-dissertation submitted in partial
fulfilment of the requirements for the degree**

MAGISTER COMMERCII

in

Economics

in the

SCHOOL OF ECONOMIC SCIENCES

at the

VAAL TRIANGLE CAMPUS

of the

North-West University

Vanderbijlpark

Supervisor: Prof W.C.J. Grobler

November 2012

DECLARATION

I, **Sonwabo Zide** declare that AN ANALYSIS OF THE DEMAND FOR NEW PASSENGER VEHICLES IN SOUTH AFRICA (1995-2005) is my own work and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Signature: _____

Date: _____

ACKNOWLEDGEMENTS

I would like to thank my parents (Nomalizo and Gordon Zide) for their continued support and words of encouragement.

ABSTRACT

This dissertation analyses the determinants of demand for new passenger vehicles in South Africa over a ten-year period, between 1995 and 2005. The following investigation into the determinants of demand for new passenger cars, is based both on a statistical and empirical analysis of the performance of the South African new passenger car market.

Firstly, in Chapter 2 a brief history of the South African motor industry provides a background for the analysis which follows in this dissertation and gives some insight into the historical developments that created the structure of the industry during the period analysed by the study. The theoretical components of the thesis focus on the macro-economic theory of demand, which seeks to explain the influences which determine consumer demand when purchasing durable goods and more specifically new passenger cars. Chapter 3 explains how consumers trade off preferences and substitutes in their efforts to maximise their utility. When comparing the general theory of demand to the theory of demand for durable goods and more specifically the theory of demand for new passenger cars, it is demonstrated that the theory of demand for new passenger cars is inherently different to that of non-durable goods. New passenger cars and other durable goods require a relatively higher investment, last longer than non-durable goods and literally retain some of their value, as they get older. Chapter 3 creates a theoretical foundation upon which the determinants of demand for passenger cars will be analysed in Chapter 4.

Chapter 4 forms the base upon which the South African New Passenger Car Market will be analysed.

In Chapter 4 the study statistically and graphically analyses the primary economic determinants of demand for new passenger cars. The analyses first present the relationship between price and new passenger car demand. It was found that demand for new passenger cars was price elastic. It was also identified that price elasticity of demand changed over the ten-year period analysed.

Next, the impact of population growth and personal disposable income on new passenger car demand was analysed. It was discovered that should the population grow faster than the economy; relative prices unchanged, personal disposable income will decline and thereby affect desired stocks of new passenger cars negatively. The effect of disposable income on the sale of new passenger cars was found to be income inelastic. Income elasticity also, however displayed signs of change over the analysed period.

The effect of the rate of interest on the demand for the new passenger cars was also analysed. The analysis indicated that changes in interest rates resulted in changes of various proportions in all rates of interest in the economy; such an effect filtered through to the new passenger car market.

After this, the effect of GDP on the demand for new passenger cars was examined. The examination found that changes in the new passenger car market correlated very closely with GDP growth changes, hence GDP changes served as an important indicator of the new passenger car market.

The result of changes in the price of fuel on new passenger car demand was also examined. The result showed that the structure of the market, i.e. the size of cars, etc. was more affected than the volume of sales.

Finally, the effect of the level of confidence in new passenger car demand was analysed. Business and consumer confidence were found to be good indicators of the new passenger car market.

Chapter 5 concluded and summarised the findings of the dissertation. The study also noted that the effects of South Africa's upgraded public transport system in the form of the Bus Rapid Transport System (BRT) and the Gautrain on the demands of new passenger cars could be a case for future research.

TABLE OF CONTENTS

DECLARATION.....	ii
ACKNOWLEDGEMENTS	iii
ABSTRACT	iv
TABLE OF CONTENTS	vi
LIST OF TABLES.....	xi
LIST OF FIGURES	xii
CHAPTER 1.....	1
INTRODUCTION TO THE STUDY	1
1.1 INTRODUCTION	1
1.2 PROBLEM STATEMENT	3
1.3 OBJECTIVES OF THE INVESTIGATION	4
1.3.1 Primary objective	5
1.3.2 Theoretical objectives	5
1.3.3 Empirical objectives	5
1.4 RESEARCH HYPOTHESES	6
1.5 PRELIMINARY LITERATURE REVIEW.....	6
1.6 STRUCTURE OF THE STUDY.....	8
1.7 SUMMARY	8
CHAPTER 2.....	9
THE STRUCTURE OF THE SOUTH AFRICAN MOTOR INDUSTRY	9
2.1 INTRODUCTION	9
2.2 THE PERIOD 1896-1930.....	9
2.3 THE PERIOD 1931-1960.....	12
2.4 THE PERIOD 1961-1994.....	14
2.5 THE PERIOD 1995 TO DATE	20

2.6	THE GLOBAL MOTOR INDUSTRY AND SOUTH AFRICA'S ROLE.....	25
2.6.1	The global motor industry.....	26
2.6.2	Global market structure.....	26
2.6.3	Characteristics of successful motor industries	27
2.6.4	Economic levels of production	27
2.6.5	Phases in motor industry development	28
2.6.6	The role of marketing	28
2.6.7	The rapid pace of change	28
2.6.8	The new customer	29
2.6.9	Pricing strategies	29
2.7	AN OVERVIEW OF THE SOUTH AFRICAN MOTOR INDUSTRY	30
2.7.1	The size and structure of the South African new passenger car market.....	30
2.7.2	South Africa's new passenger car market structure	32
2.7.3	Motor Industry Development Programme	34
2.7.4	Problems facing the South African motor industry	36
2.8	DEVELOPING A SUSTAINABLE SOUTH AFRICAN MOTOR INDUSTRY.....	36
2.8.1	Development stages in the South African motor industry.....	36
2.8.2	Key challenges post MIDP	37
2.8.3	A strategy for success.....	37
2.9	SUMMARY AND CONCLUSION.....	38
	CHAPTER 3.....	41
	MACROECONOMIC FRAMEWORK OF THE STUDY: DEMAND AND MACROECONOMIC THEORY.....	41
3.1	INTRODUCTION	41

3.2	THE DEMAND THEORY	42
3.2.1	Demand curve.....	42
3.2.2	Factors that influence demand.....	44
3.2.3	Abnormal demand curves	46
3.3	MARKET DEMAND CURVES	48
3.3.1	Shifts in the market demand curve.....	50
3.4	THEORY OF DEMAND FOR DURABLE GOODS	51
3.5	THEORY OF DEMAND FOR NEW PASSENGER CARS	54
3.5.1	Indifference curve	59
3.5.2	The effect of exogenous factors on new passenger car preference functions.....	61
3.5.3	Manufacturer demand characteristics	64
3.6	SUMMARY AND CONCLUSION.....	66
CHAPTER 4.....		96
AN ANALYSIS OF THE DETERMINANTS OF DEMAND FOR NEW PASSENGER CARS IN SOUTH AFRICA 1995-2005.....		96
4.1	INTRODUCTION	96
4.2	RESEARCH DESIGN AND METHODOLOGY	97
4.3	QUALITATIVE RESEARCH	97
4.4	QUANTITATIVE RESEARCH	97
4.5	GENERAL PROCEDURES	98
4.6	INTRODUCTION TO THE NEW PASSENGER CAR MARKET AND REGRESSION ANALYSIS	98
4.6.1	New passenger car market	98
4.6.2	Regression analysis	99

4.7	THE EFFECT OF PRICE ON THE NEW PASSENGER CAR DEMAND	100
4.7.1	Regression analysis results: New passenger car market versus annual percentage change in relative new car prices	109
4.7.2	Close substitutes.....	113
4.7.3	Budget considerations.....	114
4.7.4	Number of uses.....	114
4.8	POPULATION GROWTH AND PERSONAL DISPOSABLE INCOME.....	115
4.8.1	Regression analysis results: New passenger car market versus real disposable income of households.....	120
4.9	THE RATE OF INTEREST	125
4.9.1	Regression analysis results: New passenger car market versus annual average prime rate.....	130
4.9.2	Regression analysis results: Annual average prime rate versus annual percentage change in new passenger car market.....	133
4.10	GROSS DOMESTIC PRODUCT	133
4.10.1	Regression analysis results: GDP growth versus new passenger car market	138
4.11	PETROL PRICES	138
4.11.1	Regression analysis results: New passenger car market versus petrol price.....	141
4.12	BUSINESS AND CONSUMER CONFIDENCE	141
4.12.1	Business confidence	142
4.12.1.1	Interpreting business confidence	142
4.12.1.2	Regression analysis results: Business confidence index versus annual percentage change in new passenger car market.....	146

4.12.1.3	Consumer confidence	146
4.12.1.4	Interpreting consumer confidence	146
4.13	SUMMARY AND CONCLUSION	148
CHAPTER 5.....	150
SUMMARY AND CONCLUSION.....	150
5.1	INTRODUCTION	150
LIST OF SOURCES	157

LIST OF TABLES

Table 2.1	The phases and requirements of the local content programme and related events	15
Table 2.2	Key features of the two motor industry development plans.....	21
Table 2.3	Major motor car/light commercial vehicle MIDP provisions.....	22
Table 2.3	Major motor car/light commercial vehicle MIDP provisions (continued).....	22
Table 2.4	Development stages in the South African vehicle industry	36
Table 4.1	Regression analysis: New passenger car markets versus annual percentage change in relative new car prices	108
Table 4.2	Regression analysis: Log of new passenger car market versus log of real new car price	112
Table 4.3	Regression analysis: New passenger car market versus real disposable income of households.....	119
Table 4.4	Regression analysis: Log of real disposable income of households versus log of new passenger car market	124
Table 4.5:	Regression analysis: New passenger car market versus annual average prime rate	129
Table 4.6	Regression analysis: Annual average prime rate versus annual percentage change in new passenger car market.....	132
Table 4.7	Regression analysis: GDP growth versus new passenger car market.....	137
Table 4.8	Regression analysis: New passenger car market versus petrol price	140
Table 4.9	Regression analysis: Business confidence index versus annual percentage change in new passenger car market.....	145

LIST OF FIGURES

Figure 2.1	South African market new passenger car volumes: 1995-2005.....	31
Figure 2.2	South Africa's new passenger car segment structure	32
Figure 3.1	The demand curve	43
Figure 3.2	A change in demand	44
Figure 3.3	Abnormal demand curve	47
Figure 3.4	Abnormal demand curve – Veblen goods	48
Figure 3.5	Construction of a market demand curve from individual demand curves	49
Figure 3.6	Increases in each individual's income.....	50
Figure 3.7	Effects of income changes on market demand	51
Figure 3.8	Budget set and car demand.....	58
Figure 3.9	Household preferences, car ownership.....	58
Figure 3.10	Indifference curve	59
Figure 3.11	Indifference curves with an increase in utility	60
Figure 3.12	The effect of the exogenous factors on numerous preference functions	62
Figure 3.13	Firms identifying a niche in the market.....	65
Figure 3.14	Market dominated by one vehicle	65
Figure 4.1	New passenger car market: 1995-2005.....	99
Figure 4.2	Real new passenger car price index 95=100 versus new passenger car market 1995-2005	104
Figure 4.3	New passenger car market versus annual percentage changes in relative new car prices	106

Figure 4.4	Real disposable income of households versus new passenger car market	121
Figure 4.5	Annual percentage in real disposable income of households versus annual percentage change in new passenger car market (1995-2005)	123
Figure 4.6	New passenger car market versus annual average prime rate.....	127
Figure 4.7	Annual average prime rate versus annual percentage change in new passenger car market	130
Figure 4.8	GDP growth versus new passenger car market.....	136
Figure 4.9	Petrol price history versus new passenger car market	138
Figure 4.10	Business confidence index versus annual percentage change in new passenger car market	143
Figure 4.11	Consumer confidence index versus annual percentage change in real disposable income of households versus annual percentage change in new passenger car market.....	147

CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

The title of this dissertation seems to indicate that the study concerns itself with demand only. This is not entirely correct.

This thesis analyses the determinants of demand for new passenger cars in South Africa over a ten-year period, between 1995 and 2005. The following investigation into the determinants of demand for new passenger cars, is based both on a statistical and an empirical analysis of the performance of the South African new passenger car market.

The title of the study indicates that its objective is two dimensional. Firstly, the objective is to examine the theoretical and inherent driving characteristics of demand, demand for durable goods and the demand for new passenger cars South Africa. Secondly, the investigation sought to analyse how the interaction between the first objective and macroeconomic variables influenced the demand for new passenger cars in South Africa.

The structure of demand for new passenger cars in South Africa has changed significantly over the past decade; the changes that have occurred can be attributed to a number of reasons that are both political and economic. The following study's is an investigation into how and why such a change in the demand for new passenger cars has occurred in South Africa during the period 1995-2005 will be based on the statistical and empirical analysis of the performance of the South African motor car industry. It is important to note that the study concentrates on this ten year period as it is a period of economic significance. The period 2007/2008 saw the global meltdown of the world economy; the automotive sector was one of the hardest hit. The South African market was not immune to the recession consequently all preliminary research conducted was heavily convoluted. However, this presents an opportunity for further research into the subject. A proposed title for the study

would be: “An analysis of the demand for new passenger vehicles in South Africa during the Credit Crunch”.

As a theoretical base for the empirical analysis, the study first presents the neo-classical theories of demand with emphasis on the theory of demand for durable goods. The presentation is structured to examine theoretic and practical consequences of changes in economic variables on the demand for new passenger cars. The analysis presents the debate concerning the influence of new car prices, disposable income, interest rates, Gross Domestic Product (GDP) and confidence indicators on new passenger car demand. However, because of the sensitivity of the new passenger car market the study will also investigate the structure and performance of passenger transport in developed nations.

Preliminary investigation found the structure of demand to have changed after 1995 as reflected by a shift to the right of the demand curve, by the fact that the sales cycle became a coinciding indicator of the general business cycle, the decrease in age of the car park, by the increase in per capita car ownership, by the growth in demand for small cars and by the statistical relationship between new passenger car sales and GDP after 1995. In the course of the empirical analysis the hypothesis that the structure of demand for new passenger cars was influenced and changed by the above indicators during the period analysed, is investigated.

The preliminary investigation performed in the study identified the following about the variables to be analysed:

Price: Consumers were influenced by changes in price and expected changes in price of substitute goods.

Income: An increase in disposable income increases the ability of consumers to buy an item. Demand for new passenger cars in South Africa was found to be very income elastic.

Interest rates: Due to their influences on the general economy, a relationship was identified between interest rates and the new passenger car market.

GDP: It was identified that growth in the South African economy had a positive impact on the new passenger car market.

Confidence: The level of confidence by either business or consumers, presents the level of optimism or pessimism that business or consumers have about the economy; this bias was found to be reflected in new passenger car demand.

Emerging black middle class: The black middle class is playing a significant role in the demand for new passenger cars and the growth prospects have on the structure of the new passenger car market. A comparison is drawn by looking at how new passenger car demand was affected in other economies through the up-liftment and growth of the middle class.

The bulk of the statistical investigation will be conducted by using Market Segment Analyser (MSA), a motor industry sales and statistics Microsoft Access database compiled by Response Group Trendline. The validity of the data will be tested using Eviews to compile different regression analysis models.

1.2 PROBLEM STATEMENT

The South African Motor industry currently has limited research in place that measures how macroeconomic variables and economic drivers of demand influence the new passenger car market over a period longer than five years. Standard Bank South Africa's economics department is currently monitoring the influence of inflation on the motor industry. This is only for a maximum of five years at a time. In his 1991 doctoral thesis Neal Bruton of Response Group Trendline (RGT) investigated "The Structure, Conduct and Performance of the Passenger Car Manufacturing Industry in South Africa". This study merely touched on the research objectives.

Over the period analysed the new passenger car market accounted for 60% of the total market share in the South African motor reliance industry. The problem with this lack of measurement is that the industry and manufacturers do not have an understanding of the long term influences of these variables on the market and are unable to pre-empt and thus react to macroeconomic changes. This is evident from the phenomenal drop in new passenger car sales when the leading indicators to be analysed display signs of a possible

contraction on the market. Secondly, the increase in stock on storage during recessionary periods confirms the slow reaction of manufacturers.

Macroeconomic behaviour has an influence on consumer consumption and thus on demand (De Long, 2002; Dornbusch, 1999). It is thus important to analyse the effect of particular macroeconomic variables on SA's new passenger car market as discussed in Section 3. These variables thus have a direct influence on car ownership and demand forecasting.

The demand for car ownership is essentially equivalent to the demand for other normal consumer durable goods; demand will increase as incomes increase; implying a positive elasticity to income. At a national level, car ownership could be expected to change, depending upon household structure, type of area (population density, urban development), and the socio-economic group (SEG) a household member belongs to. It could also be influenced by company subsidies, changing tastes and trends over time. The costs of motoring (fixed costs such as the car purchase price, vehicle excise duty (VED), insurance, as well as variable costs such as the price of fuel and maintenance) would also be expected to influence the level of car ownership.

1.3 OBJECTIVES OF THE INVESTIGATION

The objectives of this study are firstly, to introduce a theoretical framework upon which the study will examine the driving characteristics behind demand, demand for durable goods and demand for new passenger cars. Secondly, based on the theoretical framework, the study will investigate how the introduced demand and macroeconomic variables influence the new passenger car market in South Africa.

In light of the underlying theoretical framework, this will entail:

- (i) Investigating how macroeconomic variables and demand drivers influenced SA's new passenger car market.
- (ii) Making use of the analysed variables to construct a demand forecasting tool.

1.3.1 Primary objective

The primary objective is to establish whether correlation exists between the demand for new passenger cars in South Africa and the selected economic indicators (new car prices, disposable income, interest rates, Gross Domestic Product (GDP) and confidence indicators) during the period 1995 - 2005. This will be established through Empirical analyses of the indicators of new passenger car market during the period of analysis.

1.3.2 Theoretical objectives

In order to achieve the primary objective, the following theoretical objectives are formulated for the study: to study the macro-economic theory of demand, which introduces and explains the influences that affect consumer demand for durable goods such as new passenger cars.

When analysing these influences, the study will look at the following variables: price, disposable income, interest rates, GDP, the South African new passenger car market and confidence indicators. However, because of the stickiness of the new passenger car market the study will also investigate the structure and performance of passenger transport in developed nations.

1.3.3 Empirical objectives

In accordance with the primary objective of the study, the following empirical objectives are formulated:

Price: Are consumers influenced by changes in price and expected changes in price of substitute goods?

Income: Does an increase in disposable income increase the ability of consumers to buy an item? The study will seek to establish whether the demand for new passenger cars in South Africa is income elastic.

Interest rates: What is the relationship between interest rates and the new passenger car market?

GDP: Does growth in the South African economy have a positive impact on the new passenger car market?

Confidence: Do changes in the level of confidence by either business or consumers influence the level of optimism or pessimism that business or consumers have about the economy.

1.4 RESEARCH HYPOTHESES

The following hypotheses are formulated in this study:

H₀: Macroeconomic variables and demand drivers did not have an influence on South Africa's new passenger car market.

H₁: Macroeconomic variables and demand drivers had an influence on South Africa's new passenger car market.

1.5 PRELIMINARY LITERATURE REVIEW

To the general car-buying public, the motor industry is to a large extent represented by the supply and demand of new cars. A new passenger car represents a significant financial investment (Bruton, 1991:1). This study will therefore seek to determine and analyse the primary determinants of demand and the macro-economic influences of South Africa's new passenger car market. The importance of this analysis is that it analyses the period after South Africa's first democratic elections in 1994.

The analysis of the determinants of demand for new passenger cars will be based on the demand for durable goods. Deaton and Meullbauer (1980:101) view the determinants of current and future planned demand for durable goods as present and future incomes, prices and interest rates. The effect of these determinants can usually be analysed by distinguishing income and substitution effects.

The consumer in the theory of demand is seen as an entity whose objective is to maximise the satisfaction he/she can derive from selecting the best possible combination of commodities he/she can afford (Clarkson, 1963:27).

The theory of demand focuses on three aspects; firstly, it looks at the determinants of quantity demanded using a demand curve as a graphical illustration and secondly, it looks at how consumers balance off preferences with utility and thirdly, the theory of demand determines how income and

substitution effects influence demand. Furthermore, the theory of demand for durable goods, highlights the fact that durables require a relatively high investment; therefore, their demand patterns are inherently different to those of non-durable goods.

The study also examines the inherent characteristics of the South African economy and its interaction with the new passenger car market. In the main this study will examine the macroeconomic variables that are considered to have the greatest influence on the new passenger car market.

There are two pertinent grounds upon which to study macroeconomics: to gain an education on the subject and to appreciate how economic movements influence you as an individual. (De Long, 2002:26).

According to Dornbusch (1999:3), macroeconomics draws attention to the economic performance and laws that affect expenditure and investment as well as financial and fiscal policies.

Both De Long and Dornbusch's descriptions of macroeconomics touch on the fact that macroeconomic behaviour has an influence on consumer consumption and thus an influence on demand, hence the importance of analysing the effect of macroeconomic variables on the South African new passenger car market.

The demand for car ownership is essentially equivalent to the demand for other normal consumer durable goods; demand will increase as incomes increase (implying a positive elasticity with respect to income). One might also expect to observe a saturation level at higher levels of income. In addition, a number of different factors, which could be expected to influence the level of new passenger car demand at a national and local level, have been considered in the course of preparing this study.

At a national level, new passenger car demand could be expected to change depending upon household structure, type of area (population density, urban development), and the socio-economic group (SEG) that a household member belongs to. It could also be influenced by company subsidies, changing tastes and trends over time, and the level of car driving license holding. The costs of motoring (fixed costs such as the car purchase price,

vehicle excise duty (VED), insurance and also *variable* costs such as the price of fuel and maintenance) would also be expected to influence the level of passenger car demand.

1.6 STRUCTURE OF THE STUDY

The layout of the dissertation is as follows: After the Executive Summary and Contents Page, Chapter One deals with the introduction, objectives and purpose of the study this is accompanied by the research hypotheses and preliminary literature review.

Chapter Two introduced the structure motor industry focusing on the history of the South African industry and its role in the global motor industry and how the global industry has evolved over the years.

Chapter Three concerns itself with the macroeconomic theory of demand relating to passenger cars and factors influencing passenger car demand including the characteristics of new car demand. The chapter also presents an analysis of demand for new passenger cars categorised to different segments.

Chapter Four, analyses figures and statistical data focusing on issues such as the size of and the trend in the South Africa passenger car market, the effects of oil and fuel prices and the population growth. The chapter also discusses the effects of demand for used cars on the new models in the market.

Chapter Five, presents a summary and conclusion and predictions of expected future trends in the demand for passenger cars.

CHAPTER 2

THE STRUCTURE OF THE SOUTH AFRICAN MOTOR INDUSTRY

2

2.1 INTRODUCTION

The South African motor industry was formally established in the mid-1920s when the first Ford and General Motors plants were erected. This, however, does not imply that South Africans had to wait until this time to drive a motor vehicle (DMI, Undated: 27).

This section covers the development of the South African motor industry, starting in 1896. Understandably, the first 30 years were characterised by “firsts”. In the next 30 years the industry was largely left to develop at its own pace, followed by a period of government efforts to increase local content (1960 to 1994). This section concludes with an overview of the period after 1994, when the Motor Industry Development Plan was introduced.

Compared to previous programs, the MIDP was heavily based on exports. It created a terms that were advantageous to export production without jeopardising the import subsidy for the domestic market.

Historically, local production expansion of passenger cars relied on growth in the in the local passenger car market and the economic growth of the country, slow development of the auto production industry since the 1970’s and early 1980’s was due to the deterioration of the South African economy as a whole.

2.2 THE PERIOD 1896-1930

Barely ten years after Karl Benz had demonstrated his gasoline-powered motor vehicle, and in the same year that Henry Ford had produced his first experimental car, the first motor car, a two-cylinder 1,5 h.p. Benz-Velo Voiturette arrived in Port Elizabeth. The car was built in Mannheim, Germany, and it arrived on December 22, 1896. Early in the next year the car was shown to President Paul Kruger, who declined the owner’s offer for a ride. To

commemorate the occasion the president presented a solid gold medal to J.P. Hess, the car's owner. This car became the object of the country's first motoring legislation – a Johannesburg Town Council Ordinance banned the car from the road. Later, in the same year, the car was destroyed in a fire (Nieuwenhuizen *et al*, 1977:8).

In 1898 Garlick and Company, cycle dealers from Cape Town, established the first motor dealership. This company sold the first second-hand car, a Royal Enfield, for £110. Four years later, in 1902, Frank Connock and Albert Atkey established the first motor car dealership, the Johannesburg Motor Car Company, in the Transvaal province (now Gauteng). More dealerships followed in the years to come, and in the 1920s dealers looked after their own imports, paid cash for their stock and also sold the cars for cash. A fair portion of the vehicles sold in the 1920s was to farmers (DMI, undated: 30).

In 1903 Arthur Youldon ordered the first Ford for South Africa. At the time, Henry Ford told him that the sale was his first outside North America!

In 1908 South Africa's first motor car show was held in the gymnasium of the Wanderers Club, a venue later occupied by the main Johannesburg Station. The first taxi, a 14 h.p. Darraq, started to operate in Cape Town in 1909, with Miss Ellen Budgell as the first taxi driver. In this year there were 500 cars and 50 dealerships in South Africa. In the following year, the McCarthy Rodway Group had its beginning as the Coventry Cycle Company. It was one of the first motor businesses to be listed on the Johannesburg and London stock exchanges, and developed into the third largest motor dealer group in the world (DMI, undated: 31).

By 1910 most of the 2 000 motor vehicles on South African roads were medium-powered British and Continental cars, but they would soon be outnumbered by American vehicles. When the Union of South Africa was formed in 1910, the customs duty on built-up vehicles was 15%, with a rebate of 3%. Although the duty was increased to 20% in 1915 the South African motor assembly industry was commenced only in 1924 (Nieuwenhuizen *et al*, 1977:8).

Initially, when the large-scale importation of motor cars began in 1913, only 1 279 of the 4 000 vehicles were of American origin. Halfway through 1914 the importation of European vehicles ended abruptly, leaving the export market wide open to the Americans. This situation continued for the next 30 years, and already in 1917, 3 423 American cars were imported. In 1920 vehicle imports exceeded 10 000 units for the first time (DMI, undated: 32).

The year 1914 saw the introduction of number plates, car registrations, driving licences and licence fees. Licence fees were based on weight throughout, and at the time it cost £5 to licence a typical car for a year. The white letters on a black background on number plates were copied from the British system. In the same year, municipalities started to make their own traffic laws, stating that it was quite lawful to drive on either side of the road, except when approaching oncoming traffic! This year also saw the introduction of traffic circles in Cape Town; London was to get its first one only 12 years later. In 1926 the first traffic lights were installed in Jules Street, Johannesburg. Again London had to wait until 1932 before it got its first traffic lights (Duncan, 1997:8).

The official birth of the South African motor industry came in 1924 when Ford, setup the first plant in an old wool-packing shed in Port Elizabeth. The staff complement at the time was 70. The government, who had promised to protect the industry, approved the introduction of completely knocked down (CKD) components at lesser rates than fully built-up (FBU) components. The assemblers agreed to employ only white labour. The Customs Tariff and Excise Act passed in 1925 provided further protection for goods produced in the Republic and allowed for free entry of materials for the country's motor sector, this was mainly aimed at encouraging the local manufacturing of motor vehicles (Nieuwenhuizen *et al*, 1977:8).

In 1926 GM established the second assembly plant, also in Port Elizabeth. The initial production at the GM plant was 11 cars a day. This later increased to 45 units a day. Soon employment increased to 600 white South Africans at each plant. Three years later, in 1929, GM opened its new Kempston Road assembly plant in Port Elizabeth. In the following year GM started assembly of

Vauxhalls and Opels, while Ford started the building of a new plant in Port Elizabeth at a cost of R1 million (DMI, undated: 32).

2.3 THE PERIOD 1931-1960

Starting with the Great Depression and preceding the introduction of the Local Content Programme, this era was dominated by three main events and developments: the Great Depression itself, World War 2 and the large-scale establishment of dealerships and component suppliers. Limited interventions by the government also affected the industry, but the effects of the introduction of the Local Content Programme in 1960 were only felt during the following period.

In spite of the limited spending power during the Great Depression, the subsequent economic uncertainty and the apprehension about an imminent war, there were about 2½ times more cars (320 000) on South Africa's roads in 1939 than there were at the beginning of the decade (135 000). By 1938 a surplus of traded-in vehicles gave rise to the first price-cutting war in the country. During World War 2, production had slowed to almost nothing, and the motor industry endured through military agreements and by reconditioning used vehicles. During this time women worked in large numbers in the factories. In the post-war period, high living standards resulted in predominately white's only manufactures taking on black and coloured workers to keep down the price of unskilled and semi-skilled work (Duncan, 1997:9).

In 1931 large-scale unemployment that emanated from the Great Depression, kick-started the building of better roads. This process was given more impetus in 1935 with the passing of the National Roads Act. This Act made provision for the National Road Fund, which allowed for the collection of revenue from fuel tax (Bell, 2003:13).

As a result of inflationary conditions caused by the Second World War, car prices increased substantially, with the result that most light motor vehicles came to be priced at well over R800, which made them dutiable at the **ad valorem** rate of 25% instead of at the specific rate of R2,30 per 45 kilograms (Nieuwenhuizen *et al*, 1977:10).

At this time South Africans still preferred the larger, more luxurious American cars. These cars were consistently cheaper than their European counterparts. As local road conditions improved, however, the larger, softer-sprung, tough American cars started to lose their dominance in the market. The improved roads, together with increasing urbanisation, required a different type of car. It was the introduction of the first locally assembled Volkswagen Beetle in 1951 (and its subsequent popularity) that prompted GM, Ford and Chrysler to develop smaller cars in the years that followed. The Mini was introduced in 1959, heralding the decade of the small car (the 1960s) (DMI, undated: 34).

A limited number of other government interventions also affected the industry during this period. A treaty with Germany in 1933 led to the subsequent re-entry of Mercedes Benz in 1935. The Motor Vehicle Insurance Act, legislated compulsory insurance on motor vehicles in 1946. The introduction of import control in 1949, in an effort to save foreign exchange, resulted in an increase in the number of assemblers. The withdrawal of these controls in 1957 resulted in significant growth in car sales during the period 1954 to 1957. It also marked the entry of Japanese vehicles. As can be expected, the introduction in 1955 of stringent controls on hire purchases had a negative effect on car sales (Bell, 2003:14).

A number of unrelated but significant events that were to shape the future of the motor industry also occurred in this period. An East London motoring journalist, Braud Bishop, arranged the first South African International Grand Prix on the outskirts of the city in 1934. Several overseas drivers took part in the event, which was won by Whitney Straight in a Maserati. In the following year, the National Association of Automobile Manufacturers of South Africa (NAAMSA) was founded. In a precursor to the apartheid era the Free State Congress of the United Party in 1936 proposed that “natives” should not be allowed to drive “as they have not acquired road sense”. It was eventually decided to make driving tests so strict that few black applicants would be able to pass.

After the war there was a need for “almost anything on wheels, at almost any price”. The South African government nonetheless decided in 1946 against

the establishment of a car manufacturing industry (as opposed to a car assembly industry). By the 1950s, therefore, the local content of the average South African vehicle was only 15%. At the same time Australia decided to enter into car manufacturing, and the Holden was born – with a local content of 90%. In 1960 the Board of Trade and Industry (BTI) issued the first comprehensive report on the South African motor industry, declaring that the importation of motor vehicles represented the largest drain on the country's foreign exchange resources (DMI, undated:35). This led to the introduction of a Local Content Programme (LCP) in the following year. The nature of this programme will be discussed briefly in the next section.

2.4 THE PERIOD 1961-1994

The 30-odd years covered by this era not only included the introduction of the LCP, but were also a time of profound change and turmoil. While the 1960s were mainly characterised by an economic boom period that only really levelled off in the early 1970s, the remainder of this period produced mainly negative impacts on the industry at large. In the first part of this section the study briefly explores the LCP, followed by a short review of the events of the 1960s. The last part of this section reviews events of the mid-1970s and beyond (Duncan, 1997:8).

When the Board of Trade and Industry introduced the LCP in 1961, its main aim was to transform the industry from one based on the assembly of motor cars to one involved in their manufacture. The LCP initially suggested the introduction of steadily increasing local content requirements for passenger cars in a series of five phases over a period of 20 years. A sixth phase was introduced on 1 March 1989. Table 2.1 provides an abridged view of the LCP.

Table 2.1 The phases and requirements of the local content programme and related events

Phases	Requirements and events
Phase I (1960-June 1964)	<ul style="list-style-type: none"> • Initially certain items were protected (tyres, interior trim, carpets, glass; later also paint, batteries, exhaust systems, road springs and seat frames). • The restricted list was replaced by a system whereby cars had to meet a requirement of 12% local content by value. • It was later substituted by local content by mass (to be increased from 15-40% by July 1964). • Commercial vehicles were excluded.
Phase II (July 1964-Dec. 1969)	<ul style="list-style-type: none"> • The target was to increase local content by mass from 45-55% "usual".¹ • Passenger cars with a 45% local content could be declared "manufactured" locally (subject to the manufacturer committing himself to increasing the content to 55% by 31 December 1969). • Import controls on these manufactured models were completely abolished.
Phase III (1 Jan. 1971-Dec. 1976)	<ul style="list-style-type: none"> • The target was to increase local content from 52% "net" to 66% "net".² • New makes and models were only allowed in exceptional circumstances to encourage rationalisation.
Phase IV (1 Jan. 1977-Dec. 1979)	<ul style="list-style-type: none"> • The target remained at 66%. • The hire purchase repayment period was extended for motor cars and commercial vehicles. • Local content levels of +71% were to be encouraged by means of excise duty rebates. • Punitive excise duties were reintroduced, and were rebated according to local content achievement. Zero duty was payable at 66% local content by mass, while additional rebates could be earned to encourage development up to 71%.

¹ "Usual" local content required that the last manufacturing process for a component had to be performed in the Republic of South Africa.

² "Net" local content required that the component be manufactured locally from locally purchased raw materials. Imported raw materials could only be classified as local content if they were unobtainable in this country.

<p>Phase V (1 Jan. 1980-1 March 1989)</p>	<ul style="list-style-type: none"> • The target remained at 66%. • Models were not separately evaluated for local content (in phase IV weighted averages were used). • A model was defined as a motor vehicle that differed from another in respect of any one or more of the following features: body style, engine, steering, transmission and braking equipment. • The result was the phasing out of certain models (particularly commercial vehicles). • Heavier penalties were imposed on cars that contained less than 66% local content. • Excise duties were now calculated on both mass and value, and favoured smaller, cheaper and less luxurious cars.
<p>Phase VI (1 March 1989-1994)</p>	<ul style="list-style-type: none"> • The main aim was to reduce foreign exchange usage by the motor industry. • Many believe this phase was not related to the previous five and should not be interpreted as an attempt to rectify the inability of phase's I-V to deliver the desired results. • The intention was also to boost export promotion by the motor industry. • Local content was now measured in terms of both mass and value. • A foreign exchange target was set, based on the value of the vehicles sold by a manufacturer. • Exports effectively counted as local content (local content = value of new car – value of imported components). • The duties and rebates imposed favoured cheaper and smaller cars.

Source: DMI: 38

Over the years the LCP added cost pressures to the industry, served as a barrier to entry, acted as a means of rationalising the industry, influenced model proliferation and levels of vehicle specification, determined investment requirements and levels, and played a major role in shaping the structure, competitive conduct and performance of the industry (Duncan, 1997:8).

It is readily acknowledged today that the LCP, up to and including Phase V, was unable to reduce the large foreign exchange usage by the motor industry. It also failed to achieve the rationalisation that had been envisaged. It was unsuccessful in achieving the desired economies of scale and imposed a high

cost premium on consumers. Phase VI of the LCP was principally introduced to reduce the industry's foreign exchange usage and to promote exports. It must be viewed separately from Phases I to V, as it was not intended to address the inability of these phases to produce the desired results.

Phase VI was heavily criticised and the eventual outcome was the Motor Industry Development Programme (MIDP) that came into effect in mid-1995. This programme will be discussed in the next section.

The economic boom of the 1960s and early 1970s meant that the sales of new motor vehicles (both passenger cars and commercial vehicles) grew at a steady rate. Like the previous period it saw the establishment of a number of motor companies and component manufacturers. One particular newcomer to the scene was Toyota. In 1961 Dr Albert Wessels obtained an import permit to import Toyopet Stout pickups from Japan. In less than 20 years Toyota had grown to become the market leader (Bell, 2003:15).

From 1973 onwards, the motor industry came under increasing pressure to survive. Five serious challenges faced by the industry were: labour problems, the energy crisis, adverse economic conditions, political events and the rising cost of motor vehicles. Below, the study considers each of these challenges.

The industry's labour problems began in 1965 when it started to experience a shortage of skilled labour. Attempts to allow more skilled jobs to go to black workers were opposed by the white unions. Verwoerd's policy of job reservation to protect white workers played a minor role in this regard, as it was never fully enforced. Job reservation was scrapped altogether in 1971. More serious labour problems occurred because of industrial strikes about wages and apartheid in 1980, wildcat strikes in 1981, wage disputes in 1982, industrial action by black trade unions in 1985 and 1987, and a devastating 27-day strike in 1994. The latter was the longest and costliest total industry strike in the world (Duncan, 1997:9).

The decision by the Organisation of Petroleum Exporting Countries (OPEC) to increase the price of oil by 70% in 1973 resulted in a fuel crisis that continued for years to come. It compelled all manufacturers to produce cars with better fuel consumption, and in 1977 the bulk of the car buying public traded their

high fuel consumption vehicles, replacing them with more fuel-efficient vehicles. This trend continued well into the 1980s (DMI, undated: 38).

A poor economy, characterised by high fuel prices, a weak rand, high inflation and an accelerating increase in the Consumer Price Index in 1979 did not affect the retail sales of passenger vehicles until 1982. From then onwards, however, sales figures declined for five years in a row. By 1984 South Africa was in the grip of a deep economic recession. Higher sales tax introduced in the same year and high bank rates added to the woes of the industry. In 1986 car sales were the lowest since 1977, and the motor industry's losses were estimated at R1 billion a year. Unemployment levels in the industry reached 40%. Mounting taxation and the introduction of tax on fringe benefits, including motor vehicles, threatened to discourage buyers altogether from buying a new car. The biggest loss was in the two-litre and higher range, where the market share declined from 35% to 14% in 1985. The sale of used cars was, understandably, buoyant (Bell, 2003:4).

The external shock of the early to mid-1980's resulted in constrained foreign exchange and in economic growth in the country. This was at a time when the market environment required significant growth in foreign exchange to compensate for capital goods imports.

Political events, including unrest in South Africa in general, also affected the motor industry. The Soweto uprisings of 1976, coupled with the oil crises, caused car sales to plummet in the mid-1970s. The political unrest continued for another 15 years, also resulting in an unstable labour environment. In a decision, spurred by the strong anti-apartheid mood that started to gather momentum towards the end of the 1970s, General Motors (GM) sent shock waves through the entire automotive trade and the country when it announced that it would pull out of South Africa in 1987 (DMI, undated: 39).

GM's withdrawal was neither the first nor the only, but followed the withdrawal of Chrysler (1983), Ford (1985), Alfa Romeo (1985) and Leyland Rover (1987). The Ford pull-out was the most socially devastating, as the other majors, namely Chrysler and GM, had found local operators to take over their factories (DMI, undated: 38).

In 1988 NAAMSA stopped releasing new car sales figures for strategic reasons. This policy persisted until 1992.

Owing to a number of factors, the cost of owning and maintaining a motor vehicle escalated dramatically in the mid-1980s. In 1985 car prices went up by 35%, followed by a 30% increase in the following year. In 1985 the cost of petrol rose above R1/litre for the first time. In 1984 the Central Statistical Services calculated that the cost of running a motor car had risen by a massive 43,3% in that year. Between 1980 and 1986 vehicle costs had gone up by 26%, the rand had dropped by 52 cents against the dollar, and real disposable income was down by 10% (Bell & Nkosi, 2001:11).

The combined result of all of the above factors brought about a fundamental change in vehicle-buying patterns and ownership. Private individuals found it increasingly difficult to buy new vehicles. In 1985 private buyers' share of the market had dropped from 50% to 30%. This was bad news for car dealers who did not have access to the fleet market. In 1986 even fleet buyers started to show resistance to buying new cars.

By 1992, eight out of every ten cars were sold to companies. At this point the industry observed a major trend towards full maintenance leasing (FML) for companies with large fleets. FML also emerged as an option for small companies and individual buyers. Fortunately for the motor industry, the motor car was still considered a crucial status symbol in South Africa. This fact, and the need to attract high-calibre senior executives, forced South African companies to buy new motor vehicles in boom times (Bell & Nkosi, 2001:11).

One of the significant positive developments of this period was the growth in the minibus market. At a time when car ownership amongst blacks was only about 22 per 1 000 of the population (for whites it was about 60), black taxi owners emerged as the single most powerful organised group of purchasers of motoring products. By 1990 this growth had given rise to backyard mechanics, a growth in the DIY market, declining local franchise repair centres, and an increase in both vehicle servicing and parts supply by the franchise dealers (DMI, undated: 39).

Finally, the period 1961-1994 brought about a change in the number of motor vehicle manufacturers and their operations. In 1965 six manufacturers were preparing to operate full-scale factories in South Africa: GM, Ford, Chrysler, Jaguar, Leyland and Nissan. By 1970 there were 12 car manufacturing plants, producing 16 different models. By 1974 the number of manufacturers had grown to 16, selling 42 major passenger car lines, each with derivatives. Just more than ten years later, in 1986, they were down to seven, selling only 22 lines and fewer derivatives. The industry started to turn towards the export market, but because of sanctions the companies did not release details in this regard.

2.5 THE PERIOD 1995 TO DATE

The final period in the history of the South African motor industry roughly coincides with the political rebirth of the country. The period commenced with the Motor Industry Development Plan, which was introduced on 1 September 1995. This programme is still in place. From the outset the MIDP took into account South Africa global competitiveness, considering the following; improvements in technology, changes in consumer expectations and they high phase in style and design changes.

The introduction of the MIDP came after the realisation that there existed structural differences between the different sectors of the industry. Today there are, in effect, two separate motor industry development programmes – one for passenger cars and industrial vehicles and another for trucks and heavy industrial work (commonly referred to as yellow metal).

The key objectives of the MIDP are (DMI, undated: 40):

- To improve the international competitiveness of the South African automotive manufacturing and associated industries;
- To improve vehicle affordability in the domestic market;
- To encourage growth in the vehicle market and in the component manufacturing industry, particularly in the field of exports;
- To stabilise employment levels in the industry; and
- To create a better balance between the industry's foreign exchange usage and foreign exchange earnings.

The key features of the two programmes are summarised in Table 2.2.

Table 2.2 Key features of the two motor industry development plans

Motor car and light commercial vehicle manufacturing industry	Medium and heavy commercial vehicle manufacturing industry
<ul style="list-style-type: none"> • Progressive reduction in import duties on built-up vehicles, from 65% at commencement to 40% by 2002, and on original equipment components from 49% to 30% by 2002 • A duty free allowance of 27% of manufacturers' ex-factory turnover (versus an average imported content of 43% for the Car/LDV manufacturing industry) • No minimum local content requirement • Import/export complementation by way of duty-free importation conditional on export performance • Compliance with the requirement that domestic vehicle assembly should proceed on the basis of completely disassembled components as a precondition to participation in the programme • Continuation of a small vehicle incentive to promote affordability 	<ul style="list-style-type: none"> • Progressive reduction in built-up vehicles, from levels significantly lower than duties on cars and light commercial vehicles (from 40% as at September 1995 to 20% by January 2000) • Relatively low levels of protection for driveline component suppliers, tyres and cad/body manufacture and no duty on other components (phased out in January 2000, except for the standard 15% remaining on tyres) • No duty-free allowance • Import/export complementation by way of duty-free importation conditional on export performance – interchangeable with the Car/LCV MIDP

The MIDP's have progressively exposed the domestic vehicle and component manufacturers to the pressures of the global market and the need for efficiency improvements, thereby facilitating greater affordability in the domestic market. The programmes were also instrumental in boosting the industry's export momentum.

The Ministry of Trade and Industry announced amendments, effective as from 1 July 2000 through to 2007, to the two programmes.

Table 2.3 Major motor car/light commercial vehicle MIDP provisions

Year	Import duty	Value of export performance	Qualifying content	
	Built-up light vehicles	Original equipment components	Built-up vehicles and components (excl. tooling)	Catalytic converters exported
1999	50,5%	37,5%	100%	90%
2000	47,0%	35,0%	100%	80%
2001	43,5%	32,5%	100%	60%
2002	40,0%	30,0%	100%	50%
2003	38,0%	29,0%	94%	40%
2004	36,0%	28,0%	88%	40%
2005	34,0%	27,0%	82%	40%
2006	32,0%	26,0%	76%	40%
2007	30,0%	25,0%	70%	40%

Source: NAAMSA (2009)

Table 2.3 Major motor car/light commercial vehicle MIDP provisions (continued)

Year	Ratio of exports against imports		
	Components, heavy motor vehicles and tooling exported: completely built-up (CBU) light motor vehicles imported	Components, vehicles and tooling exported: components and heavy vehicles and tooling imported	CBU light motor vehicles exported: CBU light motor vehicles, heavy vehicles or components imported
1999	100:75	100:100	
2000	100:70	100:100	
2001	100:70	100:100	
2002	100:65	100:100	
2003	100:60	100:100	

2004	100:60	100:100
2005	100:60	100:100
2006	100:60	100:100
2007	100:60	100:100

Source: NAAMSA (2009)

The amendments to the MIDP involved decreasing the number of fully built-up cars for import, reducing the number of cars that can be used for export credits and significantly promoting the use of modern technology in the industry. The changes also encouraged the use of local original equipment through changes in export support and decreasing the qualifying criteria of platinum group metals (PGM's).

The amendments to the respective MIDP's would serve to provide the South African new vehicle manufacturing and associated industries with a relatively stable basis for the purposes of future planning.

When reviewing the events in the motor industry from 1995 onwards, it becomes clear that the MIDP has been very successful in achieving its primary goals. In 1996 South African companies exported only 11 500 vehicles, worth a total of R750 million. In 2002 the industry exported around 125 000 cars and commercial vehicles totalling R15 billion. This represents more than 31,9% of the total South African vehicle production. Exports of automotive components also increase to around R20 billion in 2002, up from R4 billion in 1996 (Bell, 2003:16).

In the past exports were mainly to Africa, today they go all over the world. These cars are of an exceptionally high quality, and in 2002 the South African-built BMWs were found to be even better than ones built in Germany. Productivity levels have also improved substantially; in 1996 the average annual number of vehicles produced by each employee was 7,5. In 2001 this figure had risen to 12,6 units (DMI, undated: 43).

The local market had also opened up to overseas investors. At the beginning of this period only the three German manufacturers (VW, BMW and Mercedes Benz) were not South African owned. Ford (United States) and Nissan

(Japan) have bought the local companies bearing their name, and Toyota Motor Company (Japan) has recently taken control of Toyota SA. In January 2007, GM acquired the remaining shares (51%) of Delta, this is now General Motors South Africa. Since 1995 a host of international manufacturers and automotive suppliers have set up offices in South Africa or have started to export to this country. These include Peugeot, Chrysler, Federal Mogul, Valvoline, Hyundai and Fiat, to name but a few. The motor industry started to experience the effects of globalisation when imports of fully built-up vehicles topped 50 000 for the first time in 2000. This represented 22% of the market at the time (Bell, 2003:18).

From seven manufacturers compelled to manufacture, basically all competing in a few core volume car sectors (and the public effectively having a limited choice of car configurations), there are now products in many niche sectors. These include Recreational Vehicles (RV), convertibles, sports, Multi-purpose Passenger Vehicles (MPV's) and mini cars, all of which present the customer with a greater choice. This means that manufacturers no longer just have to market themselves against the next competitor selling his version of the same small car or medium car, for example, but that companies also have to compete for attention with a whole new range of alternatives. The result is that there are more makes, more models and more functional styles, all competing for the same-sized market, and with import duties dropping and export trade growing, this trend will continue into the indefinite future. The importance of marketing and brand identity is therefore growing, and the weaker marques will struggle to survive.

A number of South African manufacturers availed themselves of opportunities to diversify in this period. In 1997 Delta Motor Corporation (now GMSA) set up a joint venture with WesBank, namely Delta Finance (GMSA Financial Services). In the same year, BMW launched its own short-term insurance scheme in reaction to exorbitant insurance premiums. In its first year the company reported "embarrassing profits" despite charging less than half the market-average premiums. Others like Daimler-Chrysler followed suit.

The growth in South Africa's Internet population prompted McCarthy Motor Holdings to launch the country's first online new and used car sales portal,

while the National Automobile Dealers Association (NADA) introduced a special website where dealers can report the details of used vehicle deals. This has enabled the creation of a unique database that allows the first real-time analysis of used vehicle values and market trends (Bell & Nkosi, 2001:15).

In 1998 it was reported that 200 franchise dealers were experiencing serious liquidity problems, while another 400 were unprofitable.

NAAMSA's Annual Report (2001/02) suggested that the manufacture, distribution, servicing and maintenance of motor vehicles contributed 5,7% to the GDP (gross domestic product), and that it employs in excess of 180 000 people. There were in the order of 1 100 new car dealerships with an estimated 850 used car dealerships. There were approximately 5 500 garages and filling stations, plus another 3 300 specialist repairers, about 220 motor vehicle component manufacturers, 150 suppliers the sector on a non-elite basis, 450 tyre traders, 80 car restoration centres, 650 parts and spare parts merchants and approximately 280 agricultural vehicle and equipment suppliers. In excess of R12,5 billion in foreign direct investment was invested in the country in the industry's infrastructure. (DMI, undated: 45).

Sections 2.1 to 2.4 set the foundation upon which to investigate the Global Motor Industry and South Africa's role and compositeness in it.

2.6 THE GLOBAL MOTOR INDUSTRY AND SOUTH AFRICA'S ROLE

With continued growth in the global motor industry and decreasing trade barriers, its having global uniqueness will become very important in the next decade. This will increase competition amongst manufactures as the market will open up as new producers enter and the increased market choice will result in a reduction in market share of the more well established manufactures.

More innovative and technologically advanced production plants will surface making use of non tradition resources like plastic, aluminium and other alternatives that will go against the traditionally steel based industry. The

automotive sector will continue to generating profits however, operating in an environment that will be under highly influenced by the publics concerns for the environment (Rhys, 2003).

South Africa contributes less than 1% to this enormous global industry in which “big is beautiful”. Investment in new vehicle tooling is astronomical, demanding global levels of production to achieve economies of scale and profitability. Emerging from a historically isolated and protected industry, South African motor manufacturers have now entered the world arena, wrestling with a lack of foreign direct investment, ageing facilities and an unpredictable labour force.

This section analyses the global and local motor industries, in order to determine the forces at work and the strengths and weaknesses of the South African motor industry.

2.6.1 The global motor industry

According to Rhys (2003), the automotive industry is undergoing a transformation. This includes extensive economic changes on the configuration and performance of the industry and the size of its contribution in the economy in general. The sector is very competitive were even differentiation in models, designs, cost and brands is substantial. This has contributes towards the structure of demand from segment to segment.

This extract provides an apt introduction into the complexities of the global motor industry which is dominated by large multinational companies such as General Motors, Ford and Toyota, and where most of the smaller vehicle industries are foreign owned.

2.6.2 Global market structure

In terms of economic theory (Salvatore, 2001:382), classical market structures fall into four broad categories, namely:

- Perfect competition;
- Monopoly;
- Monopolistic competition; and
- Oligopoly.

Salvatore (2001:426) further described an oligopoly as “the form of market organisation in which there are few sellers of a homogeneous or differentiated product”. Due to the few large firms dominating the global motor industry, the fierce rivalry between them and the wide variety of differentiated products, the global motor industry can be classified as a differentiated oligopoly with rivalry.

2.6.3 Characteristics of successful motor industries

In analysing the various vehicle design and production centres around the globe, it is apparent that two key factors are required to develop a globally dominant motor industry within a country.

Firstly, the key players such as the United States and Japan have populations of more than 50 million, where the local market provides a strong foundation for the industry. A second characteristic is the economic strength of the country, where the GDP per capita should preferably be greater than the price of an average family car (Rhys: 2003).

These macro-economic factors, although not ensuring success, create the conditions in which an industry of this nature can flourish, and eventually challenge the dominance of the big players.

2.6.4 Economic levels of production

One of the most significant reasons for the dominance of a few firms is the economic level of production of a motor vehicle, which tends to be around two million units (Rhys: 2003).

Economies of scale dictate that due to the enormous investment in tooling-up a complete motor vehicle, minimising the average unit cost on the long-run average cost curve requires in excess of two million units of global production. This has led to the creation of vehicle platforms, where a number of models share the same under-body structure, which minimises capital investment, while providing broader product differentiation. This factor alone is a significant barrier to entry for new firms to the automotive industry.

2.6.5 Phases in motor industry development

New players in this industry cannot compete head-on with the multinationals, and there tends to be development phases in a local industry, as the local value added increases. According to Rhys (2003) the development phases can be classified as follows:

- Simple assembly (kit);
- Manufacture;
- Exports; and
- World competition.

The speed of transition through these phases to world competition depends entirely on the quality and strength of the industry itself, and each will tend to strive towards its optimum phase of development.

2.6.6 The role of marketing

Technical excellence in product design is no longer sufficient to ensure the success of a vehicle model. The brand image of a product is an essential component of the marketing mix that can either lead to the success or spectacular failure of a product. A brand, according to Kotler (2000:404) is a differentiator in the form of a symbol and or a sign or an amalgamation of both used by traders to distinguish their products against their competitors.

Brands have attributes, provide benefits to the customer, engender values and culture, and have a personality and a typical user profile.

Customer perceptions regarding the attributes of a brand in terms of quality, reliability, technology, exclusivity etc. have a profound impact on buying behaviour, and to this end, motor vehicle companies spend large sums of money to develop and position their brands through advertising, motor sport, sponsorships and involvement in various forms of social responsibility programmes.

2.6.7 The rapid pace of change

The electronic revolution has profoundly changed the way business is conducted, and the motor industry is no exception. Product Data Management (PDM) and Enterprise systems organise and connect all aspects

of product design, specification and manufacture, provide opportunities for international design collaboration, and significantly cut time to market for new products through inter alia virtual prototyping. Electronics systems now control all aspects of the vehicle including the engine and transmission, security, entertainment, climate control and various other gadgetry designed to make the driving experience more comfortable and unique. Marketing and sales techniques now include the internet as a legitimate channel directly to the customer.

To be a competitive player in the modern industry requires that companies not only embrace the new technologies, but actively seek new ways to maximise the benefits of these technologies in terms of improved co-ordination and reduced cost. Failure to do so will leave them unprofitable, irrelevant and unable to compete in the global marketplace.

2.6.8 The new customer

Vehicle buyers have evolved into what is now being referred to as “the new customer”, who is typically a lot stronger and mobile than ever before. Rhys (2003) identified the following as key characteristics of new customers:

- Knowledge (access to vast amounts of information);
- Despotic (they know what they don't want); and
- Lack of loyalty (easily switches brands based on personal benefits).

All this translates into an extremely difficult and competitive market requiring constant attention to customers' needs and preferences to retain market share.

2.6.9 Pricing strategies

Convergence of prices means that car prices across manufacturers are moving closer together. Price alone is becoming less of a factor in the purchase decision of the customer.

Falling real prices have made motor vehicles available to a broader segment of the population, as lower cost methods of production from the Japanese have forced western manufacturers to improve efficiencies to remain competitive.

Non-price competition has become more and more important to vehicle firms as vehicle quality and prices converge across the industry. According to Rhys (2003), some non-price competitive factors include:

- Warranty;
- Dealer service quality;
- Vehicle range and model cycle length;
- Vehicle gestation cycle (time to develop new models);
- Affordable financing/credit facilities;
- Cost of vehicle change (related to used vehicle depreciation); and
- Quality adjusted pricing and lifetime costs.

2.7 AN OVERVIEW OF THE SOUTH AFRICAN MOTOR INDUSTRY

The South African motor industry

integrates all the different sub-sectors of the industry such as production, supply, servicing and maintenance of cars and parts, the industry plays a significant role in the economy, generating around 5,4% of Gross Domestic Product of the country (NAAMSA, 2003).

The sector has expanded a great deal over its 50 years history and has matured from being primarily an import based industry into a very self reliant industry with the fully vehicle manufacturing value chain, distribution and servicing network (NAAMSA, 2006).

2.7.1 The size and structure of the South African new passenger car market

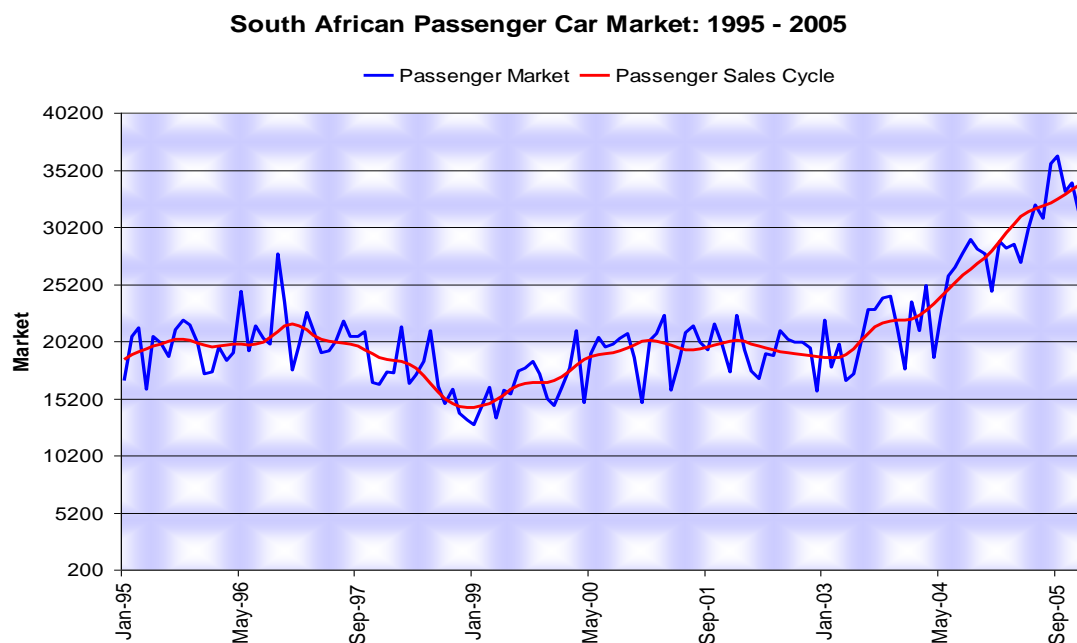
During the period analysed total annual new car sales in South Africa had grown from 376 784 in 1995 to 564 998 in 2005; this total, the new passenger car market accounted for 53% of the market and had grown from 236 584 in 1995, to 376 869 in 2005. The total number of cars

in operation in the country at this stage consisted of fewer than eight million cars, five million of which were passenger cars. In 2006 the replacement value (at 2006 prices) of a population of ten million cars in South Africa was in excess of R800 million (NAAMSA, 2006). Refer to Figure 2.1 below for an

overview of the South African passenger car market during the period 1995-2005.

On examination of Figure 2.1, it becomes evident that sales of new passenger cars South Africa, in 1995 in terms of volume were comparable to the levels of sales experienced in 2003. This period is characterised by a country and a socio-economy on the course of political recovery; economically this period is marred by episodes of high interest rates, high inflation and a volatile currency. Mid 2003 saw the recovery of both the economy and the new passenger car sales. Therefore, the subject that needs to be dealt with in the process of gaining more knowledge of the structure of demand for new passenger cars in South Africa is 'why did this occur.' In Chapter 4 it will become clear that an understanding of exogenous forces that affected the new passenger car market potential during the period analysed, is extremely important to understand both the structure of demand as well as the structure of the industry. It will also become clear that the South African motor industry of the twenty first century is operating in a completely different economic environment to that of the eighties and nineties.

Figure 2.1 South African market new passenger car volumes: 1995-2005



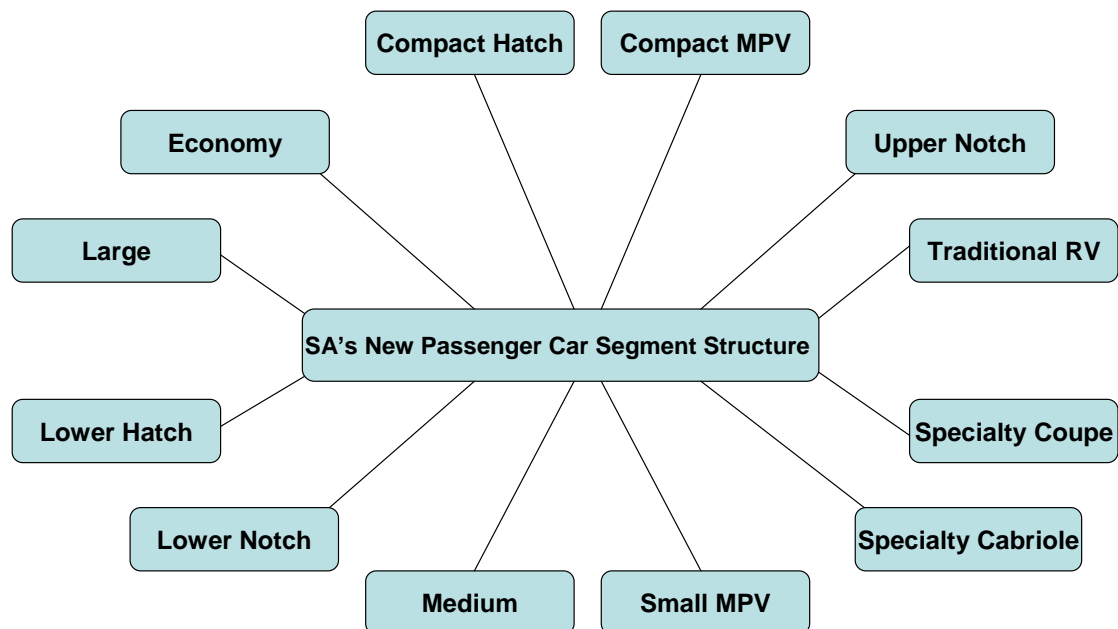
Source: Response Group Trendline (2007)

In 2005, South Africa had a total of 17 firms selling 174 different models. In 2005 South African motor manufactures had contributed well over R10,5 billion in total capital investment, with a further R7 billion investment going towards factory and production equipment in the parts and accessories industry (NAAMSA, 2006).

A brief summary of the structure and performance of the South African Motor Industry Market presents the following.

2.7.2 South Africa's new passenger car market structure

Figure 2.2 South Africa's new passenger car segment structure



Source: Zide (2010)

The above figure depicts the structure of South Africa's new passenger car market. South Africa's new passenger market is split up to twelve segments as presented above. The criteria used to split up the different passenger car type/models into the segments presented below (it must however be noted that different manufactures make use of different segment structures, the study has adopted General Motors' global segment configuration):

- Footprint – vehicle size, body shape (not strictly dimensions), vehicle application.
- Engine specification – power, performance, engine design application.

- Brand value – premium, luxury or mainstream.
- Trim level – specific model (i.e. flagship, basic).
- List price.

Listed below are segments and examples of South African passenger cars that fit into that segment during the analysed period.

- Economy – Chevrolet Spark, Opel Corsa
- Compact Hatch – Opel Corsa, Chevrolet Aveo
- Lower Hatch – Opel Astra, Opel Kadett
- Compact MPV – Chevrolet Vivant, Opel Zafira
- MPV – VW Caravelle, Mercedes Vito
- Medium – Opel Omega, Opel Rekord
- Small MPV – Opel Mariva
- Recreational RV – Toyota Condor, Renault Scenic
- Speciality Calrio – Opel Tigra, SAAB 9-3
- Specialty Coupe – Opel Astra, Opel Calibra, SAAB 9-3
- Specialty Other – Porsche 911
- SUVKV – VW Touarang, Lexus RX
- Large – Chevrolet Lumina, SAAB 900, SAAB 9-5
- Lower Notch – Chevrolet Aveo, Opel Astra, Opel Corsa, Opel Monza
- Traditional RV – Chevrolet Blazer, Isuzu Frontier
- Upper Hatch – BMW 1-series, Toyota RunX
- Upper Notch – Chevrolet Optra, Opel Astra, Opel Monza

By 2005 the South African motor industry had **more than 60 brands**, with **over 190 car lines** and **more than a thousand individual models**, their performance is illustrated below:

- *Sales split over last 5 years (2000 – 2005): Passenger Car (55%), Light Commercial Vehicle (LCV) (30%), Truck/Bus, (5%) and Other (10%).*
- *Regional sales split:*
 - Gauteng: 37% of all sales
 - Western Cape: 13.5% / Kwazulu-Natal: 13.2%
- *Passenger segment:*

- Volkswagen and Toyota dominate (2005 - VW 24.1%, Toyota 20.5%)
- Daimler Chrysler (9.8%), Ford (10.5%), GMSA (9.5%) follow
- Major segments 2005: Economy (18%), Small Car (21%), Medium (12.4%), SUV (9.2%)
- *Light Commercial segment:*
 - Toyota historical dominance reducing
 - 2005: Toyota (27.3%), GMSA (23.8%) dominate
 - Major segments (2005): 1 Ton (60%) and sub 1 Ton (33%)
- *M&H duty Truck segment:*
 - DaimlerChrysler domination reducing
 - Significant growth from VW/TATA
 - Major segments 2005: Medium (46%) and Extra Heavy (33.9%)
- *Overall 2005:*
 - Toyota (22%), VW (17.2%), GMSA (13.3 %), Ford (12.3%)
 - The introduction of new competitors (Chinese and Indian) had reduced Toyota's dominance

2.7.3 Motor Industry Development Programme

Hailed as a success and acknowledged globally the Motor Industry Development Programme (MIDP) is a pioneering state policy that has build the national motor industry and opened the local market to rest of the world. Exports in the industry generated new blood to an industry that had volumes that did not justify its existence based only on domestic demand. The industry had made great strides on reducing tariff protection and making vital changes to the structure of the market to improve efficiencies and lowering operational costs. This resulted in the industry being recognised as a leader in the manufacturing sector in the country.

The Motor Industry Development Program (MIDP) was established in South Africa in 1995 with the ultimate objective of transforming the automotive industry from the protectionism and inefficiencies suffered under the Apartheid state due to international isolation, to a globally competitive industry in the absence of protective trade tariffs. This program has gradually reduced

import duties on foreign vehicles and components, while providing incentives for exports.

The MIDP has been characterised by widespread success, with South African firms stepping up to the challenge of global competitiveness in terms of both quality and cost.

South African automotive manufacturers have shown good performance since 1995 as regards MIDP objectives such as turnover growth, exporting levels, competitiveness and rationalisation. Importing levels and local content are still a cause for concern however (Barnes, 2003).

The industry performed extremely well when compared to the South African manufacturing average in terms of contribution to manufacturing sales, value added and gross salaries. Labour productivity also increased at a healthy pace but capital productivity required improvement (Barnes, 2003).

Barnes (2003) Highlighted specific problems about the MIDP implementation:

- Low levels of localisation;
- Exports over-subsidised;
- Too easy to achieve duty neutrality;
- Lack of industry integration – major component exports do not reduce local vehicle production costs; and

Revised MIDP objectives for the period 2007-2012 include the following:

- Local content in South African manufactured vehicles to increase on 2001 levels;
- Imports limited to less than 35% of total domestic CBU market;
- CBU exports to substantially increase on 2001 levels;
- Diversity of components exported to increase relative to 2001 basket;
- Employment levels in the assembly and components industry to increase by 10% on existing levels; and
- Trade balance to improve on 2001 levels.

The primary objective of the 2005 MIDP is a more integrated automotive industry relative to original MIDP objectives, with a greater link between exported components and supply to domestic assemblers.

2.7.4 Problems facing the South African motor industry

There are some unique and other very common problems facing the South African motor industry as a whole. Some of these issues are listed below:

- Low quality, high cost raw materials and restrictions on raw material imports;
- Volatile currency, affecting both import costs and export profitability;
- Labour cost, productivity and skill levels;
- Growth in Eastern Europe and China as competitors for global production contracts;
- Geographic location of South Africa remote from major markets; and
- Crime and violence levels deterring foreign direct investment.

2.8 DEVELOPING A SUSTAINABLE SOUTH AFRICAN MOTOR INDUSTRY

The discussion that follows seeks to provide guidelines, in the light of both global and local trends, for the South African motor industry, in finding its global niche in order to successfully compete in the international arena.

2.8.1 Development stages in the South African motor industry

In Table 2.4 below, the development stages as proposed by Barnes (2003) are illustrated to provide a road map for manufacturers, highlighting the process to be followed to achieve full internationally competitive manufacturing capability.

Table 2.4 Development stages in the South African vehicle industry

	CKD Assembly	Transition	Full Manufacture
Target market	Domestic	Domestic/export	Domestic/export
Integration with parent Company	Low, import of CKD packs	Medium	High
Model line-up	Multiple	One/two	One/two

	CKD Assembly	Transition	Full Manufacture
Derivatives	Limited to reduce cost	Full range – supply export market	Full range – supply export market
Localisation	Low, unless local content requirement	Modest, based on cost factors	Equal to source plant
Quality	Below source plant	Equal to source plant	Equal to source plant
Production cost	High	Medium, penalties due to logistics costs	Low
Domestic design	Local adaptations	None	None – May do global R&D in niche areas

2.8.2 Key challenges post MIDP

Operational competitiveness:

- High local content – logistics penalty at output end of value chain only;
- Technology employed – up to date or 5 years behind frontier on rolling basis; and
- World class conversion capabilities – lean production widespread.
- Large scale CBU export programmes:
- Technologies employed;
- Economies of scale; and
- Multiplier effect.

Domestic market growth in South Africa is important as both a production base and market, and should not be overlooked in striving for globalisation.

2.8.3 A strategy for success

In the light of global domination of the vehicle industry by a few multinationals, how can smaller companies and more specifically South African companies survive? The key lies in finding the right niche and developing a tailor made strategy which exploits their own unique competencies and strengths. According to Rhys (2003), the key issues for developing this winning strategy can be summarised as follows:

- Focus on core competencies;
- Build strategic alliances (internationally);
- Exploit the unique strengths of the firm;
- Develop a strategic approach to out-sourcing;
- Develop new management disciplines (multiple relationships, learning from alliances);
- Adapt organisation structure for maximum efficiency (partnerships, high power business teams, skill acquisition);
- Exploit a range of technologies;
- Extract value from core competencies; and
- Maximise benefits from strategic alliances.

The key is to find out what you are good at and to build these competencies, with the help of strategic alliances, into an internationally competitive force. Technology and company flexibility are key elements for success.

2.9 SUMMARY AND CONCLUSION

This chapter attempted to trace the history of the South African motor industry from its origin in the 1920s to its position in 2005 the South African manufacturing sector. The dominant factor in the industry's growth and development has been the course of government policy. It was state intervention which secured the assemblers' presence in Port Elizabeth in the 1920s, which paved the way for the growth in the number of assemblers after World War II. Thereafter, successive phases of the state's local content policy permitted the expansion of components manufacturing in South Africa, but it also contributed to keep new vehicles beyond the reach of most of the population. Efforts to reform government policy since 1980 were met with mixed success. Foreign and local investment tended to follow the various stages of government policy.

The 1980s and early 1990s were marred by political instability, strikes, stay-away's and economic stagnation. The hardships of this period however assisted in the industry's efforts to take the first tentative steps toward international competitiveness. However, the import of a wider range of models under the MIDP made the conditions even more difficult for marketing teams.

The relative success some companies had over others was a result of their sophisticated marketing and advertising strategies.

The underlying weaknesses of the South African motor industry are were apparent, as the sector remained dependant on state protection.

In summary, the transformation that the global motor industry has undergone during the analysed period is much more sophisticated and high phase when compared to the early stages. It is very possible that more changes will occur, with new entrance in the market and considerable technological advancements.

Based on a solid understanding of the global industry, a clear strategic approach to maximising core competencies, a carefully selected alliance partner and excellent technology and quality levels, the South African motor industry could in all probability succeed. Major international successes have already been demonstrated in terms of high volume export contracts. Domestically, the strength and growth of the South African economy will continue to shape the structure of the industry.

Policy and non-policy influences will have a roll to play in the development of the South African motor industry. A decrease in import taxes could possibly have an impact on exports and on imports but reductions in tariffs of Completely Built Up (CBU) units will result in a reduction in exports and increases in imports, the net result of which is a decrease in production and negatively impacting the country's balance of trade.

Growth in CBU export appears to be influenced by non-policy dynamics, it is thus questionable that the fast expansion in the in assembly sector can be maintained through CBU exports. In addition the sustainability of the reliance on component export is also debatable.

As the MIDP approaches the end of its lifecycle, policymakers need to decide on an alternative, a globally prohibited export subsidy a motivating factor is one of the motivating factors for this. Over and above the negative effects highlighted above, the programme needs to address the following:

- A reduction in import barriers has resulted in an increase in competition of foreign competitors in the country.
- The complexities of the programme make it hard to understand and quantify its benefits

Therefore, the main concern for South African policymakers should be trying to understand the structure and nature of the future motor industry in a free market without policies that incentivise and protect local manufactures.

Chapter 3 will attempt to set the theoretical foundation upon which this study will base its analysis and findings.

CHAPTER 3

MACROECONOMIC FRAMEWORK OF THE STUDY: DEMAND AND MACROECONOMIC THEORY

3

3.1 INTRODUCTION

This chapter deals mainly with the theory of demand, with specific reference to demand for durable goods and new passenger cars. The objective of this chapter is to discuss and explain the theory of demand and investigate the economic variables that influence it.

The theory of demand focused on in this study looks at a few aspects of demand. It first describes demand then looks at the determinants of quality demanded using a demand curve as a graphical illustration. The theory also touches on how income and substitution effects influence demand. In addition other forms of demand curves are also investigated.

The theory of demand for durable goods adapts the theory of demand and incorporates the fact that durables require a relatively high investment therefore their demand patterns are inherently different to those of non-durable goods. The theory of demand for new passenger cars extends on the theory of durable goods by focusing on issues that related specifically to the demand for new passenger cars.

The rest of the chapter will focus on creating a theoretical platform upon which the economic variables will be tested, to establish their influence on new passenger cars economists and other analysts use economic indicators to assess the general performance of the economy (Mohr, 1998:1). Thus, the importance of creating a theoretical platform upon which to assess the general performance of South African economic indicators against South Africa's new passenger car demand.

3.2 THE DEMAND THEORY

Demand refers to the products and/or services required in the market during a specific period. Demand is determined largely by the price of products. The quantity demanded indicates the quantity that consumers would be prepared to buy at a specific price and not necessarily the quantity that is actually bought. If the quantity demanded is larger than the quantity supplied, consumers will not be able to buy the quantity they want (Smit, 1996:103).

The law of demand states: “Other things remaining the same, the higher the price of a good, the smaller is the quantity demanded; and the lower the price of a good, the greater the quantity demanded” (Parkin, 2005:55).

There are two reasons a higher price reduces the quantity demanded: For two reasons:

The substitution effect; and the income effect.

The substitution effect: When prices drop, consumers can afford to buy more of that product, because the product provides the same utility at a lower price (Smit, 1996:104).

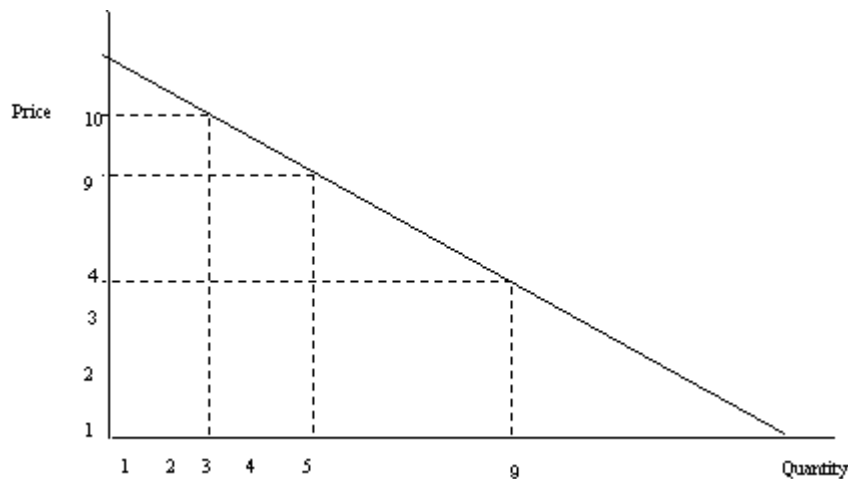
The income effect: When prices drop, more consumers can afford to buy that product. Consumers who, previously, could not afford the product at the higher price can now enter the market (Smit, 1996:104).

The most commonly used method of explaining the relationship between price and quantity demanded is by means of a demand curve. In this way, the values for price and quantity can be established by drawing lines from the point perpendicular onto the two axes.

3.2.1 Demand curve

The term demand refers to the entire relationship between the price of the good and the quantity demanded of the good. Demand is illustrated by the demand curve and the demand schedule. The term quantity demanded refers to a point on a demand curve – the quantity demanded at a particular price (Parkin, 2005:56). Figure 3.1 presents the demand curve.

Figure 3.1 The demand curve



Source: Parkin (2005:56)

A demand curve shows the relationship between the quantity demanded of a good and its price when all other influences on consumer's planned purchases remain the same (Parkin, 2005:56).

In Figure 3.1, the downward sloping demand curve shows the quantity of goods demanded at various prices. A change in quantity demanded is a movement along a demand curve caused by a change in the price of the good. For example, a decrease in the price of the good would increase the quantity demanded. However, a change in demand implies a movement for an entire demand curve for a good, because the quantity demanded by consumers at each price will change. See Figure 3.2 (a) and (b). Hyman (1989:50) identified a change in demand as a change in a demand influence other than the price of the good, while a change in quantity demanded is a response to a change in a goods own price.

Figure 3.2 A change in demand

Figure 4.2(a) An increase in demand

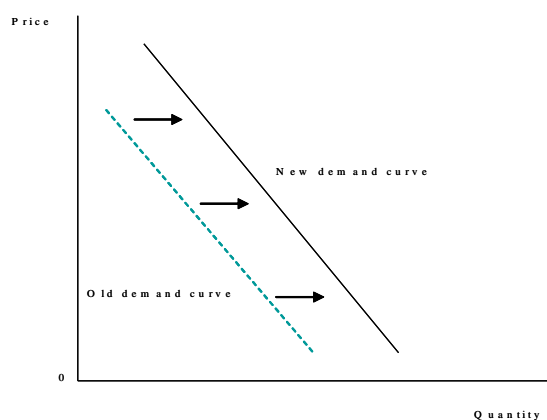


Figure 4.2(b) A decrease in demand

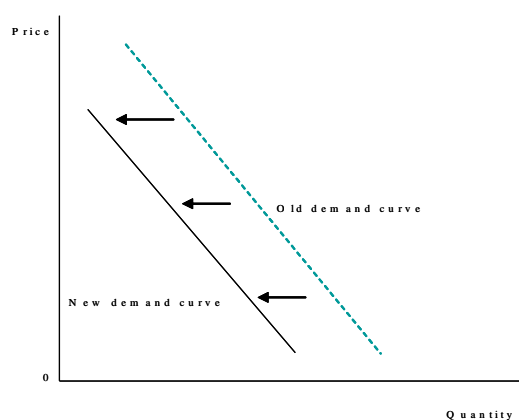


Figure 3.2(a) illustrates that an increase in demand is represented by an outward shift of the entire demand curve. Figure 3.2 (b) shows a decrease in demand as an inward shift of a demand curve. After a decrease in demand, the quantities that consumers will be willing to buy at each price will be smaller than previously.

Using logic and observation, Hyman (1989:52) finds it is possible to make hypotheses about the possible impact of changes in various determinants on the demand for goods. Therefore, the next sections look to these hypotheses in discussing what influences demand.

3.2.2 Factors that influence demand

Apart from price, several other factors influence demand including:

- Consumer income;
- Tastes and preferences;
- Price of other products;
- Number of buyers in a given area; and
- Expectations.

An individual examination of each of these factors will now be conducted, as presented by Mulhearn and Vane (1999).

- (i) Changes in consumer income. An increase in income available for spending increases the ability of consumers to buy an item. Increases in income usually increase the demand for most goods (normal goods) while decreases in income tend to decrease the demand for most goods. However, as income increases, demand for inferior good will decline.
- (ii) Changes in the prices of other goods. Consumer willingness to buy a particular item also depends on the prices of related items, known as substitutes. A change in the price of a substitute can also influence the demand for a particular good.
- (iii) Changes in expectations of future prices. The demand for an item also depends on expectations buyers have about future prices. Expectations of future price increases therefore tend to shift current demand curves outward and vice versa.
- (iv) Changes in tastes or preferences. The general appeal of a product to buyers can change from time to time. If consumer's taste for an item changes, the demand for it may decrease because they are less willing to buy the item at any given price. Changes in tastes or preferences are particularly relevant to demand for new passenger cars, as car manufacturers are continuously introducing new models with new features in the new passenger car market.
- (v) Changes in the number of buyers served by the market. The total quantity of any item demanded at any price also depends on the number of buyers in the market interested in buying the item at that price.

Evidently, demand does not only reflect need, but includes the wish to obtain the product as well as the willingness to pay a certain price for it. To summarise demand in a formula all the factors that may influence demand have to be taken into account.

Mostert (2002:69) expresses this using the following formula:

$$Q_d = f(P_b, Y, T, P_c, P_s, B, E)$$

where:	Q_d	=	the quantity demanded
	f	=	the factors influencing demand
	P_b	=	the price
	Y	=	the consumer's income
	T	=	the consumer's tastes and preferences
	P_c	=	the price of a complementary product
	P_s	=	the price of a substitute
	B	=	the number of potential buyers
	E	=	consumer expectations

If price is assumed to be the only factor influencing demand and all other factors are assumed to be constant, the formula can be simplified to $Q_d=f(P_b)$ *ceteris paribus* (Mostert, 2002:69).

A similar formula for new passenger cars will be explored, taking into account the different factors that influence new passenger cars.

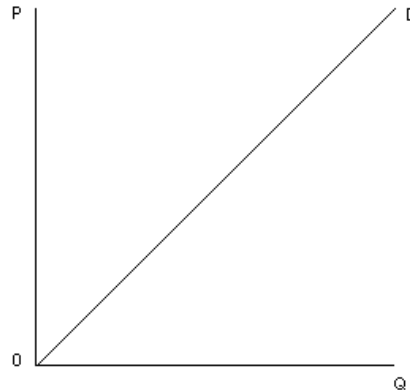
In some cases demand curves do not slope negatively. These exceptions to the rule occur in Giffen goods and Veblen goods. The next section explores the theory behind Giffen goods and Veblen goods, such curves are known as abnormal demand curves. This is an important observation in the context of the study as demand for some passenger cars does not follow the traditional laws of demand.

3.2.3 Abnormal demand curves

In the nineteenth century, Sir Robert Giffen identified that the common man's demand for basic goods hardly reacted to changes in price correlation to the traditional law of demand. Working class people bought more bread when the price of bread went up and less bread when the price went down (Mostert, 2002:75).

Giffen used the upward sloping/positive demand curve below to describe the highlighted market conditions. (see Figure 3.3).

Figure 3.3 Abnormal demand curve



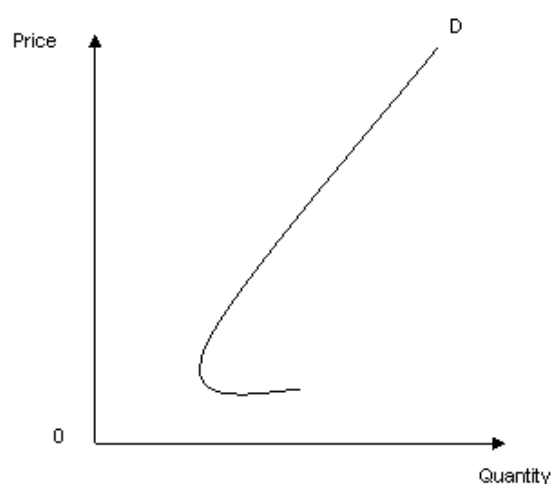
Source: Smit (1996:112)

Inferior products; these are not products consumers perceive to be substandard but less desirable alternatives that the market purchases simply because other options are too costly. The mass market perceived bread as an inferior product to other consumable goods like vegetables and meat (Smit, 1996:112).

For the working class, bread was staple food and they had to buy it irrespective of the price thus they spent a large portion of their income on it and similar products (Smit, 1996:112).

Good and products that are bought to increase status and prestige are commonly referred too as “Veblen goods”. A consumer who buys a sports car may do so partially because of the snob value of the car. Consumers will buy less of these products if their prices were to drop, because the products will then lose their exclusivity (see Figure 3.4).

Figure 3.4 Abnormal demand curve – Veblen goods



Source: Smit (1996:113)

Price therefore carries information other than the cost of a product to the consumer: it contains information about quality too.

Now that the demand curve for individuals has been discussed and established, the next step will be to identify and discuss the market demand curve. A discussion on the market demand curve is very relevant in the context of this study, because the analysis is of South Africa's new passenger market and not just individuals; thus a brief theoretical overview on the market demand curve will allow the study to establish a theoretical background into what influences demand in the market.

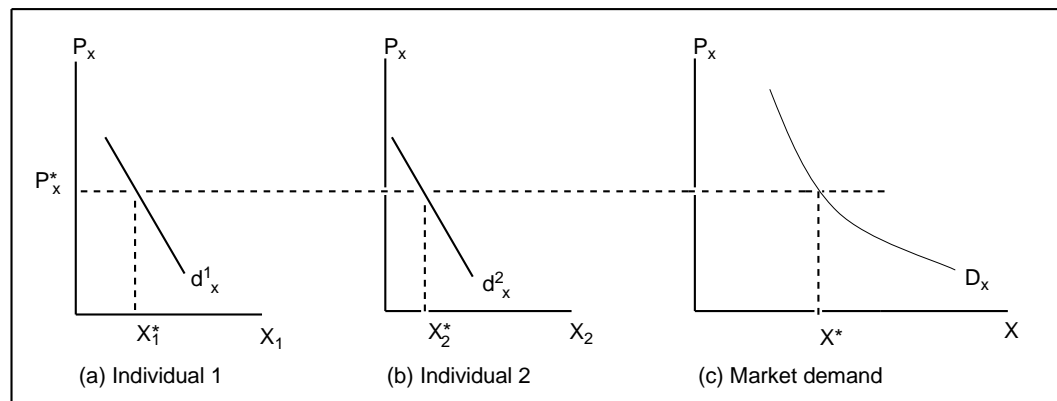
3.3 MARKET DEMAND CURVES

The market demand curve is negatively sloped on the assumption that most individuals will buy more when the price of a good falls. That is, most individuals in the market are assumed to view most goods as normal goods, or if the good is inferior, it is assumed that Giffen's paradox do not occur (Nicholson, 2002:197).

It is important at this stage to differentiate between what will be called 'new passenger car demand' in the study and the concept of 'market demand'. The study will refer to the term 'new passenger car demand' as it describes the relative contribution to total demand for new passenger cars made by different car buyers.

A market demand curve is the “horizontal sum” of each individual’s demand curve. At each price the quantity demanded in the market is the sum of the amounts each individual demands (Nicholson, 2002:173). For example Figure 3.5 illustrates that at P^* the demand in the market is $x_1^* + x_2^* = x^*$.

Figure 3.5 Construction of a market demand curve from individual demand curves



Source: Nicholson (2002:173)

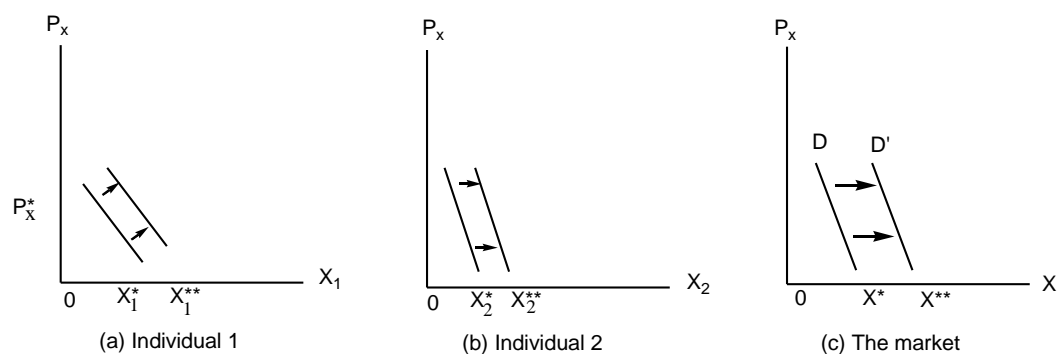
The market demand curve, summarises the *ceteris paribus* relationship between X and P_x . The curve is in reality a two-dimensional representation of a many-variable function. Changes in P_x result in movements along this curve. But changes in any other determinants of the demand for X cause the curve to shift to a new position. A general rise in incomes would, for example, cause the demand curve to shift outward (assuming X is a normal good) because each individual would choose to buy more X at every price. Similarly, a rise in P_x would shift the demand curve for X outward if individual regarded X and Y as substitutes, but shift the demand curve for X inward if the goods were regarded as complements (Nicholson, 2002:173).

Accounting for all such shifts may sometimes require returning to examine the individual demand functions that constitute the market relationship, especially when examining situations in which the distribution of income changes, thereby raising some incomes and reducing others.

3.3.1 Shifts in the market demand curve

To discover the causes of a shift in the market demand curve, the starting point would be to first determine the causes behind shifts in individual curves (as discussed in Section 3.1) and then compare the sum of these new demand curves with the old market demand. In some cases, the direction of a shift on the market demand curve is reasonably predictable. For example, if two buyers' incomes increase and both regard X as a normal good, then each person's demand curve would shift outward. Hence, the market demand curve would also shift outward. At each price, more would be demanded in the market because each person wants to buy more (Nicholson, 1990:119). This situation in which a general rise in income increases market demand is illustrated below in Figure 3.6.

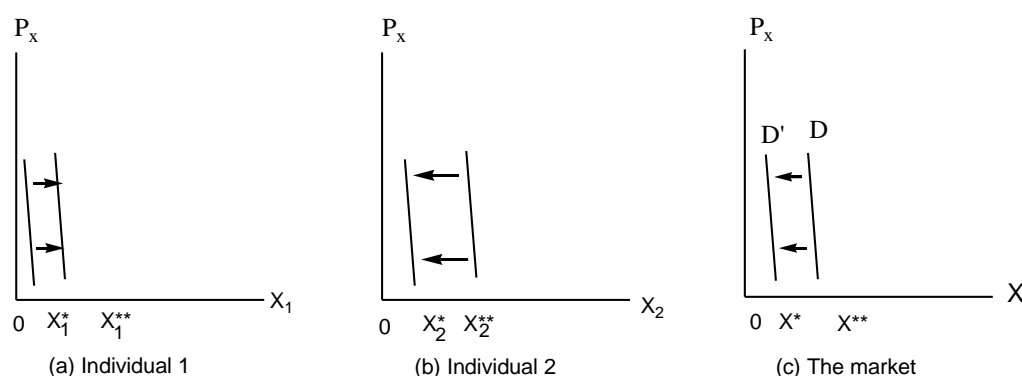
Figure 3.6 Increases in each individual's income



Source: Nicholson (1990:119)

Consumption and Income Taxes show how the above notion can be used to study the effects of tax cuts although, as is often the case in economics, it is not quite as simple as it appears to be. In some cases, the direction that a market demand curve shifts may be ambiguous but a second person's income decreases. The location of the new market demand curve now depends on the relative shifts in the individual's demand curves that these income changes cause (Nicholson, 1990:119). Figure 3.7 shows the market demand curve shifting to a different position because of different income changes for the two buyers.

Figure 3.7 Effects of income changes on market demand



Source: Nicholson (1990:121)

Individual 1's income has increased, causing an outward shift in his demand curve, but individual 2's has decreased, causing his demand curve to shift to the left. The net result of these changes is that the market demand curve shift inward (D').

Sections 3.1 and 3.2 dealt with demand, the demand curve, and its influences. The two sections focused mainly on the aspects that influence demand for normal goods. Although most of the above demand principles apply when demanding a new passenger car, as a durable good new passenger cars are inherently influenced by other factors other than those that influence normal goods. Therefore, following section will discuss the theory of demand for "durable goods".

3.4 THEORY OF DEMAND FOR DURABLE GOODS

Consumers' decisions with respect to durable consumption goods are inherently dynamic in nature. By definition, a durable good provides benefit during more than one period and, in combination with the relatively high investment associated with their purchase, decisions with respect to durable goods impose stronger links between present and future decisions than in the case of non-durables. Another distinguishing aspect is that decisions regarding the purchase of durable goods are not only confined to purchase, but also comprise replacement, scrappage and repair.

Perhaps the best way of seeing how complex demand for durable goods is, is to begin by listing various themes or special features of the demand for durable goods, all of which have been emphasised by different economists.

Deaton and Muellbauer (1980:345) identified the following themes:

- (i) There is an extremely important distinction to be made between purchases, on the one hand and consumption on the other. Purchases are regarded as adding to stocks, while consumption, which is rendered possible by the existence of the stocks, is responsible for their depletion or physical deterioration.
- (ii) The presence of stocks that last through more than one time period means that past decisions affect present behaviour just as present decisions set constraints on future action.
- (iii) The purchasing decision can be advanced or postponed in the light of new information.
- (iv) Consumer confidence, income and price expectations are important determinants of purchases.
- (v) Purchases of durable goods are particularly volatile.
- (vi) A useful and perhaps important distinction should be drawn between new demand and replacement demand.
- (vii) The decision whether or not to buy a durable good is a choice between two discrete alternatives. It is thus different, in principle, from a non-durable purchase where choice is exercised over a continuous range.
- (viii) Many durable goods either are new to the market or are subject to a high level of technical change. Hence, information about them may take time to diffuse through the population.
- (ix) Stocks of durables and 'stocks' of habits play a similar role in linking past, present and future decisions and ought to be analysed using the same tools.
- (x) Markets for durable goods are often imperfect; for example, developed, second-hand markets do not always exist and information possessed

by buyers and sellers may be quite different. Such phenomena give rise to complex constraints facing consumers and are likely to affect behaviour.

- (xi) There are adjustment and/or transaction costs that may give rise to a lagged adjustment of actually desired stocks.
- (xii) Because of the volatility of purchases, markets for durable goods are more liable to excess demand episodes where suppliers cannot meet demand, yet do not raise prices to clear the market. Then some purchasers will be informally rationed by having to wait for delivery while the demand of others may be shifted to some available but less preferred alternatives.
- (xiii) Markets for new and used durables interact in complicated ways unless different vintages of durables are perfect substitutes *ex ante*.

It is important to note that not all of these issues are specific to durable purchases alone, but most arise more acutely in the case. These issues have been highlighted for the purpose of the study and upon examination reflect important differences in the characteristics of demand for durable goods and that of other goods. Consider for instance theme number (IV) above, with durable goods the purchase decision can be postponed, if for example, a consumer receives information that a new passenger car model is to be introduced into the market. The consumer can either wait for the new model or anticipate a decrease in the price of the current model and act accordingly.

The brief discussion above on the demand for durable goods highlights differences in characteristics of demand for durable and consumer goods. The next step is to examine the relationship between durable goods and energy consumption.

It is recognised in that the characteristic of household energy consuming durable goods influenced the structure of demand. This observation led to a distinction between short-run and long-run demand elasticities (Davis, 2003:1). Demand elasticity measures the sensitivity of demand to a change in another variable such as price. Elasticity will be discussed in detail in Chapter 4.

In the short run, households respond to increases in energy costs by reducing their consumption of durable goods however, in the long-term, they respond to increases in energy cost by buying alternative durable goods (Davis, 2003:2).

Dubin and McFadden (1984:24) explained that because households make durable goods purchase and utilisation decisions simultaneously, the characteristics of durable goods are endogenous in energy demand equations. Dubin and McFadden addressed this by using a discrete model to describe durable goods choice. Deriving the probability that a particular household chooses a particular durable good type as a function of household and market variables they (households) used these probabilities as an instrument for durable good holding in estimating the effects of energy prices on energy demand.

Household utility of durable goods is obtained from its end use of goods and services that consume energy. Households assess the value they derive from a collection of durable goods based on the benefit the goods offer, the purchase price and the operational costs. The use of durable goods can be expensive depending on the cost of energy and the utilisation (of the durable good) patterns of the household. Therefore any possible savings in operational cost is heavily dependant on the cost of energy, increases in the cost of energy result encourage the household to replace unproductive durable goods (Davis, 2003:3).

The above discussion on demand for durable goods highlights the many characteristics of demand for durable goods. Section 3.3 identified that price and income play a major role, when demanding durable goods; however, there are certain demand characteristics that are different to those of normal goods, for example, the high financial investment, replacement value and the influence of the price of energy. Section 3.3 laid a foundation upon which the theory of demand for new passenger cars can be evaluated.

3.5 THEORY OF DEMAND FOR NEW PASSENGER CARS

In this section the study will discuss two theories of demand for passenger cars, the first by McGowan and the second by Kooreman. The purpose of focusing on two theories instead of one is to gain a better perspective and

understanding of the variables that influence the demand for new passenger cars.

The demand for passenger cars is a function of many of the same variables associated with other demand functions. Price, income, the price of substitutes, the price of complements and tastes (or preferences) are all important independent variables that help to determine the quantity of passenger cars demanded (McGowan, 1984:225).

McGowan (1984:25) views the implicit demand function as:

Quantity demanded of a particular type of passenger car (Qd) = f(P, Y, P_s, P_c, T)

The importance of analysing this function is that it ties in with the general theory of demand and the theory of demand for durable goods discussed in this chapter. The above function of demand for passenger cars therefore seeks to determine how the primary drivers of demand for durable goods specifically influence the demand for passenger cars.

P stands for the price of the passenger car. *Ceteris paribus*, there is (usually) an inverse relation between *P* and the quantity demanded. Since the purchase of a passenger car represents a large initial investment for most consumers and since many consumers can postpone the purchase of a new car – either by buying a used one or by continuing to drive vehicles they already have – it can be expected that the quantity demanded is quite responsive to changes in price. In other words, a one per cent change in price could possibly cause an even greater change in the quantity of passenger cars demanded. That is, a one per cent rise in *P* might be expected to cause a fall in the quantity demanded (*Qd*) of more than one percent. Thus, the percentage change in *Qd* is greater than the percentage change in *P* in absolute terms, meaning the sign, whether positive or negative is not considered. In economics, such a demand is said to be price elastic (McGowan, 1984:225).

Y stands for total money income. *Ceteris paribus*, income and the quantity of passenger cars purchased are positively related. Economists refer to the relation between a one per cent change in income and the percentage of the quantity of cars demanded as the income elasticity of demand for passenger

cars. Income elasticity is the responsiveness of the quantity demanded to a change in consumer income. McGowan (1984:226) found that the demand for cars was income elastic. When income rises, the quantity of cars demanded increases by proportionally more than the increase in income and if income declines, sales can fall sharply (McGowan, 1984:226).

P_s stands for the price of substitutes. As the price of substitutes falls relative to the price of the particular car being considered, the demand for cars will fall (McGowan, 1984:226). In other words, the demand schedule will shift to the left.

P_c stands for the price of complements. Complements to a passenger car include such things as petrol, repair and maintenance, registration and insurance. They also include new accessories that may be added to the car from a package deal. A good example of mandatory “packaged” accessories is the safety and environmental equipment required on all new passenger cars.

The addition of these accessories can be viewed in two ways. First, as complements to the basic car, an increase in their price reduces the demand. Secondly, insofar as they become integral parts of the car (especially such things as shock-absorbers) the original car is no longer available. Instead, the old demand becomes a new demand for different cars (McGowan, 1984:226).

T stands for consumer tastes and preferences. Car manufacturers appear to be able to sell almost anything they make. Consumerists believe advertising stimulates consumer preferences for new styling and new models that differ very little from the previous ones (McGowan, 1984:226).

McGowan’s theory of demand for passenger cars ties in with the demand theory already discussed in Section 3.1 and the theory of demand for durable goods in Section 3.2. The determinants of demand as contained in the theory of demand for durable goods appear in McGowan’s demand function, P , Y , P_s , P_c and T and all of them also affect the demand for passenger cars. McGowan further introduces the concept of elasticity from the perspectives of both income and price in understanding the extent to which demand for new passenger cars will react to changes in price and income. As a durable good

passenger cars are far more than just a means of transportation. To some consumers passenger cars promise social status and comfort. Therefore, for such consumers, in maximising their utility and satisfying their preferences, their demand for new passenger cars is heavily influenced by style changes and appearance.

Consider Kooreman's theory on the demand for cars. Unlike Gowan, Kooreman focuses on the product related issues of new passenger car demand. For example, a household without a car that is considering buying one has to decide about the preferred mode of transportation (new passenger car, second hand car or public transportation). If the household decides to buy a new passenger car, decisions have to be made concerning the make, size, type of fuel, type of transmission and so on. These discrete decisions are closely related to the continuous aspect of choice notably the amount of income spent on the car and the number of kilometres it is to be driven.

Consider Kooreman's (1997:163) stylised decision process of car ownership in which the discrete aspect is a binary choice. Kooreman uses the following notation:

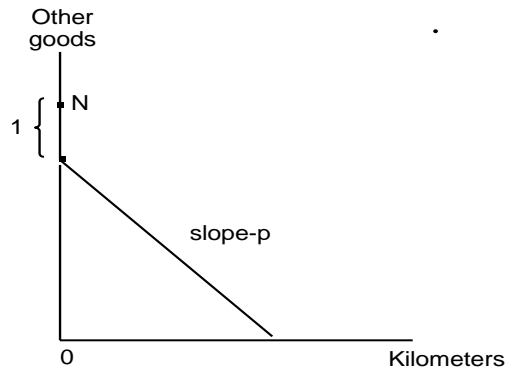
- Y = household income;
- f = fixed cost of a car;
- p = price per driven kilometre;
- R = expenditure on other goods (including public transport);
- K = number of kilometres driven.

Kooreman uses a similar notation/equation to that of McGowan, however, in order to prove that there is also empirical evidence to suggest that household decision processes for the purchase of new passenger cars are sequential. Kooreman's notion/equation excludes consumer tastes and preferences, and includes the number of kilometres to be driven.

The corresponding household budget set is shown in Figure 3.8. It consists of two parts. The first is the triangle which corresponds to the case of passenger car demand. The second part is Point N on the vertical axis, which corresponds to the case of not owning a passenger car; the number of

kilometres driven is zero and income, Y , is completely available for other goods. Note that the budget is set non-convex because of the existence of fixed costs of passenger car demand (Kooreman, 1997:163).

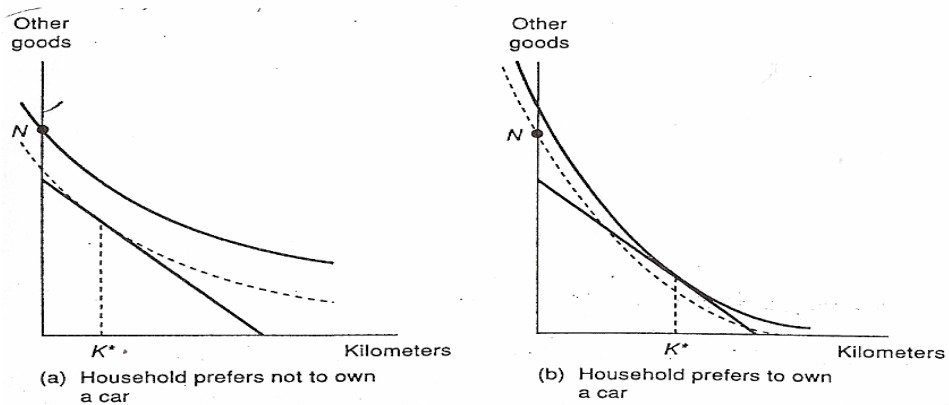
Figure 3.8 Budget set and car demand



Source: Kooreman (1992:164)

As a consequence, finding the optimal choice requires two steps. First, the tangency point of the indifference curves and the solid line bias to be determined; this point gives the optimal number of kilometres conditional on owning bias to be compared to the indifference curve that passes through Point N . Figure 3.9(a) and 3.9(b) show the two different outcomes. The household in Figure 3.9(a) prefers not to own a car, since the indifference curve that passes through Point N represents a higher utility level than the indifference curve corresponding to K^* . In Figure 3.9(b), the household prefers to own a car, and will drive K^* kilometres. Note that the model addresses ownership and usage simultaneously (Kooreman, 1997:164).

Figure 3.9 Household preferences, car ownership



Source: Kooreman (1992:164)

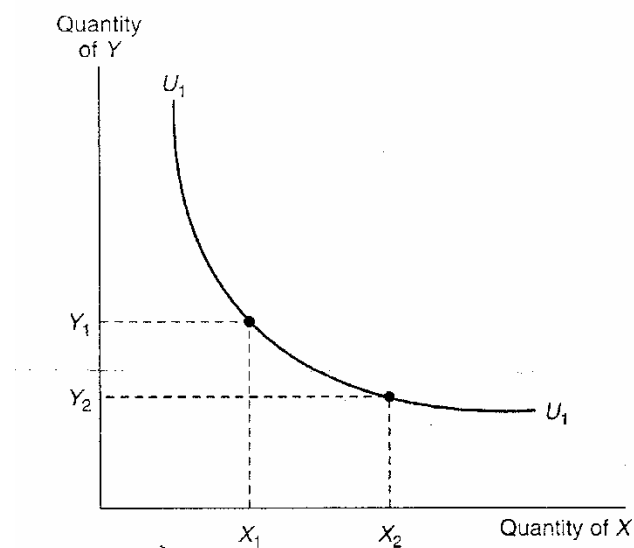
To better understand Kooreman's explanation of household preferences and car ownership, the study will briefly discuss indifference curves and how they illustrate individuals' intent to maximise their utilities.

3.5.1 Indifference curve

An indifference curve shows a set of consumption bundles among which the individual is indifferent. That is, the bundles all provide the same level of utility (Nicholson, 2002:70).

The slope of the indifference curve in Figure 3.10 is negative, showing that if the individual is forced to give up some Y, he or she must be compensated by an additional amount of X to remain indifferent between the two bundles of goods.

Figure 3.10 Indifference curve



Source: Nicholson (2002:71)

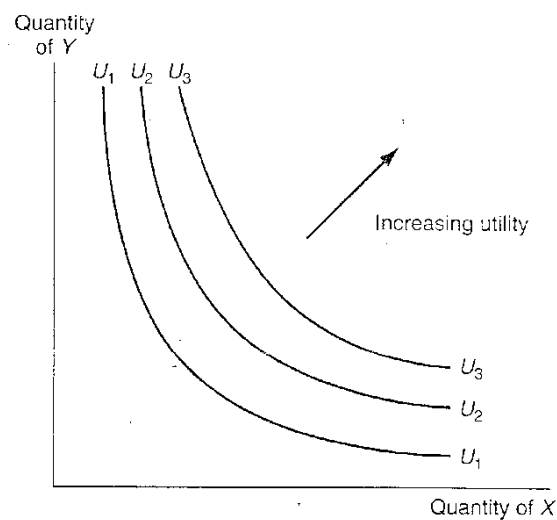
The curve is also drawn so that the slope increases as X increases (that is, the slope starts at negative infinity and increases towards 0). This is a graphical representation of the assumption that individuals become progressively less willing to trade away Y to get more X. In mathematical terms, the slope diminishes as X increases (Nicholson, 2002:71).

The curve U_1 represents those combinations of X and Y from which the individual derives the same utility. The slope of this curve represents the rate

at which the individual is willing to trade X for Y while remaining equally well off. This slope (or, more properly the negative of the slope) is termed the marginal rate of substitution. In Figure 3.10 the indifference curve is drawn on the assumption of a diminishing marginal rate of substitution (Nicholson, 2002:71).

In Figure 3.10 only one indifference curve is drawn. The X, Y quadrant, however, is densely packed with such curves, each corresponding to a different level of utility. Next Figure 3.11 illustrates how individuals increase utility and move to higher levels of satisfaction.

Figure 3.11 Indifference curves with an increase in utility



Source: Nicholson (2002:72)

In Figure 3.11, several indifferences are shown to indicate that there are infinitely many in the plane. The level of utility represented by these curves increases as they move in a northeast direction – the utility of curve U₁ is less than that of U₂, which is less than that of U₃. This is because of the assumption made in Figure 3.9: More of a good is preferred to less.

In Figure 3.11, there is an indifference curve passing through each point in the X-Y plane. Each of these curves records combination of X and Y from which the individual receives a certain level of satisfaction. Movements in a northeast direction represent movements to higher levels of utility (Nicholson, 2002:72).

Therefore, based on the above brief discussion on indifference curves, it can theoretically be assumed that individuals are always looking at maximising their utility. Kooreman (1997) established that one of the constraints of demand for new passenger cars was income (discussed in Section 4.4). Using indifference curves the next section will consider the effect of exogenous factors (make of car, price and income) on individual's decision-making process when demanding new passenger cars. The section will also look at the integral part played by income and substitution effects when demanding new passenger cars.

3.5.2 The effect of exogenous factors on new passenger car preference functions

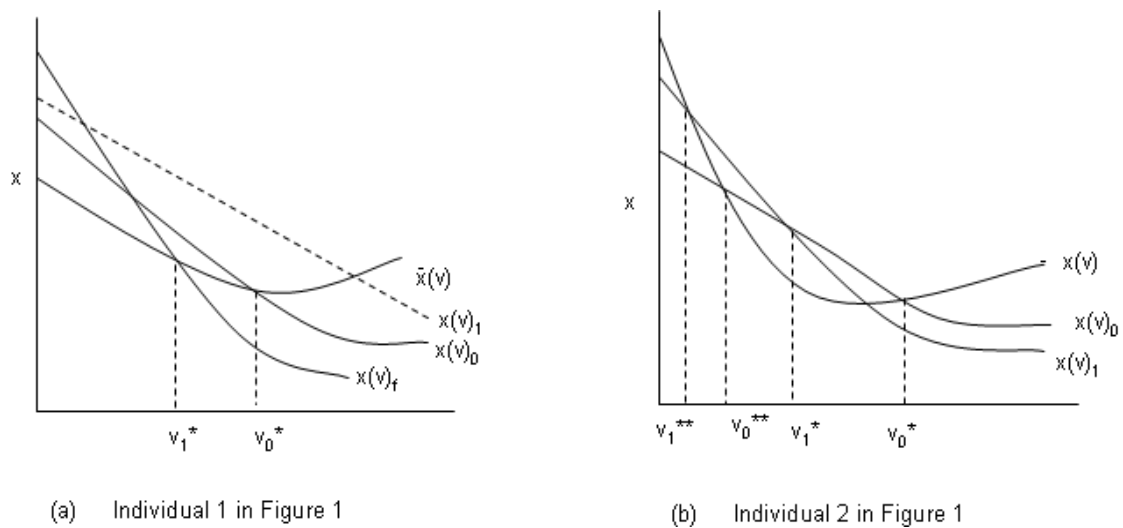
With reference to Figure 3.2, this section considers the effect of exogenous factors on the position of the $x_1(v)$ relative to $\bar{x}(v)$. $x_1(v)$ is viewed as the individual's preference function, $\bar{x}(v)$ is viewed as the market mean. Among the more obvious exogenous factors are an individual's income, the price of cars (including running costs) relative to the price of competing goods, the availability of credit, expectations of changes in tax rates or credit restrictions, and socio-economic factors such as family size, age, distance from place of work to place of residence (Armstrong, 1978:204). In order to illustrate the effect of exogenous factors on $\bar{x}(v)$ the study will make use of income but the analysis can be adapted and applied to other exogenous variables.

Consider the likely effect on $x_1(v)$ of an increase in individual 1's income. Changes in income affect maximum utility obtainable, and hence $x(v)$. Take individual 1 from Figure 1 in Figure 3.12(a), if his preference functions before and after his increase in income, is $x(v)_0$ and $x(v)_1$ respectively. As a result of his increased income, he now shows greater preference for new passenger cars relative to older cars.

Before examining the implications of this for the demand for new passenger cars, note that such behaviour is *a priori* reasonable; in conventional demand analysis an increase in income merely moves a demand curve outwards without altering its shape. In Figure 3.12, the shift from $x(V)_0$ to $x(v)_1$ can be regarded as consisting of a 'pure income' effect and a substitution effect. The

former causes the consumer to be prepared to pay a similar extra amount for passenger cars of all vintages, i.e. a move to an intermediate curve $x(v)_2^1$. The substitution effect causes a switch towards new vintages and the curve swivels to $x(v)_1$: newness is, in this sense a luxury since new passenger cars have a higher income elasticity of utility than old passenger cars (Armstrong, 1978:295).

Figure 3.12 The effect of the exogenous factors on numerous preference functions



Source: Armstrong (1978:295)

The effect of a change in income on replacement demand is two-fold; these will be a long-term effect due to the new level income and an initial short-term effect due to the change in the level of income. The new higher level of income will mean that individual 1 will sell his car sooner – when it reaches v_1^* ; instead of v_0^* . He will thus be buying a new car every v_1^* years and not (less frequently), every v_0^* years. The short-term effect arrives if his present car is between v_1^* and v_0^* . With his previous level of income and preference function $x(v)_0$ the consumer would keep his car until it was vintage v_0^* . However, with the change to $x(v)$ he now finds that he is the owner of a car of beyond optimal age v_1^* . In order to correct this he will immediately sell his car and buy a new one (Armstrong, 1978:295).

Next, the study examines the behaviour of individual 2 in Figure 3.12 (b) when faced with an increase in income. This preference function is shown as $x(v)_0$ in Figure 3.12(b); after an increase in income this function shifts to $x(v)_1$. Originally, he sold his car of vintage v_0^* and replaced it with one of vintage v_0^{**} . Now, with a higher income individual 2 will sell his car at vintage v_1^* and replace it with one of vintage v_1^{**} . The long term effect here is to reduce the right-skewness of $x(v)$ but there is no effect on the demand for new passenger cars. The short-term effect is that he will find himself in a sub-optimal position since, whatever vintage he was previously owning between v_0^{**} and v_0^* will be greater than his new optimal vintage for selling v_1^* . He will thus correct this once-and-for-all by selling his car and buying one of vintage v_1^{**} (Armstrong, 1978:195).

In this case there has been no effect on the demand for new passenger cars, but it is not difficult to imagine that, if $x(v)_1$ had been shown with a steeper slope and a higher intercept on the axis, individual 2 would have become the sort of person who would buy a new car, with consequent effect both in the short-term and the long-term on the demand for new passenger cars (Armstrong, 1978:295).

The same analytical approach can be used for a decrease in income or for a change in other exogenous factors.

To sum up the effect on replacement of changes in exogenous factors, it can be said that, when faced with a favourable movement in exogenous factors, total replacement demand will increase. It will increase by more in the short-term (when car owners react to finding themselves in a sub-optimal position) than in the long-term (when they are always pursuing an optimal policy involving more new cars than previously).

The above analysis showed that the effect of an increase in income on an individual utility was to move it upwards and to increase the slope as a result of income and substitution effects respectively. The analysis assumes that $\bar{x}(v)$ did not change. This was justified when considering a single individual since the shift in his $x(v)$ will have no significant effect on the mean $\bar{x}(v)$.

When examining a general increase in income, an allowance for a shift in the individual's utility and a corresponding shift in the mean is allowed. When considering a pure income effect all the curves in Figure 3.12 would move upwards by the same amount and there would be no change in optimal replacement vintages and hence no change in the demand for new passenger cars. If, however, a substitution effect is allowed to act, the result is a swivel in both $x_1(v)$ and $\bar{x}_{x(v)}$ leading to replacement in this case at v_1^* and not later at v_0^* . It is, of course, possible that the behaviour and preferences of some individual will diverge from the typical pattern discussed here.

The above section discussed individual demand characteristics; the next step is to now discuss the demand characteristics of a manufacturer at an industry level.

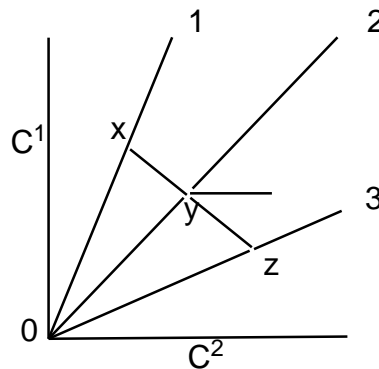
3.5.3 Manufacturer demand characteristics

It is not the objective of this study to discuss the manufacturers demand characteristics, however, the researcher felt it fitting that the study touch on the demand characteristics of manufacturers as their demand patterns have a profound influence on the construction of the new passenger car prices.

Reduction in demand price elasticity for companies is dependant on their ability to differentiate their goods at certain price levels. As a result companies try to segment their products in different niches markets through presenting the consumer with distinct packages or offerings in their vehicles, this eventually influences the structure of demand in the market.

This can be shown in Figure 3.13. Here the market was originally covered by cars 1 and 3. A producer identifying a gap in the market that requires a car which offers a different combination of the two characteristics c^1 and c^2 . (These could be exclusiveness and size respectively.) This is given by car '2', the points X, Y and Z are the maximum amounts of the characteristics that can be purchased given the price of the cars and consumer income. Some consumers will buy '2' as to them it is on a higher indifference curve 1 (Obe, 2003:94).

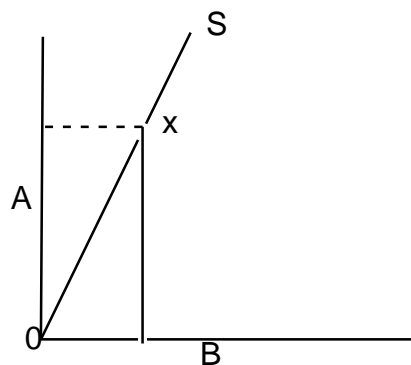
Figure 3.13 Firms identifying a niche in the market



Source: Obe (2003:94)

In Figure 3.14 there is a position where one vehicle has dominated the market. However, the combination of characteristics is given by the ray 'S'. Here the characteristics are labelled A and B; the former could be durability and the latter comfort. This leaves a large potential market in the space between ray 'S' and the horizontal axis. Eventually a new producer may be attracted by the possibilities offered, and could tap a level of demand that is far greater than that supplied by the original vehicle. Furthermore, the new vehicle may take sales from the original vehicle as consumers who had bought it really wanted characteristics in a combination best served by the new entrant (Obe, 2003:95).

Figure 3.14 Market dominated by one vehicle



Source: Obe (2002:95)

As stated earlier it is not the purpose of the study to discuss a car manufacturer's demand characteristics at length. The objective of Section 3.4.3 was to highlight the fact that car manufacturers demand characteristics

naturally have an influence of final consumer demand through the packages that they offer.

The chapter to follow will focus mainly on the introduction of micro-economic variables that influence new passenger car demand.

3.6 SUMMARY AND CONCLUSION

In the introduction to this chapter it was stated that the objective of the chapter is to create a theoretical platform upon which the economic variables will be tested in order to establish their influence on South Africa's new passenger car demand. In setting up this foundation the chapter began with an introduction of the theory of demand and the relationship between changes in price and quantities demanded and the influences of demand.

The study then attempted to clarify the theory behind 'Market Demand Curves' and how they are influenced by a collective of individual demand curves. With this as background an effort was made to understand the theory of demand for durable goods and new passenger cars. Theoretically, the demand for durable goods and passenger cars depends on the size of a population's income and wealth, and on the prices the industry is able to profitably charge. A parallel can thus be drawn between factors that influence both durable goods and passenger cars. The following variables were identified to have had a profound influence on consumer demand for durable goods and passenger cars:

- Income;
- Price of substitutes;
- Price of complements;
- Consumer tastes; and
- Cost of ownership.

In its true nature, a passenger car is a durable good, thus the above parallel is not surprising; however, it was also noted that there are those goods that contradict this status quo (goods that are price insensitive) and their demand is not driven by the same set of variables. At a Micro economic level it was

noted that the motor industry is important, as the manufacturing and sale of vehicles generates considerable upstream and downstream activity. Commercial vehicle demand is determined by industrial and commercial activity and the efficiency of the manufacturing policies (the MIDP in South Africa's case).

Chapter 3 presented a general view of the influences of demand on passenger cars, Chapter 4 will now scrutinise the drivers and determinants of demand for new passenger cars, specifically focusing on the key indicators that influence demand.

CHAPTER 4

AN ANALYSIS OF THE DETERMINANTS OF DEMAND FOR NEW PASSENGER CARS IN SOUTH AFRICA 1995-2005

4

4.1 INTRODUCTION

The theory of demand for new passenger cars, introduced in Chapter 3, provides a foundation upon which the determinants of demand for passenger cars in South Africa will be evaluated. As indicated in Chapter 1, Chapter 4 seeks to analyse, describe and interpret empirical data reflecting the demand and the determinants of demand for new passenger cars.

The interrelationships between the state of the general economy, standards of living, income and wealth effects, trends and the source of demand, elasticities, substitutes and the legislative environment define, *inter alia*, the basic conditions under which competition takes place within an industry (Bruton, 1991:138).

This chapter will present and analyse historical data reflecting the determinants of demand for new passenger cars. However, due to the extent of the subject matter, only the most significant determinants will be considered. The chapter will explore the statistical and graphical relationship between new passenger car demand and the major determinants of demand for new passenger cars.

Although McGowan's demand function presented in Chapter 3 forms the theoretical base for Chapter 4, Bruton (1985:175) found that, based on research in the form of discussions with experienced motor industry managers, that the drivers of demand for new passenger cars primarily focused upon (by industry analysts) included the impact of changes in gross domestic product, new car prices, personal disposable income, interests rates, business and consumer confidence and at times the price of fuel.

Chapter 4 therefore seeks to graphically and statistically explain the effects of changes in new passenger car prices, disposable income, interest rates,

gross domestic product (GDP), the fuel price, business and consumer confidence indices and the car population on the size of demand for passenger cars in South Africa. The price and income elasticities of demand for new passenger cars will also be determined.

The data to be analysed in Chapter 4 and indeed throughout this study comprises of the period from 1995 to 2005; a period of not only significant political but also economic changes. The study will make use of annual data throughout its ten year period for analysis.

4.2 RESEARCH DESIGN AND METHODOLOGY

This section will concentrate on outlining the appropriate research methods for the given research objectives. The research methods to be used must be applicable to the nature of the study and its objectives. In order to test the above hypotheses, both qualitative and quantitative research methods will be employed in this study.

4.3 QUALITATIVE RESEARCH

The qualitative research method was used to understand the South African motor industry's performance as a market from an insider's perspective as the insider operates in it and has valuable knowledge and experience. Mouton (1992:155) stated that the purpose of qualitative investigations are those approaches in which the procedures are not as strictly formalised, while the scope is more likely to be undefined, and a more philosophical mode of operation is adopted.

4.4 QUANTITATIVE RESEARCH

The quantitative approach can be seen as being more formalised and explicitly controlled, with a range that is defined more exactly, and in terms of the methods that it uses, tends to be closer to physical sciences.

Quantitative research methods can be seen to support deductive reasoning and analysis; it begins with an explicit conceptual framework developed from existing theory and models. Quantitative research methods require the formulation of a specific research hypothesis, with the use of a fixed

alternative questionnaire as the instrument for data collection (Leady & Ormrod, 2002:34).

For the purpose of quantitative research, Chapter 3 will be used as a theoretical framework for the data analysis to follow in Chapter 4. The literature analysis will be based primarily on secondary information such as reference books, journals and internet articles. The bulk of the data to be analysed will be obtained from MSA. The South African Research Bank (SARB) website will also be used extensively for macroeconomic data.

As a tool upon which to test the hypotheses, regression analyses will be conducted using Eviews. The main aim of the quantitative assessment is to obtain statistical evidence on how the variables to be analysed influenced the South African new passenger car market.

4.5 GENERAL PROCEDURES

The methodology followed in this investigation began with the analysis of the applicable theoretical literature on the topic at hand as well as statistical evidence on the topic. The data required for this investigation was collected from both secondary and primary sources. Secondary sources will be utilised to provide the basis for the empirical research, these took the form of local and international sources, in various forms such as articles, books, and journals as well as internet based searches. The primary data used in the delimited research area, comprised of information acquired by means of interviews and questionnaires.

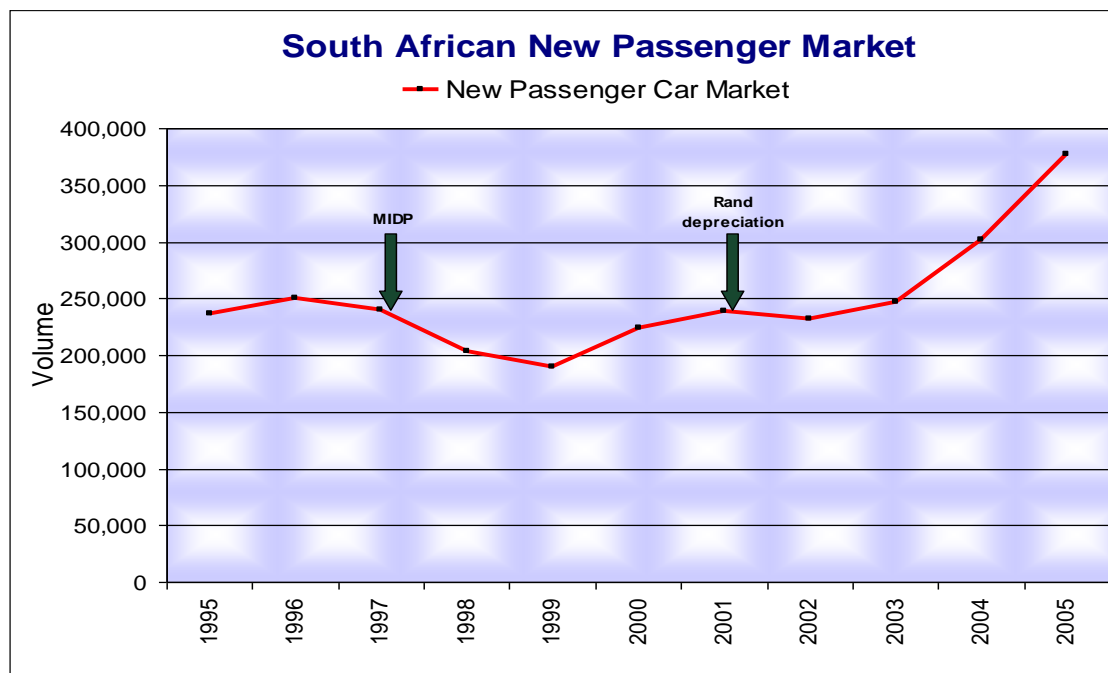
4.6 INTRODUCTION TO THE NEW PASSENGER CAR MARKET AND REGRESSION ANALYSIS

4.6.1 New passenger car market

The new passenger car market reflects the total number of new passenger car sales per year. In South Africa the National Association of Automobile Manufacturers of South Africa (NAAMSA) captures the sales of new passenger cars on a monthly basis and it is the official source of this data. Therefore the new passenger car market as measured by the number of new

passenger cars sold annually in South Africa was used in this study as a reflection of new passenger car demand. Therefore, in analysing the effect of the determinants of demand for passenger cars on new passenger car demand, the determinants discussed was tested against the new passenger car market. Figure 4.1 illustrates developments in the new passenger car market between 1995 and 2005.

Figure 4.1 New passenger car market: 1995-2005



Source: NAAMSA (2010)

4.6.2 Regression analysis

Multiple regression analysis was used in this chapter to statistically determine the relationship between the determinants of new passenger car demand and the new passenger car market.

In multiple regressions, the multiple coefficient of determination, R^2 , measures the variation in the dependent variable explained by the combined influences of the explanatory variables and the closer R^2 is to one, the better is the fit of the model. For the purpose of this study, the T and F tests were used during the analysis in Chapter 4.

4.7 THE EFFECT OF PRICE ON THE NEW PASSENGER CAR DEMAND

The demand for new passenger cars is essentially equivalent to the demand for other normal consumer durable goods; demand will increase as incomes increase (implying a positive elasticity with respect to income). One might also expect to observe a saturation level at higher levels of income. In addition, a number of different factors, which could be expected to influence the level of passenger car demand at a national and local level, have been considered in the course of preparing this study.

At a national level, car demand could be expected to change depending on household structure, type of area (population density and urban development), changes in economic indicators (interest rates, inflation, business and consumer confidence) and the socio-economic group (SEG) to which a household member belongs. It could also be influenced by company subsidies, changing tastes and trends over time, and the level of car driving licence holding. The costs of motoring (both fixed costs such as the car purchase price, insurance, and also variable costs such as the price of fuel etc.) would also be expected to influence the level of passenger car demand.

Having studied the effects of changes in market factors and the effect on quantity demanded, this section briefly isolates the effect of price changes. Section 3.2 described the fact that an increase in the price of a good reduces the quantity demanded, all things being equal. Section 3.2 also mentioned that an increase in the price of good 'A' tends to increase the quantity demanded for good 'B', if the two goods are substitutes. The question that remains is what effect a change in price has on an individual's budget line when two goods complement each other. This is specifically important to the demand for new passenger cars, as the after sales market that sells complementary parts and accessories plays a vital role in South Africa's new passenger car market.

The study aims to discuss the many aspects of price, the construction of a price index, price elasticity and evaluate the effect of price changes on demand.

Perhaps the best known of all price indices is the retail price index (RPI). It is an index of the prices of goods and services purchased by the average household. Movements in this index, therefore, show how the cost of living has changed. Annual percentage increases in RPI are the most common definition of the rate of inflation (Sloman, undated: 38).

Nominal values are the simple monetary values of the prices ruling at the time. For example, if the average price for a new passenger car was R80 000 in 2005 and R88 000 in 2006, then in nominal terms the price has risen by 10 percent. But if prices in the economy have risen by 8 percent, then real prices would have only risen by 2 percent. Thus:

$$\text{Real growth} = \text{Nominal growth} - \text{Inflation}$$

A new car price index is established in order to eliminate the effects of general inflation, to ensure that only the actual real changes in new passenger car prices are considered. Similar to obtaining real growth values, this is done by taking the adjusted original nominal new car price indices and deflating them to obtain the real new car price index to which volume changes can be related (Mohr, 1998:10).

A number of authors have had much to say about the construction of a price index against which to measure the demand for new cars, as the construction of a price index for cars is considered a difficult task. For example, Farrel (1954:171-201) indicated that when constructing a price index for so highly finished a product as a car it is necessary to allow for changes in quality.

This section plans to construct a new passenger car price index for analytical purposes; however, the variables to be used in its construction need to be established.

Changes in values have to be adjusted to eliminate the effect of price changes (i.e. inflation). The unadjusted original values are expressed at current prices or in nominal terms. The nominal prices are then deflated to obtain real prices, which reflect volume changes only (Mohr, 1998:10).

To remove the influence of general price inflation from the analysis real new car prices are adjusted for inflation using the consumer price index (CPI). In order to

obtain real new passenger car prices, nominal new car prices must be adjusted by the CPI using the following formula:

$$\text{Real New Car Price} = \left[\frac{\text{Nominal New Car Price}}{\text{CPI}} \times 100 \right]$$

The next step is to use the real new car price to develop a real new car price index.

In South Africa, the Reserve Bank publishes a motor vehicle price index as part of the presentation of the Consumer Price Index (CPI). This index has not been used in this study because, firstly, it includes all motor vehicles both new and used new vehicles and secondly, it was found to be too “smooth”, i.e. as stated by Bruton (1985:267) it did not reflect the dynamic nature of pricing in the motor industry.

In this study the new vehicle price index from Response Group Trendline was used which reflects an index of the weighted price of new vehicles only on a monthly basis. Response Group Trendline acquires this index from the South African Reserve Bank via the Economics Division of Standard Bank of South Africa and it was used in this dissertation as a proxy for new passenger car prices given that more detailed data was not available. Furthermore sales of new passenger cars account for around 66% of total new vehicle sales and as such the index should reflect to a reasonably accurate degree, movements in new car pricing.

The value of the index is set at 100 in the base year. If the price index in a given year exceeds 100, it means the price level in that year is higher than it was in the base year. Similarly, a price index of less than 100 for a given year means the price level in that year is lower than it was in the base year. Therefore, the real new vehicle price index reflects the average price of new vehicles in a particular year relative to the average price of new vehicles in the base year.

For the purposes of this study, the base year will be adjusted to 1995. Hyman (1989:152) identifies a price index as the ratio of the current cost of a given market basket to the cost of the same market basket in the base year

multiplied by 100. Therefore, the new passenger car price index is calculated as follows:

$$\text{New Passenger Car Index} = \left[\frac{\text{Cost of a New Passenger Car in current year}}{\text{Cost of a New Passenger Car in base year}} \times 100 \right]$$

The value of the index is always 100 in the base year because the numerator and denominator of the above equation will be in the same base year.

However, because of its generic approach to setting an index, the new passenger car price index does not take into account the changes in real new car prices and the size of the new car market; specifically South Africa's new passenger car market. In the context of this study, this is particularly important as South Africa's new passenger car market comprises different segments whose sales/volume differs with price.

Depending on the segment, the prices of other goods have a significant influence on demand. Thus it is necessary to understand and analyse the relationships between changes in real new car prices and the size of South Africa's new passenger car market, taking into account the size of each segment. This will introduce the concept of relative new car price changes in new cars relative to the change in price of other goods. Relative new car prices were calculated as follows:

$$\text{Relative New Car Price} = \text{Inflation} \left[\frac{\text{Annual change in consumer price index}}{\text{Annual change in nominal new vehicle prices}} \right]$$

The combined cost of purchasing and maintaining a vehicle is a major determinant of demand. It may be argued that operating costs (i.e. fuel, repairs) have little influence on car ownership and hence demand in the short-term. Changes in such variable costs mainly result in adjustments in car usage, rather than car demand, over the short-term (for instance, increases in fuel costs lead to a downward adjustment in distance travelled. This subject will be discussed in more detail in Section 4.11).

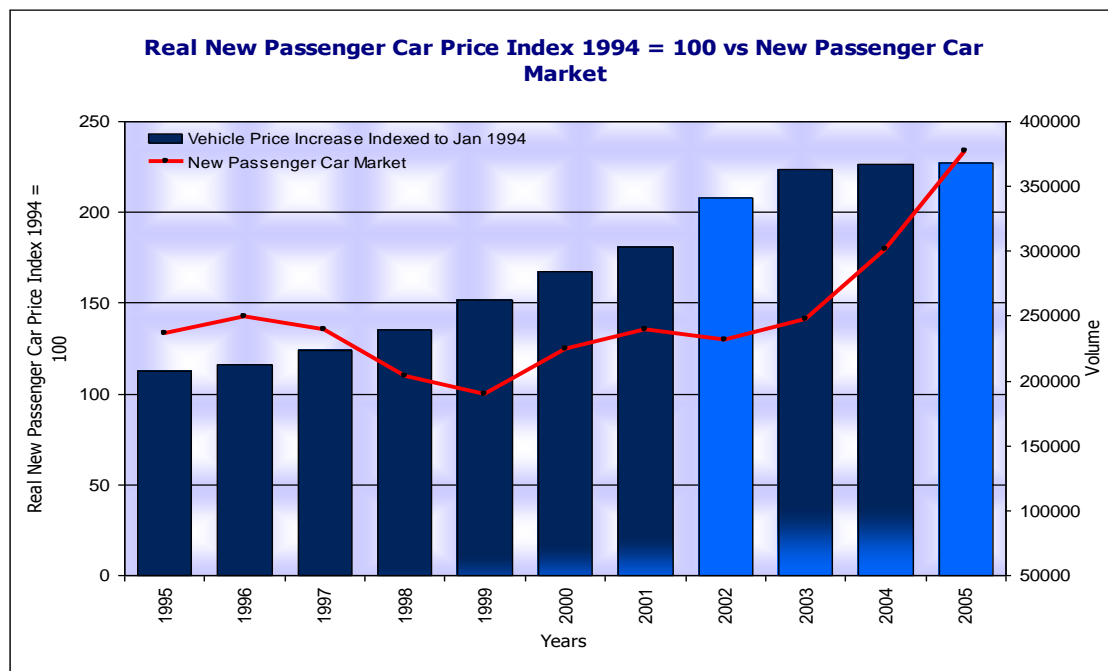
The fixed cost component (which incorporates new passenger car prices and related costs such as insurance and registration has a greater influences on

car demand than do variable costs, fixed cost also influence demand over a shorter time horizon than do variable costs (OECD, 1983:17).

One further point is that the cost of credit can also influence new prices and hence car demand. For example, high interest rates tend to lead to a slowdown in the car market; this subject will be dealt with in Section 4.9 in the study. The terms of loan finance (e.g. the length of repayment allowed may also be relevant in some countries to the extent that they can either moderate or exacerbate any consumer resistance to the credit factor) is mainly relevant over the short-term (OECD, 1983:19).

Figure 4.2 graphically depicts the relationship between the Real New Car Price Index and the New Passenger Car Market from 1995 to 2005.

Figure 4.2 Real new passenger car price index 95=100 versus new passenger car market 1995-2005



Source: Response Group Trendline

When viewing Figure 4.2 it would appear that after a brief period of stability in the index during the late 1990's real passenger car prices gradually increase throughout the rest of ten-year period and the new passenger car market fluctuates during such price increases. However, what is the key for the

discussion of this study is the concept of using relative price changes rather than the actual new passenger car price index.

In analysing the relationship between relative price changes and the new passenger car market, the study calculated the annual percentage change in new passenger car prices. The annual percentage change in the new passenger car prices reflects the percentage at which new passenger car prices change per annum, and is calculated as follows:

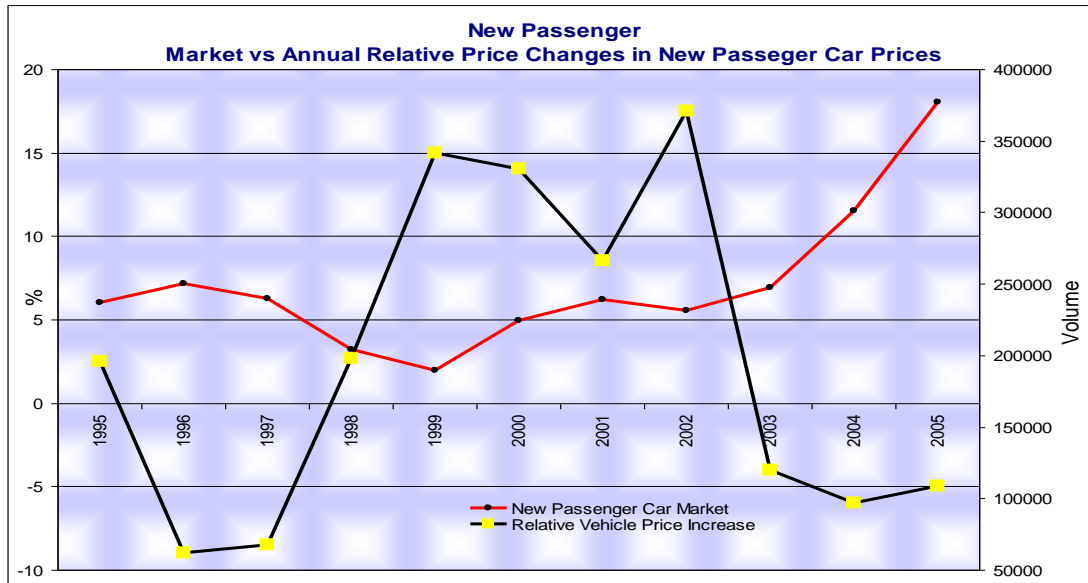
$$\text{Percentage change in New Passenger Car Prices} = \left[\left[\frac{\text{Current New Passenger Car Price}}{\text{Previous year New Passenger Car Price}} \right] - 1 \right] \times 100$$

The annual relative price changes in new passenger car prices reflect percentage changes in the CPI. Annual relative price changes in new passenger car prices are calculated as follows:

$$\text{Annual Relative Price Changes in New Passenger Car Prices} = \text{Percentage Change in New Passenger Car Prices} - \text{Percentage Change in CPI}$$

Figure 4.3 graphically depicts the relationship between annual percentage changes in Relative New Car Prices and the New Passenger Car Market from 1995 to 2005.

Figure 4.3 New passenger car market versus annual percentage changes in relative new car prices



Source: Response Group Trendline (2010)

When first viewing the figure it would appear that the rate at which relative new passenger car prices change has an identifiable influence on the new passenger car market. A slowdown from one year to the next in the rate of price increases in relative prices yielded growth in the new passenger car market. This effect was observed between 1994 (although 1994 is not presented in the graph above) and 1996, when a mini boom was experienced in the new passenger car market, within the three-year period the new passenger car market increased by 27.2 percent or by 9.0 percent per annum on average. Within the same three year period, relative new car prices increased at a decreasing rate of 3.79 percent (annual average). The greatest effect was identified in 1995 where the new passenger car market grew by 23.23 percent and relative new car prices decreased by an annual rate of 3.31 percent.

The same effect of growth in the new passenger car market after decreasing relative new car prices was experienced during the years 2000 and 2001, where the new passenger car market grew by 25.02 percent or at an annual average of 12.51 percent. Within the same two year period relative new car prices decreased rate of 2.54 percent (annual average).

The inverse was also identified, where an accelerated rate of price increases from one year to the next resulted in a decrease in the new passenger car market. The three year period between 1997, 1998 and 1999 saw the new passenger car market decrease by 4.04, 14.99 and 7.09 percent respectively. During the same three year period, relative new car prices increased by 3.06, 3.68 and 4.72 percent respectively at an average of 3.82 percent. Therefore confirming the traditional demand theory discussed in Chapter 3, that is increases in price result in decreasing demand.

Perhaps the most profound representation of this is the last period depicted in the graph above, 2003-2005. This period was characterised by a significant fall of 22 percentage in the increase of new passenger car prices in 2003. This initiated the boom that was to follow. In 2004 and 2005 saw the sales of new passenger cars increased by 22% and 25% respectively. This was against the backdrop of stable prices.

The next step in analysing the relationship between the annual relative price change in new cars and the new passenger car market using regression analysis, to establish a statistical relationship between the two variables. Table 4.1 presents a regression analysis between annual percentage changes in the relative price of new cars and the new passenger car market.

Table 4.1 Regression analysis: New passenger car markets versus annual percentage change in relative new car prices

<i>Regression Statistics</i>	
Multiple R	0.602233057
R Square	0.362684656
Adjusted R Square	0.283020237
Standard Error	18962.87087
Observations	10

<i>ANOVA</i>					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1637091560	1637091560	4.552655557	0.065415505
Residual	8	2876723774	359590471.8		
Total	9	4513815334			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	232794.8596	6940.257621	33.54268275	6.8133E-10	216790.5969	248799.1224	216790.5969	248799.1224
Annual % Change in Relative New Car Prices	3736.922111	1751.385093	2.133695282	0.065415505	-7775.623376	301.7791535	-7775.623376	301.7791535

4.7.1 Regression analysis results: New passenger car market versus annual percentage change in relative new car prices

$H_0: B_1 = 0$ (null hypothesis – no relationship exists)

$H_1: B_1 \neq 0$

t = test

Computed value = 33.54; critical value = -2.13, assume 0.05 level of significance.

Rejection region: Reject H_0 if computed value 33.54 exceeds the critical value of -2.13. Fail to reject if otherwise (Bails & Peppers, 1982:154).

Therefore, reject the null hypotheses, H_0 , that changes in new passenger car prices have no influence on the new passenger car market.

Testing for overall significance.

$H_0: B_1$ (null hypothesis = no relationship exists)

H_0 : Not all slope coefficients are simultaneously zero

$$F = \frac{ESS / df}{RSS / df}$$
$$= 4.55265$$

Critical value = 0,0654155, assume 0.05 level of significance.

Rejection region: If computed F-value exceeds F-critical value then reject H_0 . Do not reject if otherwise ($4.5265 > 0.06541$) (Bails & Peppers, 1982:154).

Therefore, reject the null hypothesis H_0 , that new passenger car prices do not have an influence on the new passenger car market. Based on the above results it can be assumed that changes in the price of new passenger cars have an influence on the new passenger car market.

To gain better insight as to how changes in the price of new passenger cars affect the new passenger car market, the price elasticity of demand for new passenger cars will be determined for the period examined in this thesis.

Price elasticity of demand is a ratio representing the percentage change in quantity demanded resulting from each 1% change in the price of a good. This number is used to gauge the sensitivity of quantity demanded of a good (new passenger cars in this case) to percentage changes in the price of that good. Price elasticity of demand is a measure of the responsiveness of quantity demanded to price changes (Hyman, 1989:118).

Price elasticity of demand for new passenger cars is calculated as follows:

$$\text{Price elasticity of demand for new passenger cars} = \left[\frac{\text{Annual percentage change in the New Passenger Car Market}}{\text{Annual percentage change in Relative New Passenger Car Prices}} \right]$$

The annual percentage of the new passenger car market reflects the percentage change in the new passenger car market per annum, and is calculated as follows:

$$\text{Percentage change in the new passenger car market} = \left[\left[\frac{\text{Current New Passenger Car Market}}{\text{Previous year New Passenger Car Market}} \right] - 1 \right] \times 100$$

However, for the purpose of the study Microsoft Excel will be used to calculate the price elasticity of demand for new passenger cars, by regressing the log of the new passenger car market against the log of real new car prices (Bails & Peppers, 1982:154). Therefore, the equation will be as follows:

$$\text{Log } Y = b_1 + b_2 \log x$$

Therefore: $\log (\text{real new car price}) = b_1 + b_2 (\text{new passenger car market})$

The coefficient of the real new car price (b_2) is the average elasticity for the period (Bails & Peppers, 1982:198). The standard elasticity classification (Nicholson, 2002:177) is used, i.e.

eq < -1 : Elastic

eq = -1 : Unit elastic

eq > -1 : Inelastic

Because consumer reactions are reflected in the quantity demanded, the change in quantity demanded is the dependent variable. By contrast, the

change in price is the dependent variable because it causes the change in quantity demanded.

Table 4.2 displays the statistical relationship between the log of real new car prices and the log of the new passenger car market, in the form of a regression analysis.

Table 4.2 Regression analysis: Log of new passenger car market versus log of real new car price

<i>Regression Statistics</i>								
Multiple R	0.590686801							
R Square	0.348910897							
Adjusted R Square	0.267524759							
Standard Error	0.088176207							
Observations	10							

<i>ANOVA</i>					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.033332426	0.033332426	4.287104734	0.07216934
Residual	8	0.062200348	0.007775043		
Total	9	0.095532773			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	20.2263232	3.818260891	5.297260658	0.000730802	11.42139781	29.0312486	11.42139781	29.0312486
Log of Real New Car Prices	1.709561849	0.8256629	-2.07053248	0.07216934	-3.61354391	0.194420211	-3.61354391	0.194420211

The regression analysis calculates the coefficient at -1,709. Therefore, demand for new passenger cars during the analysed ten year period was price elastic. Based on the results of the regression analysis, a 1 percent decline in relative price led to a 1.709 percent rise in the new passenger car market. Therefore, a falling rate of growth in price leads to growth in the new passenger car market; this was identified in Figure 43.

It also appears that the price elasticity of demand for new passenger cars becomes more elastic during the downturn phases of the new passenger car market and more inelastic during the upturn phases of the new passenger car market.

The probable reason that price elasticity of demand for passenger cars fluctuates lies in the impact on demand changes in real personal disposable income, perceived wealth, confidence and expectation, etc. (Bruton, 1985:260).

Watson (1972:50) identifies three major causes of such fluctuations in the price elasticity of demand, the number and closeness of substitutes for a product; the importance of the product in the buyer's budget; and the number of uses of the product.

4.7.2 Close substitutes

Of the three determinants of elasticity, the substitutes for a commodity are the most important. If a commodity has many substitutes, its demand will probably be elastic. The closeness of the substitutes also affects elasticity. The closer the substitute, the more elastic the demand for the product will be. If a commodity has perfect substitutes then its elasticity of demand will be perfect, or infinite (Watson, 1972:51).

There are two viable substitutes for a new passenger car. One is a used motor passenger car so changes in the availability and price of used cars will have an impact in the price elasticity of new cars and the other is urban transport. In South Africa urban transport is, however, not a close substitute for a new car due to such factors as the underdevelopment of the urban transport infrastructure, inconvenience, social standing, etc. Perhaps a topic for future

research would be to analyse the effects of the South African Gautrain (SA's new public transport project, currently under construction) and the Bus Rapid Transport System (BRT) on the patterns of demand for new passenger cars.

4.7.3 Budget considerations

The importance of a commodity in a consumer budget also influences its elasticity (Watson, 1972:51). Here "importance" refers to the fraction of total expenditure devoted to a single commodity. The demand for low priced items is normally inelastic and vice versa for expensive items such as motor cars. A logical assumption would therefore be that a wealthy person's demand for motor cars is less elastic than a less wealthy person.

Similarly, it is logically consistent to assume that countries with higher incomes per capita experience less price elasticity of demand for motor vehicles than poorer countries. This of course assumes that motor vehicles, in whatever country, are, on average, a relatively expensive item to purchase. This assumption is acceptable when considering the complexity of and technology involved in the construction of a motor car.

4.7.4 Number of uses

The smaller the number of uses a product has the more price inelastic its demand is likely to be. If the price of a commodity is very high, consumers will put the few units they buy to the most important use of the commodity.

At successively lower prices, more of the commodity is bought to be devoted to the less important uses (Watson, 1972:51). The application of this argument to passenger cars in general and not to differences between types of cars, however, must conclude that the demand for passenger cars should be relatively inelastic. This is based on the argument that cars are, by virtue of their construction, complexity, etc, relatively expensive items.

A conclusion must therefore be reached that over the examined period the price elasticity of demand for new passenger cars was relatively price inelastic.

4.8 POPULATION GROWTH AND PERSONAL DISPOSABLE INCOME

It is obvious that the more people there are to buy passenger cars, the more passenger cars will be sold. However, it is worthless to the motor industry to have a huge potential market whose disposable income is so low that they are unable to purchase passenger cars (Bruton, 1981:59).

This section will firstly discuss the significance of population growth to new passenger car demand and how it ties in with personal disposable income. The section will then seek to determine and explain the statistical and graphical relationship between the new passenger car market and personal disposable income.

The population of an area is the total number of all individuals alive in that area at a particular point in time. Population growth can be expressed as the rate at which population grows (Frijka, 1973:1).

Marks and Brown (1981:575-582) recognised that the size and growth rate of a country's human population affects the size and rate of growth of the country's motor vehicle population.

Chow (Harberger, 1967:149) explained why a certain number of motor vehicles are required for use at any one time in an economy. A salient feature of the demand for consumer durables in general, and for cars in particular, is that annual purchase is only part of the total stock of cars available for the satisfaction of wants, purchase is made primarily to fill the gap between the quantity of total stock desired and quantity of old stock remaining from the preceding period.

In other words, a passenger car provides a certain amount of utility to the user. The user desires a certain level of utility to adequately meet his need; therefore, he desires a certain stock of vehicles. Desired stock is that level of ownership which actual ownership will approach in the course of time, given that the determining variables remain unchanged. The determining variables are shown to be the relative price of vehicles and the level of personal disposable income

or alternatively, expected income, per capita. This analogy explains the fundamental relationship that exists between the economy, the population, the level of vehicle demand and the volume of purchase in any one year. Should the economy grow faster than the population and relative vehicle prices remain unchanged, personal disposable income per capita will increase and thereby affect desired stocks of motor vehicles positively (Bruton, 1985:185).

Should the population grow faster than the economy, relative prices remain unchanged, personal disposable income will decline and thereby affect desired stocks of motor vehicles negatively (Bruton, 1985:185).

Disposable income is the amount of an individual's total income left after taxes, plus any transfer payments (growth) received from the government or elsewhere. This income is available to be 'disposed of' as either spending or saving (Wikipedia, 2009). The calculation of disposable income is as follows:

$$Y_d = Y - T = (1 - t)Y$$

The components of the equation are:

- Consumption spending (C)
- Investment spending (I)
- Government purchases (G)
- Net exports, the balance item (NX)
- Average tax rate (t)
- Net taxes (T)

Before calculating the disposable income, the first four components add up to national income:

$$C + I + G + NX = Y$$

It is assumed that the net taxes are equal to the constant average tax rate t multiplied by national income:

$$T = t \times Y$$

The amount left after households pay their taxes is their disposable income:

$$Y_d = Y - T = (1-t)Y$$

However, due to its history, the South African economy is relatively segmented. Without diverting from the topic at hand, it is worth noting that when comparing total South African disposable income per capita and cars per 1000 of population, the country rates very low on the international scale. Car ownership by whites is however, far more comparable to other western countries. This statement by Bruton (1985:206) which is still relevant at the time of writing this study ties in with the opening paragraph in this section, “as much as the population may increase it is worthless to the motor industry if personal disposable income is low”. However with changes in the political landscape of the country after 1994, the economy has been more inclusive, resulting in an increase in car demand and ownership levels among non-whites.

The size of net or disposable income is a key determinant of passenger car demand over the long term (OECD, 1983:16).

However, household passenger car demand is to a large degree determined by the household's permanent or expected income and is unaffected by transitory/windfall income changes. Demand for vehicles is very income elastic and South Africa faces a different set of opportunities and constraints resulting from its low average per capita income and the prospects of redistribution.

A durable asset like a passenger car, which is often relatively expensive in terms of the family budget, is highly sensitive to forces bearing on incomes, especially real incomes, and the distribution of incomes within a community like South Africa.

The buyers of motor vehicles can be divided into private households and business households. Private households, in turn, can be divided into low, medium and high-income households. The high-income households should normally experience no problems in buying motor vehicles because of their relative wealth position, ready access to financial means, and ability to meet the commitments resulting from access to such means. The number of persons falling in this class is, however, of a rather limited nature in South Africa.

The motor purchasing habits of the middle-income class are more directly influenced by budgetary constraints than that of the higher income classes. The

purchasing of a passenger car (or replacement of an existing vehicle) is thus of a more planned nature, taking account of the means of finance, commitments flowing there from, the price of a trade-in, the price of the vehicle, maintenance thereof and the life expectancy of the vehicle.

The motoring purchasing habits of the lower-income classes (especially Non-Whites in the period analysed), centre largely around used vehicles. This is a result of the general wealth position of these classes, the flow of income (both magnitude and regularity) and also the lesser use of such a vehicle.

The advent of the so-called company car and of leasing facilities during the last decade or two has introduced a relatively new variable into passenger car ownership. Its effect on the total number of cars in South Africa is not easy to determine and is probably not substantial, although it could result in personal expenses on motoring being less than it would have been had such facilities not been available.

To measure changes in the purchasing power of income over time it is necessary to adjust nominal income for changes in the price level. Nominal income is the actual number of Rands of income received over a year. Real income is the purchasing power of nominal income. Real income is obtained by deflating nominal income by the CPI to adjust for rises in the price level since the base year.

Hyman (1989:389) calculated Real Disposable Income as follows:

$$\text{Real Disposable Income} = \left[\frac{\text{Nominal Income}}{(\text{Current CPI}/100) \text{ Income}} \right]$$

Real disposable income measures income relative the base year (in this case 1995) Rands rather than current year rand. According to the theory of demand and the theory of demand for durable goods, as real disposable income increases so does the demand for durable goods. The regression analysis performed determined the relationship between the new passenger market and real disposable income with a base year of 1995.

Table 4.3 Regression analysis: New passenger car market versus real disposable income of households

<i>Regression Statistics</i>							
Multiple R	0.387526899						
R Square	0.150177098						
Adjusted R Square	0.043949235						
Standard Error	21897.3276						
Observations	10						

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	677871686	677871686	1.413726057	0.268531277
Residual	8	3835943648	479492956		
Total	9	4513815334			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	128727.7208	81549.19501	1.578528406	0.153097172	-59325.05993	316780.5016	-	316780.5016
Disp Income of Households (Real)	0.180254558	0.151601543	1.189002127	0.268531277	-0.169339228	0.529848343	-	0.529848343

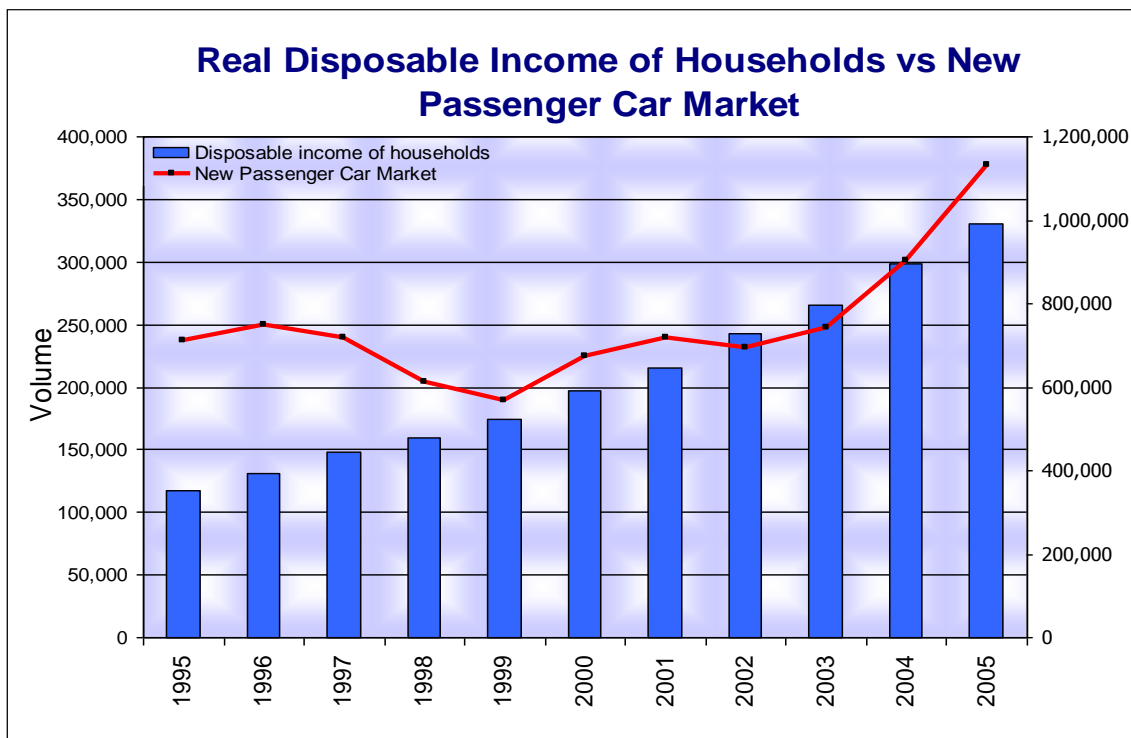
4.8.1 Regression analysis results: New passenger car market versus real disposable income of households

Rejection region: f computed F-value¹ (413726) exceeds F-critical value (0.268531) then reject H_0 . Do not reject if otherwise (Bails & Peppers 1982:154).

Therefore, reject the null hypothesis H_0 , that the real disposable income of households has no influence on the new passenger car market. There is enough evidence to suggest that the real disposable income of households has an influence on the performance of the new passenger car market.

Because there are other market drivers that determine and influence the new passenger car market, the results of the above regression analysis do not take into account how changes in real disposable income affect or result in changes in the new passenger car market. A graphical comparison of the two variables (see Figure 4.4) presents a sharp 20.5 percent decrease in the new passenger car market, between 1996 and 1999, while real disposable income increased by 9.6 percent at an average of 2.4 percent per annum over the same period.

Figure 4.4 Real disposable income of households versus new passenger car market



Sources: NAAMSA (2010), SARB (2009)

It is worth noting that it was during this period that the South African currency, the “Rand” began to depreciate against the major currencies in the world. By the middle of 1998, the rand had depreciated by well over 20 percent. The period between 2001 and 2002 was the only other period where the new passenger car market decreased as the real disposable income of households increased. In the two periods examined above, the graph seems to indicate that a relationship exists between the two, the new car market increases at a decreasing rate as real disposable income increases.

However, the above results are still inconclusive, thus a comparison between the percentage change in real disposable income and the percentage change in the new passenger car market will be undertaken to determine whether or not changes in the real disposable income of households have an influence on the changes in the new passenger car market. The annual percentage change in the new

passenger car market reflects the percentage at which the new passenger car market changes per annum, and is calculated as follows:

$$\text{Percentage change in the New Passenger Car Market} = \left[\left[\frac{\text{Current New Passenger Car Market}}{\text{Previous year New Passenger Car Market}} \right] - 1 \right] \times 100$$

The annual percentage change in the real disposable income of households reflects the percentage at which the real disposable income of households changes per annum and is calculated as follows:

$$\text{Percentage change in Real Disposable Income of Households} = \left[\left[\frac{\text{Current Real Disposable Income of Households}}{\text{Previous year Real Disposable Income of Households}} \right] - 1 \right] \times 100$$

A comparison of the two variables was done in two ways; firstly, the study determined the graphical relationship between the two, and secondly the study will measure the income elasticity of demand of the percentage changes in real disposable income against the percentage change in the new passenger car market. Income elasticity of demand for new passenger cars was calculated in the same manner in which the price elasticity of demand was calculated in Section 4.7.1, by using Microsoft Excel to regress the log of the new passenger car market against the log of real disposable income.

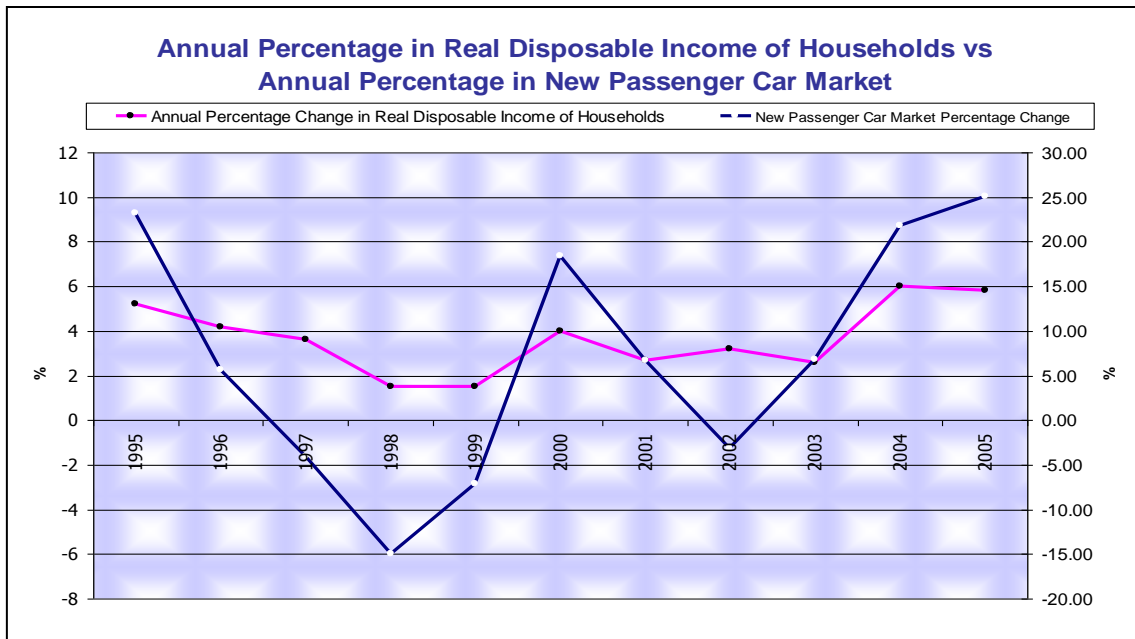
Income elasticity of demand is a number that measures the sensitivity of consumer purchases to each 1% change in income (Hyman, 1989:131). It is calculated as follows:

$$\text{Income Elasticity of Demand} = \left[\frac{\text{Percentage change in New Passenger Car Market}}{\text{Percentage change in Real Disposable Income}} \right]$$

The income elasticity of demand for a good may be positive or negative. A positive income elasticity implies that increases in income (*ceteris paribus*) are associated with increases in the quantity of a good purchased (new passenger cars in this case). A negative income elasticity of demand implies an inverse relationship between income and new passenger cars purchased (Hyman, 1989:31). Figure 4.5 presents the annual percentage change in the real

disposal income of households and the annual percentage change in the new passenger car market during the period 1995-2005.

Figure 4.5 Annual percentage in real disposable income of households versus annual percentage change in new passenger car market (1995-2005)



Sources: NAAMSA (2010), SARB (2009)

When examining a visual relationship between the two graphs above it becomes clear to the observer that changes in the annual real disposable income of households closely correlate with percentage changes in the new passenger car market.

The calculation of the income elasticity of demand should give a clear indication of how changes in the real disposable income of households influence changes in the new passenger car market. Table 4.4 presents a regression analysis to determine the income elasticity of demand, thereby identifying the relationship between changes in disposable income and changes in the new passenger car market. The coefficient (b_2) will be used as the average elasticity for the period analysed.

Table 4.4 Regression analysis: Log of real disposable income of households versus log of new passenger car market

<i>Regression Statistics</i>	
Multiple R	0.391638666
R Square	0.153380844
Adjusted R Square	0.04755345
Standard Error	0.100548419
Observations	10

<i>ANOVA</i>					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.014652897	0.014652897	1.449349151	0.263042071
Residual	8	0.080879876	0.010109984		
Total	9	0.095532773			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	6.424238646	4.897947879	1.311618418	0.226037025	-4.870449407	17.7189267	-4.870449407	17.7189267
Log of Disp Inc of Households	0.447101672	0.371381088	1.203889177	0.263042071	-0.409304651	1.303507995	-0.409304651	1.303507995

Based on the regression results in Table 4.4, the income elasticity of demand for new passenger cars was calculated at 0.4471 therefore the income elasticity of demand for new passenger cars appears to be inelastic, i.e. lower than one.

However, the coefficient for income elasticity of demand for new passenger cars is positive. As discussed before this means that a change in real disposable income (*ceteris paribus*) is associated with a change in the new passenger car market in the same direction. Thus, a 1% increase in income will result in a 0.4471% increase in the new passenger car market. This proves that the graphical illustration was correct, and therefore, changes in real disposable income had an influence in the changes of the new passenger car market during the period analysed.

4.9 THE RATE OF INTEREST

This section examines how interest rates affect the new passenger car market. It will make use of the annual average prime rate, which is the interest rate a bank charges its most creditworthy customers.

An increase in the bank rate results in an increase of various proportions, in all rates of interest in the economy, thus making overdraft credit and hire purchase credit more expensive and therefore reducing the quantity of credit demanded. The result is that the rate of credit expansion decreases along with the rate of money creation in the economy and consequently the level of aggregate demand in the economy is suppressed (Bruton, 1981:65).

In order to fully understand the effect changes in interest rates have on the economy and thus the motor industry it is important to understand how the interest rate (annual average prime rate) to be used is calculated. An important distinction to be made is the distinction between the nominal interest rate and real interest rates.

Real interest rate is the difference between the nominal interest rates and the inflation rate (Mohr & Fourie, 2005:350). The interest that the bank pays is called the nominal interest rate, and the interest rate corrected for inflation is

called the real interest. The relationship among the nominal interest rate, the real interest rate and inflation can be written as follows:

$$\text{Real interest rate} = \text{Nominal interest rate} - \text{Inflation rate}$$

Nominal interest rate tells how fast the number of Rands of an individual rises over time. The real interest rate indicates how fast the purchasing power of an individual's bank account raised over time.

If the nominal interest is lower than the inflation rate, then the real interest rate is negative. In such a case an individual who is a lender is prejudiced in two ways by inflation: the real value of his wealth declines and the interest income he receives is also not sufficient to compensate him. However, if the real interest rate is significantly positive, the redistribution of income (interest) falls away and only wealth is redistributed (Mohr & Fourie, 2004:541).

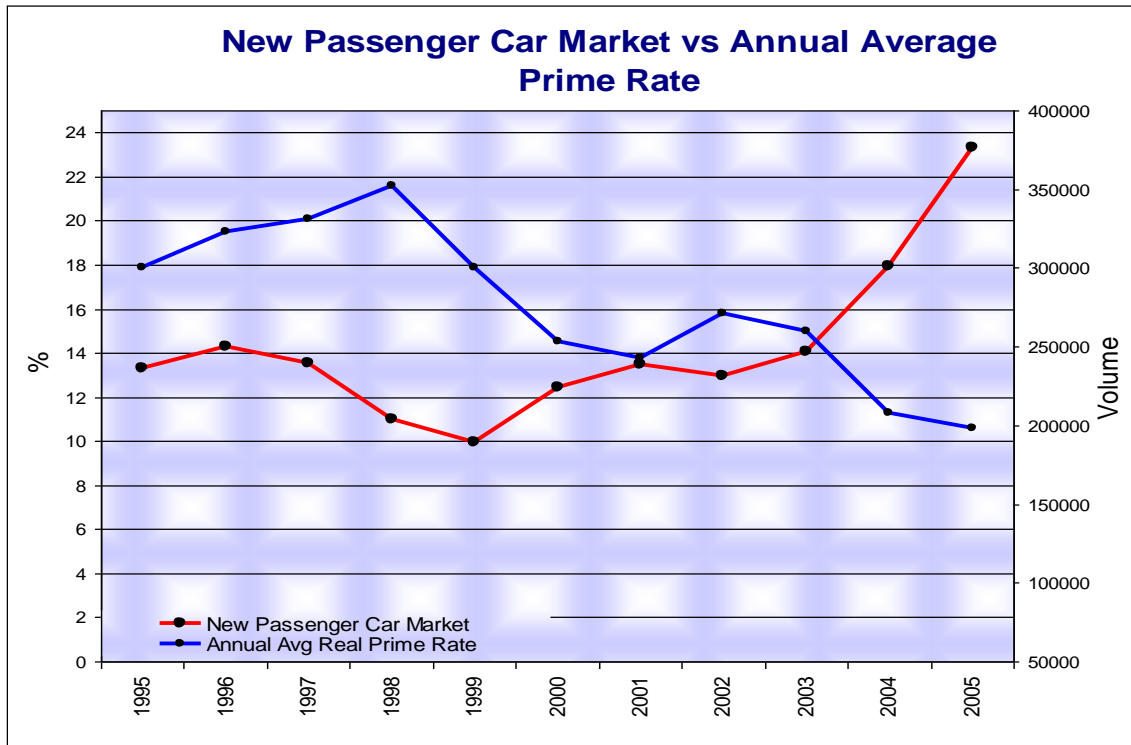
These high interest rates are seen as a disadvantage to the motor industry. Firstly, industry participants argue that high interest rates place producers/assemblers at a significant disadvantage against overseas competitors in making investments in plant and equipment. Some argue that high interest rates maintain a country's currency at artificially high levels thus making it more difficult for the industry to compete (Cole, 1990:48). During the periods of adverse conditions a portion of the costs is carried by the consumer.

In a broader context then interest rates affect demand for motor vehicles in that a high rate of interest makes it more expensive to buy a vehicle on credit. High interest rates also have the effect of stifling the economy in general and create a psychological climate not conducive to high levels of consumer spending (Bruton, 1981:65).

However, this section intends to demonstrate that the new passenger car reaction to changes in interest rates is not immediate, a lag exist from the time the change in interest occurs to the time that the new passenger car market reacts. The study will thus try to determine the time lag it takes the South African new passenger car market to react changes in interest rates.

Figure 4.6 presents the new passenger car market and the annual average prime rate.

Figure 4.6 New passenger car market versus annual average prime rate



Sources: NAAMSA (2010), SARB (2009)

Figure 4.6 indicates that during the ten year period analysed, interest rates did have an influence on the new passenger car market. For instance, between 1995 and 1998 the new passenger car market had shrunk by 13%, in 1995 average interest rates were 17.9% by 1998, the average interest rates were 21.6%; an average increase of 4 percent. The inverse effect was identified between 1997 and 2003, where interest rates fell from 17.9% in 1999 to 15% in 2003, yet the new passenger car market rose by a cumulative 31% during the same period.

It is important to note that during the course of the period analysed the South African Reserve Bank (SARB) had introduced an inflation targeting policy (2000), using interest as a tool to control inflation and keep it within a 3 – 6 percentage range. In lieu of this stimulus, annual average interest rates

decreased from 15% in 2003 to 10.6% in 2005, all things equal this could have resulted in a 52% total increase in passenger car sales during the same period.

Table 4.5 below, presents the regression analysis between the annual average prime rate and the new passenger car market.

Table 4.5: Regression analysis: New passenger car market versus annual average prime rate

<i>Regression Statistics</i>	
Multiple R	0.10444997
R Square	0.010909796
Adjusted R Square	-0.112726479
Standard Error	23623.5331
Observations	10

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	49244805.56	49244805.56	0.088241062	0.773992133
Residual	8	4464570529	558071316.1		
Total	9	4513815334			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>T Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	240723.4709	52323.82908	4.600647069	0.001753968	120064.5048	361382.437	120064.5048	361382.437
Annual Avg Prime Rate	-894.5953253	3011.558206	-0.297053971	0.773992133	-7839.260997	6050.070346	-7839.260997	6050.070346

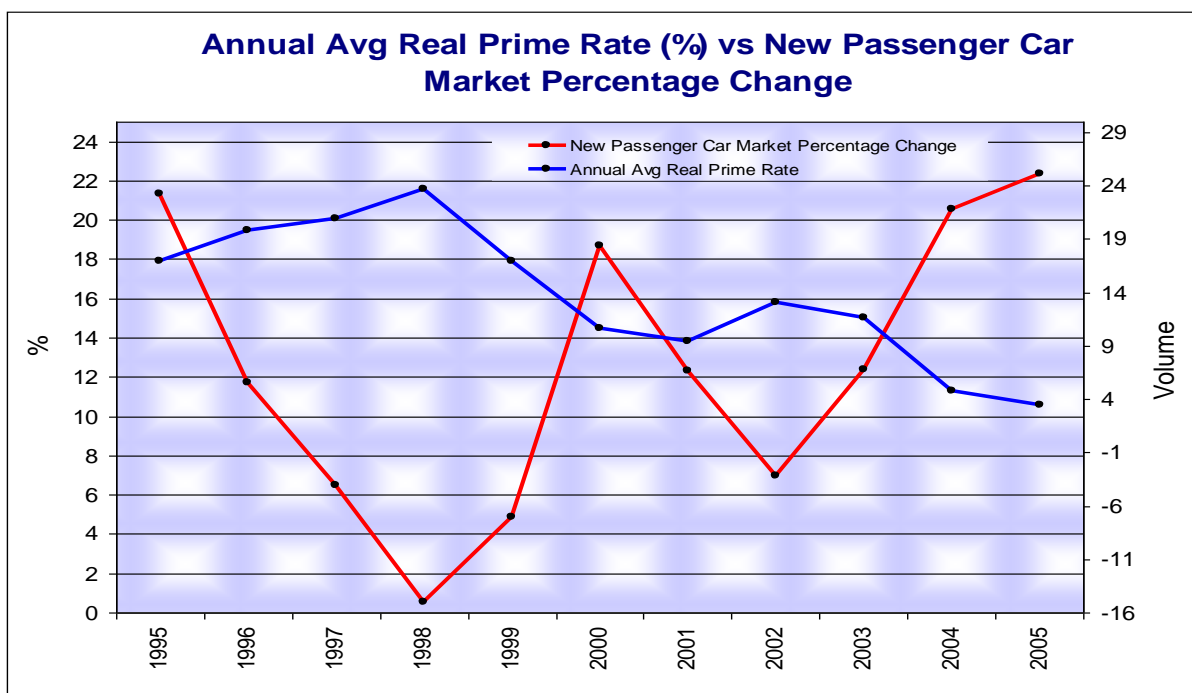
4.9.1 Regression analysis results: New passenger car market versus annual average prime rate

Bails and Peppers' (1984:154) rejection region: If the computed F-value (0.0882) exceeds the F-critical value (0.7739) then reject H_0 . Do not reject if otherwise.

Therefore, do not reject the null hypothesis H_0 that there is no statistical relationship between interest rates and the new passenger car market.

Table 4.5 fails to establish how changes in interest rates affect the changes in the new passenger car market. Figure 4.7 below presents the annual average prime rate and the annual percentage change in the new passenger car market.

Figure 4.7 Annual average prime rate versus annual percentage change in new passenger car market



Sources: NAAMSA, 2010, SARB, 2009

The graphical illustration of the two variables confirms the inverse relationship between changes in rate of interest and changes in the new passenger cars market during the period analysed, i.e., an increase in interest rates results in a decrease in demand for durable goods (*ceteris paribus*) (Hyman, 1989:607),

hence in Figure 4.6 an increase in the average prime rate is followed by a decrease in the new passenger car market throughout the ten year period analysed.

The regression analysis below (Table 4.6) statistically confirms the graphical relationship between the annual average prime rate and the annual percentage change in the new passenger car market.

Table 4.6 Regression analysis: Annual average prime rate versus annual percentage change in new passenger car market

<i>Regression Statistics</i>	
Multiple R	0.425024
R Square	0.180645401
Adjusted R Square	0.078226076
Standard Error	11.14140386
Observations	10

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	218.9398587	218.9398587	1.763782378	0.220792233
Residual	8	993.0470396	124.13088		
Total	9	1211.986898			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	34.58722596	24.67712635	1.401590504	0.198620981	-22.31832941	91.49278132	-22.31832941	91.49278132
Annual Interest Rate	Avg 1.886291587	- 1.42032041	-1.328074689	0.220792233	-5.161556323	1.38897315	-5.161556323	1.38897315

4.9.2 Regression analysis results: Annual average prime rate versus annual percentage change in new passenger car market

Bails and Peppers' (1982:154) rejection region: If the computed F value (1.763) exceeds the critical value (0.220) then reject H_0 . Do not reject if otherwise.

Therefore, reject the null hypothesis H_0 that there is no statistical relationship between interest rates and the new passenger car market.

The above result proves that changes in interest rates had a statistically relevant influence on the growth rate of the new passenger car market during the analysed period. Through their effect on income changes and the economy interest rates have an influence on changes in the new passenger car market. Therefore, even though the new passenger car market grew by 30 percent between 1994 and 1996, the increase in interest rates in that period resulted in a declining growth rate in the new passenger car market. It is also noted that changes in interest rates typically have a lag effect before filtering through and influencing the new passenger car market.

4.10 GROSS DOMESTIC PRODUCT

Real Gross Domestic Product (GDP) is the most frequently used measure of economic performance. Real GDP is calculated by adding up the value of all final goods and services produced in the economy during a specific period of time. Due to the fact that it measures the rate at which goods and services are produced, real GDP is a flow variable, it is usually expressed as an annual amount; the difference between real GDP in the third quarter and real GDP in the fourth quarter is only one-quarter of the reported annual growth rate (De Long, 2002:49).

“Real” means that this measure corrects changes in the overall level of prices. For example, if total spending doubles because the average level of prices doubles but the total flow of commodities does not change, then real GDP does not change. Economic variables are either real – that is, they have been

adjusted for changes in the price level – or nominal – that is, they have not been adjusted for changes in the price level (De Long, 2002:12).

The GDP can be estimated/calculated in three ways: according to the production approach, income approach and the expenditure approach. It is important to realise at this stage that regardless of the approach being used, all three methods are briefly explained below:

The production approach is the summation of the various stages of production: Primary, Secondary and Tertiary sector (Haydam, 2002:86).

The second method is very closely related to the production approach, the income approach is basically the other side of the coin to the production approach. The cost business incurs in producing goods and services are paid to the factors of production by way of wages, rent, interest and profit. These factors of production are seen from the point of view of the business as costs and from the receiving end as income. In actual fact, they are the same thing (Haydam, 2002:86).

The question is: How is GDP different when using the income approach?

The answer is that each of the factors' income is added individually to each of the production stages (Haydam, 2002:88).

Lastly, the expenditure method, adds up the value of all transactions once they have reached their final destination (Haydam, 2002:88).

The study will therefore make use of the annual GDP growth rate "GDP Growth" as calculated by the South African Reserve Bank. Thus, Section 4.10 will determine statistically and graphically if GDP growth has an influence on the overall performance of the new passenger car market.

Bruton (1981:59) identified that it is logical that as the value of goods and services produced in an economy grows, so the economy of the country expands and becomes more active. As this happens shortages of labour develop, and salaries and wages begin increasing. The real increase in salaries and wages raise the level of aggregate demand, thus motor vehicle sales. Similarly, as the economy expands, firms require more vehicles to

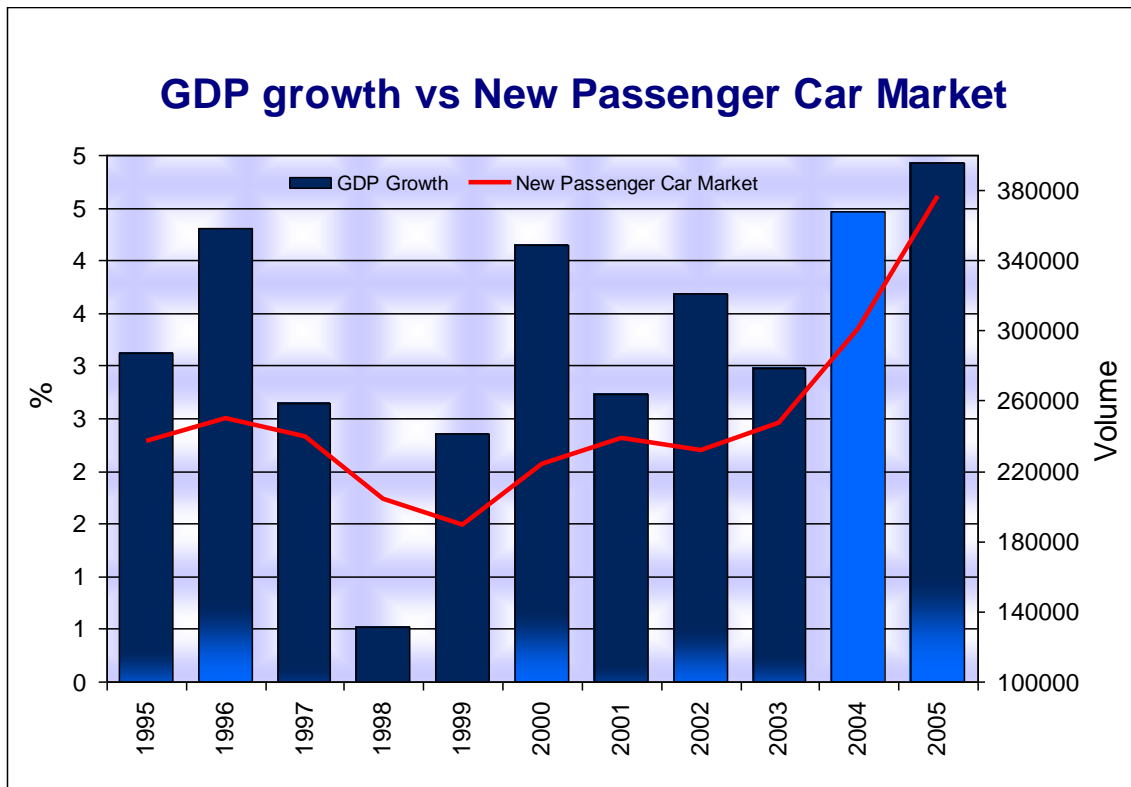
undertake for example construction as a result of a higher level of investments, or to meet more deliveries initiated by higher sales volumes or to provide transport for the extra employees firms may hire. This last statement is especially true in today's world of commerce and industry where a company, or at least a lease car, is becoming almost as much a part of a job package as three weeks holiday a year. This is particularly true of managerial positions offered.

For example, transportation accounted for 50% of Germany's GDP growth from 1950 to 1990, while the motor industry represents about 10% of manufacturing output and 20% of manufacturing sector R&D today (OSAT, 2001; Licht *et al.* 2004). For the world's leading vehicle manufacturers (e.g., Ford, GM, Toyota and VW), the emerging markets represent not only the biggest growth potential but also the greatest market risk since the market volatility is much higher than the developed markets where the vehicle is a necessity for most households.

Understandably, vehicle sales in emerging markets often collapse during economic and financial crises. But during economic booms, sales usually rise much sharper than GDP and overall consumer spending, generating big employment, revenue and profit gains. Consequently, it is essential to understand not only the long-term market growth potential but also new passenger car demand's response to cyclical fluctuations in GDP growth.

From the above it would appear that the general level of economic activity as measured by GDP growth definitely influences the new passenger car market. Figure 4.8 graphically illustrates the relationship between GDP growth and the new passenger car market during the period 1995 to 2005.

Figure 4.8 GDP growth versus new passenger car market



Sources: NAAMSA (2010), SARB (2009)

From Figure 4.8 it appears that changes in the new passenger car market correlate closely with changes in GDP growth. Developments during the period 1995 to 2005, that are immediately noticeable, is the three-year period, 1997, 1998 and 1999, where the GDP growth was 2.6, 0.5 and 2.4 percent respectively. This effect was equally experienced during the period 2003, 2004 and 2005; where the GDP growth rate was 2.9, 4.5 and 5 percent respectively accompanied by a cumulative 52% percent increase in the new passenger car market during the three year period. During the same three-year period the new passenger car market fell in total 26.12 percent, experiencing its highest fall of 15 percent in 1998, where the GDP was at its lowest during the ten year period analysed. Now that a graphical relationship between the two variables has been analysed, the next step is to carry out a regression analysis to statistically test this relationship.

Table 4.7 Regression analysis: GDP growth versus new passenger car market

<i>Regression Statistics</i>	
Multiple R	0.413951098
R Square	0.171355512
Adjusted R Square	0.067774951
Standard Error	21622.75479
Observations	10

ANOVA					
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	773467136	773467136	1.654321138	0.234345268
Residual	8	3740348198	467543524.8		
Total	9	4513815334			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	199990.2762	20861.14981	9.58673314	1.16217E-05	151884.3785	248096.1739	151884.3785	248096.1739
GDP Growth	8622.25298	6703.642591	1.286204159	0.234345268	-6836.374543	24080.8805	-6836.374543	24080.8805

4.10.1 Regression analysis results: GDP growth versus new passenger car market

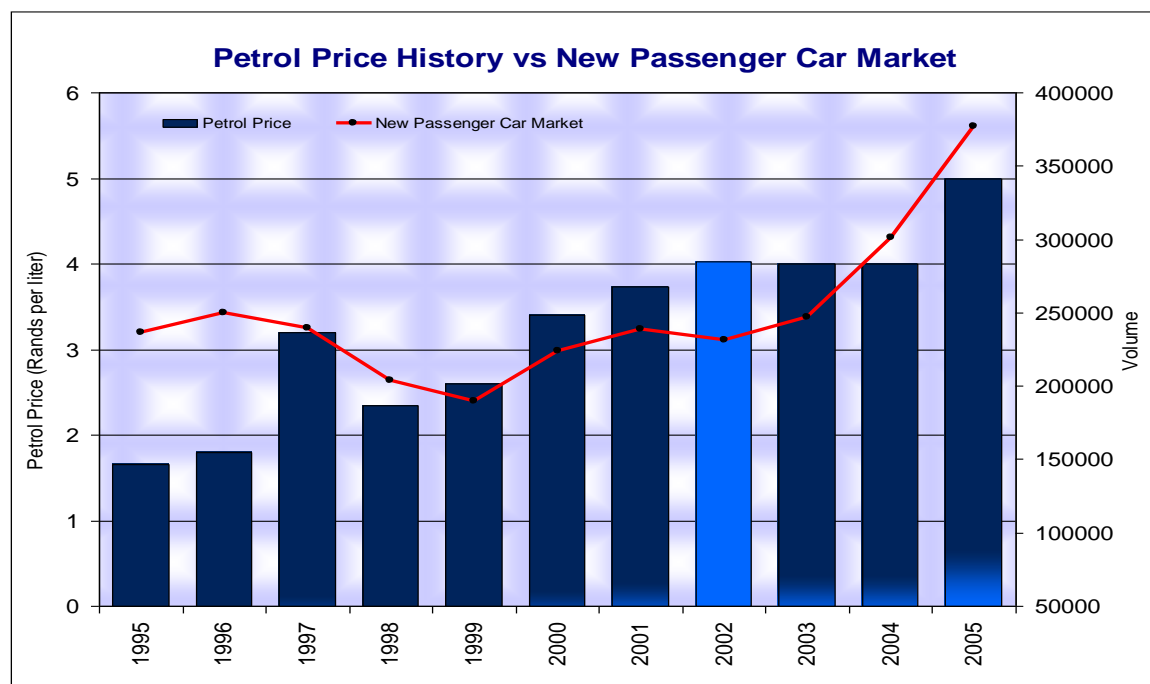
Bails and Peppers' (1984:154) rejection region: If computed F-value (1.654231) exceeds F-critical value (0.234345) then reject H_0 . Do not reject if otherwise. Therefore, reject the null hypothesis that GDP growth has no influence on the new passenger car market. There is enough evidence to suggest that GDP growth has an influence on the overall performance of the new passenger car market.

4.11 PETROL PRICES

This section examines the effect that changes in petrol prices had on the new passenger car market during the period 1995 to 2005.

Figure 4.9 is a graphical representation of the history of the South African petrol prices and the new passenger car market. The petrol price typically fluctuates from one quarter to the next therefore; the graphical depiction of the petrol price in Figure 4.9 reflects the annual average of the price of 93 octane petrol for the period 1995 to 2005.

Figure 4.9 Petrol price history versus new passenger car market



Sources: NAAMSA (2012), Response Group Trendline (2010)

When examining Figure 4.9 it is apparent that during the first two years of the period under investigation (1995 to 1995) increases in the price of petrol did not appear to have negative effects on the new passenger car market. However, between 1996 and 1999, the new passenger car market declined by 24,2 percent at an average of 8,82 percent per annum, while the petrol price increased by 32 percent; an average of 9 percent per annum. It is important to note that Figure 4.9 does not assume *ceteris paribus* conditions, therefore the sharp decrease in the new passenger car market during this period can not only result from increases in petrol price.

Therefore, it would appear that during this period the large increases in the price of petrol probably played a part in the 24 percent decline that occurred in the new passenger car market. The period after 1999 with the exception of the year 2002 is characterised by slow growth in the new passenger car market together with a continuously increasing petrol price. During the year 2000 the new passenger car market grew by 18.3 percent, the highest growth rate since 1995 (23.2%). In that same year petrol prices increased by 42 percent, the highest petrol price increase in the analysed period. This is understandable as real disposable income grew by 3.9 percent during the same year, therefore the increases in petrol prices were offset by increases in income. Table 4.8 presents a regression analysis between the petrol price and the new passenger car market.

Table 4.8 Regression analysis: New passenger car market versus petrol price

<i>Regression Statistics</i>	
Multiple R	0.342247699
R Square	0.117133487
Adjusted R Square	0.006775173
Standard Error	22318.98408
Observations	10

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	528718930.9	528718930.9	1.061392503	0.333035861
Residual	8	3985096403	498137050.4		
Total	9	4513815334			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	202454.1446	23308.10933	8.685996006	2.40413E-05	148705.5481	256202.741	148705.5481	256202.741
Petrol Price	8111.130759	7873.056983	1.030239052	0.333035861	-10044.17119	26266.4327	-10044.17119	26266.4327

4.11.1 Regression analysis results: New passenger car market versus petrol price

Bails and Peppers' (1982:154) rejection region: If the computed F value (1.0613) exceeds the F-critical value (0.333), then reject H_0 . Do not reject if otherwise.

Therefore, reject the null hypothesis H_0 that there is no statistical relationship between the petrol price and the new passenger car market in the analysed period.

An explanation to the above result is that increases in the price of petrol cause a decline in income, and as discussed in Section 6.3, changes in income influences changes in the new passenger car market.

The conclusion therefore, is that increases in the price of petrol only have a short-term effect on the new passenger car market. However, petrol price increases have a long term effect it is the effect that petrol price increases have on the structure of demand for new passenger cars, as reflected by the demand for small, medium and larger cars. Petrol price increases have an effect on the new passenger car market at different levels of income. Bruton (1985:280) found the area where petrol price increases have had the greatest effect is in the structure of demand for new passenger cars. As for the sectoral mix (i.e. small, medium and large categories) of the new car market, steady increases in petrol prices cause growth in the small car markets.

4.12 BUSINESS AND CONSUMER CONFIDENCE

The level of confidence present in an economy is possibly one of the most important factors determining the economic growth of a country. Without confidence in the future, entrepreneurs are hesitant to invest, and people would rather save money for precautionary motives, than spend it on a new passenger car or anything else that demands a substantial outlay of funds (Bruton, 1981:60).

In this section the effect of the level of business and consumer confidence on the economy on the new passenger car market is determined by making use of

business and consumer confidence indicators research by the Bureau for Economic Research (BER), Stellenbosch University.

4.12.1 Business confidence

The measurement of business confidence is important as it indicates the current and expected state of the economy. It is widely recognised that business people's subjective individual expectations play a key role in economic developments (Kershoff, 2000:2).

The BER derives its confidence index from the results of the quarterly business surveys. The business survey questionnaire contains, amongst others, current and expected developments regarding sales, orders, employment, inventories, selling prices and constraints. All of the above obviously have an impact on business confidence (Kershoff, 2000:2).

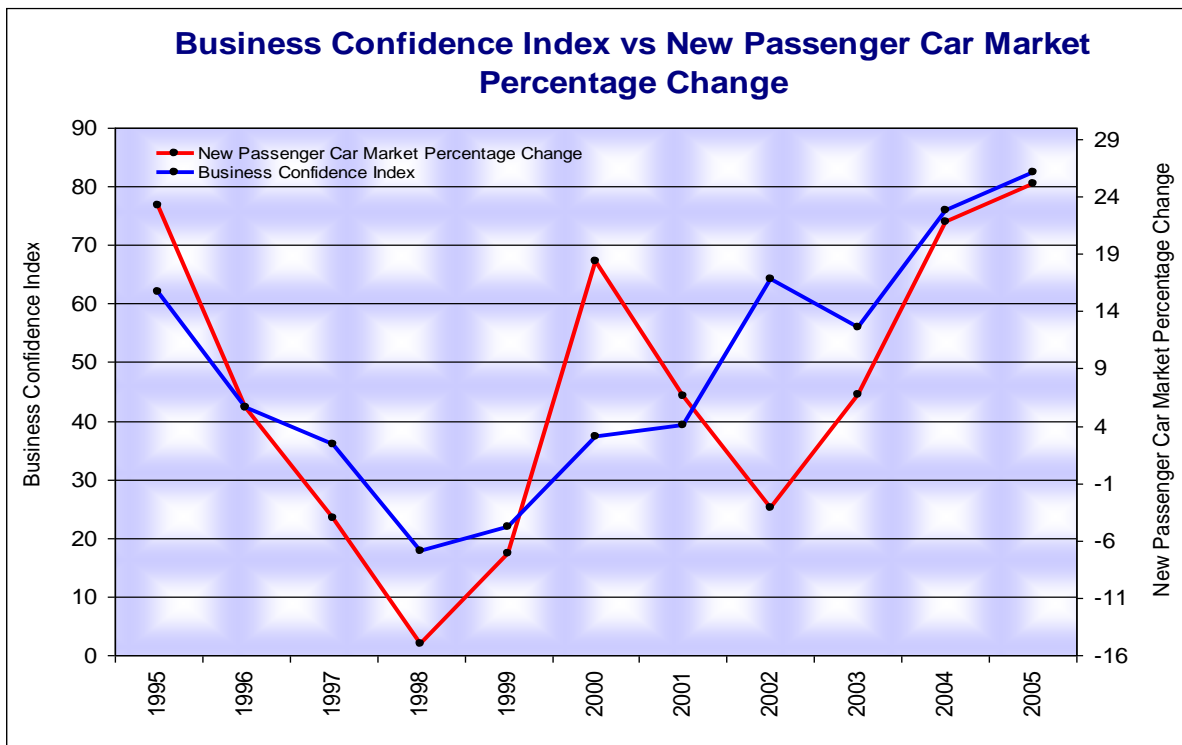
The BER takes the percentage gross of respondents that rated prevailing conditions as satisfactory as an indicator or proxy of business confidence Kershoff (2000:2). The composite business confidence index produced by the BER is the un-weighted mean of five sectorial indices, namely those of manufacturers, building contractors, retailers, wholesalers and new vehicle dealers.

4.12.1.1 Interpreting business confidence

The BER measures business confidence on a reading of 0 to 100, where 0 indicates an extreme lack of confidence, 50 neutrality and 100 extreme confidence. For example if the business confidence index amounts to 45 in a particular quarter, this indicates that 45% gross of the respondents rated prevailing business condition as satisfactory. Business confidence is therefore relatively low. Not only is the index below 50, but an index number of 45 indicates that 55% gross (i.e. 100 less 45) of respondents rate prevailing conditions as unsatisfactory (Kershoff, 2000:3).

The relationship between the business confidence index and the annual percentage change in the new passenger car market is illustrated in Figure 4.10 below.

Figure 4.10 Business confidence index versus annual percentage change in new passenger car market



Sources: NAAMSA (2010), Kershoff (2000)

There is a definite visual correlation between the two graphs during the period 1995 to 2000. Apart from the last three years of the period analysed, it appears that the business confidence index is a good indicator of the performance of the passenger car market. The period of falling business confidence between 1995 and 1998 reflects a period of uncertainty about the macro-environment within which South African companies operated, which probably contributed to the decline in the new passenger car market during this period. It is therefore no coincidence that the lowest index percentage of 18 percent in 1998 was accompanied by the largest fall of 14 percent in the new passenger car market during the period under investigation.

The regression analysis below statistically illustrates the relationship between the business confidence and the new passenger car market. For the sake of brevity, a regression analysis was not performed for consumer confidence.

Table 4.9 Regression analysis: Business confidence index versus annual percentage change in new passenger car market

<i>Regression Statistics</i>	
Multiple R	0.461887741
R Square	0.213340285
Adjusted R Square	0.115007821
Standard Error	10.91685204
Observations	10

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	258.5656305	258.5656305	2.169581394	0.178984849
Residual	8	953.4212679	119.1776585		
Total	9	1211.986898			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-12.54164274	10.55476632	-1.188244472	0.26881314	-36.88097751	11.79769203	-36.88097751	11.79769203
Business Confidence Index9	0.340436696	0.231125782	1.472949895	0.178984849	-0.192540312	0.873413705	-0.192540312	0.873413705

4.12.1.2 Regression analysis results: Business confidence index versus annual percentage change in new passenger car market

Bails and Peppers' (1982:154) rejection region: If the computed F-value (2.169) exceeds the critical value (0.178) then reject H_0 . Do not reject if otherwise.

Therefore, reject the null hypothesis H_0 that there is no statistical relationship between business confidence and the new passenger car market.

The above regression result confirms the graphical depiction of the two variables that a relationship exists between the two.

4.12.1.3 Consumer confidence

Consumer surveys provide regular assessment of consumer attitudes and expectations and are used to evaluate economic trends and prospects. The surveys are designed to explore why changes in consumer expectations occur and how these changes influence consumer spending and saving decisions (Kershoff, 2000:7).

The consumer confidence results are derived from personal at home interviews of an area-stratified probability sample of 2500 households. The total coverage represents 92% of the urban adult population and 53% of the total adult population (Kershoff, 2000:7).

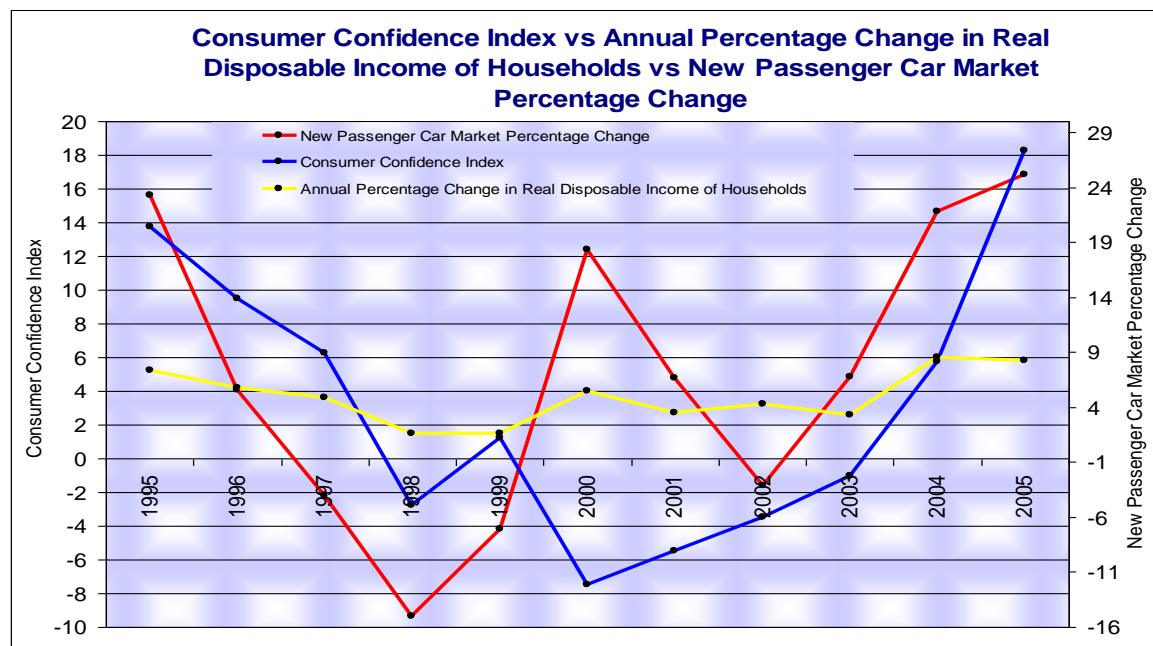
4.12.1.4 Interpreting consumer confidence

The consumer confidence index reveals the change in consumers' expectations, whereas the business confidence index indicates what the situation is at a specific point in time. The net balance is derived as the percentage of respondents expecting an improvement less the percentage expecting deterioration. The answers of the first and second question are weighted as follows: improve considerably (+10), improve slightly (+5), deteriorate slightly (-5) and deteriorate considerably (-10). The responses of the third question are weighted in the following manner: right time to buy (+10) and wrong time to buy (-10). The composite consumer confidence index is the average of the results of the above three questions.

Theoretically, this index can vary between -100 and 100, but has fluctuated between -36 (indicating an extreme lack of confidence) and +13 (indicating extreme confidence) since the BER started measuring consumer confidence comprehensively in 1982. Zero indicates neutrality. For example, a negative index number such as -5, indicates that the majority of consumers expect negative conditions or put differently, that consumers are relatively pessimistic (Kershoff, 2000:8).

Figure 4.11 below indicates a close relation between the consumer confidence index and the annual percentage change in the new passenger car market. From 1995 up until 1999 a rise in consumer confidence coincided with a growth in the new passenger car market during the analysed period and vice-versa. A rise in consumer confidence reflects an increased willingness of consumers to spend. A rise in consumer confidence could therefore result in an upturn in household consumption in general and retail and motor vehicle sales in particular (Kershoff, 2000:8). The opposite applies when the level of consumer confidence declines.

Figure 4.11 Consumer confidence index versus annual percentage change in real disposable income of households versus annual percentage change in new passenger car market



Sources: NAAMSA (2010), Kershoff (2000) & SARB (2009)

The ability of consumers to respond depends on their inflation adjusted after-tax income and the availability of credit (Kershoff, 2000:8). Between 1999 and 2000 there was a very noticeable decline in consumer confidence. Low confidence indicates that consumers are concerned about the future. The year 2000 saw the consumer confidence index decline to a low of -8, however, during the same year the new passenger car market increased by 18.3 percent, a five year high in the period analysed. If the consumer confidence index is a good indicator of the performance of the new passenger car market, then why was the increase in the new passenger car market at a five year high while consumer confidence was at its lowest in the analysed period? The answer lies with real disposable income; Section 4.8 has already demonstrated that changes in real disposable income have a meaningful and a statistically relevant influence on the new passenger car market.

Figure 4.11 illustrates that the 4 percent increase in the real disposable income of households outweighed the decline in consumer confidence; this resulted in an increase in the new passenger car market. The inverse relation between consumer confidence and the passenger car market in this period does not mean that consumer confidence is not a good indicator of the performance of the new passenger car market.

Therefore, confidence is important, firstly, because a large portion of new passenger cars are bought on credit and the consumer buys now, expecting to be able to pay later. Secondly, confidence is important because the consumer must have faith in his ability to afford the new car relative to his future income and consumption (Smith, 1975:69).

4.13 SUMMARY AND CONCLUSION

The major determinants of demand for new passenger cars were presented and analysed in this chapter. Chapter 4 revealed that changes in new passenger car prices had a negative impact on the demand for new passenger cars. However, during certain periods of the analysed period it was discovered that demand for cars was relatively inelastic as far as price changes were concerned. These include price increases above the inflation rate and the partial influence of fringe benefits taxation which combined to

substantially raise hire purchase instalment costs as a proportion of average salaries. The result of rising new passenger car prices and declining real incomes was that new passenger cars became increasingly unaffordable.

Chapter 4 also found that growth in the disposable income of households would result in better opportunities for the new passenger car market as the effect of disposable income on new passenger car demand was found to be relatively income elastic. South Africa faced a different set of opportunities and constraints as a result of its low average per capita income. It was further found that the industry is located in an economy that is characterised by low growth, fairly low average incomes and unequal income distribution. As a result, not only was the market static but market penetration of new passenger cars per head of population was low.

Furthermore, the analysis revealed that the impact of interest rates on income resulted in a change in the new passenger car market, especially during periods where interest rates fluctuated by large percentages.

After evaluating the effects of changes in the price of petrol on new passenger car demand, two conclusions were drawn. Firstly, changes in petrol prices have short-term effects on demand as consumers adjust their incomes to adapt to the price changes. Secondly, the analysis identified that changes in the price of petrol had a greater impact on the structure of demand for small, medium and larger cars than on the market itself.

In this chapter the evidence found suggested that a relationship exists between GDP and the new passenger car market. The levels of confidence proved to be possibly one of the most important factors of demand for both business and consumers.

Based on the analyses in Chapter 4, a foundation has been laid for the development of a predictive statistical model to estimate the probable size of the new passenger market under different economic scenarios. This, however, is not the focus of the current study and could form the basis of further research.

CHAPTER 5

SUMMARY AND CONCLUSION

5

5.1 INTRODUCTION

The preceding chapters of this dissertation have presented the history of the motor industry, the demand theory, the theory of demand for durable goods and looked at an international perspective of the drivers of demand for passenger transport/demand; this was followed by an analysis of the determinants of demand for new passenger cars in South Africa. Chapter 5 summarises and concludes on the findings of the study.

Chapter 1 introduced and outlined the scope of the study. This chapter also described the study's problem statement, which comprised of three objectives. The dissertation followed the objectives and purposes outlined in section 1.2 of Chapter 1. Chapter 2 an attempt was made to trace the history of the South African motor industry from its origins in the 1920s to its present position at the centre of the country's manufacturing sector.

It was important in this study to gain an overall perspective of the South African motor industry, to gain an appreciation of the extent of the industry that concerns itself with the production, marketing and the servicing and maintenance of not only new passenger cars in South Africa but motor vehicles in general. In this regard Chapter 2 examined the history of the South African motor industry and established that the dominant factor in the industry's growth and development had been the course of government policy. It was state intervention that secured the assemblers presence in Port Elizabeth in the late 1920s, paved the way for the growth of motor vehicle assemblers after World War II. Thereafter, successive phases of the state's local content policy permitted the expansion of components manufacturing in South Africa, but it contributed to keeping new vehicles beyond the reach of most of the population. Efforts to reform government policy (since 1989) were

met with mixed success, foreign and local direct investments tended to follow the various stages of government policy.

The introduction of Japanese production systems in the 1980s and 1990s was carried out against the backdrop of political instability, strikes, stay-aways and economic stagnation. It, nonetheless, assisted the industry's efforts to take the first, tentative step toward international competitiveness. Historically, South Africa has shown a great degree of originality in its markets and marketing of new passenger cars. The local market for new passenger cars has long been dominated by white consumers and corporate buyers. As a consequence, the industry's marketing efforts were largely focused on the middle-upper income section of the population, with only marginal attempts to cater for the mass of black population (for example, through the sale of minivans used as taxis). However, this all changed at the turn of South Africa's political change in 1994 as the economy opened up to the mass market so the marketing changed; the results of which had an influence in the surge of sales in the mid 2000's.

Chapter 3 sought to discuss and explain the micro-economic theory of demand, the theory of demand for durable goods and the theory of demand for new passenger cars. The chapter sought to identify and explain the influences that affect consumer demand when purchasing a new passenger car. The theory of demand provided a platform upon which further discussion would take place. The demand curve was used to explain graphically the theory of demand. Based upon Figure 3.1, it was concluded that when the price of a good rises, the quantity demanded falls (*ceteris paribus*).

Based on Hyman's (1989) interpretation of the theory of demand, the chapter further identified that the amount that consumers plan to buy depends on many factors; changes in income, changes in price, changes in tastes, etc. This coincided with the micro-economic theory of utility and preferences proving that in an effort to maximise utility consumers have different preferences. A brief description on the theory of demand for durable goods revealed that a difference exists between the demand for durable goods and demand for non-durable goods. The main difference identified was that the purchase of durable goods could be postponed and was influenced by future income and prices.

As a basis for of a core chapter of theory, the theory of demand for new passenger cars was also investigated. McGowan's implicit demand function for passenger cars formed the model upon which the determinants of demand for passenger cars was evaluated. McGowan (1984:25) identified that price, income, the price of substitutes, the price of complements and tastes were all independent variables that determined the quantity of passenger cars demanded.

The purpose of Chapter 3 was to theoretically investigate the patterns and influences of passenger car demand. This chapter formed the base upon which the South African New Passenger Car Market was analysed compared in chapter 4.

Internationally, transport and car use policy can only have a tangible influence on population density (suburbanisation) and on the availability and attractiveness of the transport modes. Policies affecting the use of private modes of transport rather than demand are usually more effective and more socially acceptable. For example, policies such as tolls and parking fees that affect the variable cost of using a car are more effective than ownership taxes or policies that affect the fixed cost of car ownership and demand. However, to date (internationally) policies designed to discourage car use have usually not been very effective thus given an appropriate economic climate new passenger car demand thrives even in the face of restrictive policies.

Chapter 4 analysed, described and interpreted quantitative data, presented in the form of graphs and tables. Using McGowan's demand function as a base the chapter sought to statistically evaluate the role played by the determinants of demand during the ten-year period analysed. Overall, the chapter presented evidence to suggest that the structure of demand for passenger cars had in fact undergone reasonably extensive change and that the timing of this change coincided with the political and economic change of the mid-nineties. The chapter presented evidence supporting this structural change through hypotheses and statistical analyses of relationships between various economic variables and new passenger car sales.

A discussion on the effect of prices of new passenger cars demanded revealed that increases in new passenger car prices had an adverse effect on demand for new passenger cars. Although the opposite occurred between 1999 and 2003, the new passenger car market increased as prices increased. Bruton (1981:63) explained the conflict as follows: “during periods of adversity, the motor industry is a price taker and in periods of prosperity it becomes a price maker”. As a result, price elasticity was observed to change over the course of the period analysed, with demand becoming more elastic during the down phase of the new passenger car market. During the upturn phase of the new passenger car market, demand became less elastic. However, in general it was found that demand for new passenger cars was relatively inelastic.

The effect of population growth on new passenger car demand was briefly discussed, indicating that the higher the density of human population the lower the level of car ownership. The discussion of population growth identified that an increase in population did not necessary result in an increase in the new passenger car market, especially if real disposable income is low. This was compounded in South Africa as the bulk of the population had not been economically active; a reverse in this trend was witnessed at the turn of the century as the economy became more inclusive. In the wake of a change in South Africa’s political landscape, efforts of raising the per capita income of South Africa’s black population to a level where it brought about a balance in equalities in the economy, confirmed the theory that an “Economically Participatory Population” has an influence on the demand for new passenger cars.

The analyses of the effect of real disposable income on the new passenger car market concluded that new passenger car demand was relatively income inelastic; that is, changes in income were closely followed by changes in the new passenger car market. A period of elasticity was, however, identified when the Rand depreciated against major currencies. The inverse was also noted though, during growth phases, the market expanded rapidly given the low levels of per capita income. Looking forward, redistribution of income at current levels of real per capita income would probably depress new

passenger car demand. Redistribution with growing incomes would lead to growth in the new passenger car market as the market would move towards a mass market situation; this growth would be fastest at the lower end pointing to a need for cheap, basic passenger car.

The effect of interest rates on income resulted in a change in the new passenger car market, especially during periods when interest rates fluctuated by large percentages. Bruton (1985:340) indicated that interest rates affect the new passenger car market to a greater extent via their effect on the general economy than via a direct effect on the new passenger car buying decision. During the period analysed, the SARB made use of interest rates to both suppress and boost levels of aggregate demand and the rate of liquidity creation in the economy. With high interest rates prevalent in the economy credit was more expensive and more difficult to acquire as banks became more selective in their choice of debtors.

Chapter 4 presented evidence to suggest that a relationship exists between Gross Domestic Product and the new passenger car market. Figure 4.8 presented a strong correlation between GDP growth and the new passenger car market; this proved that GDP serves as an important indicator of expected future sale volumes.

The effect of changes in the price of petrol on the new passenger car market lead to the conclusion that, increases in the price of petrol only have a short-term effect on the new passenger car market. Secondly, that growth in the new passenger car market only took place during periods of stable petrol prices. The world has however realised that firstly, oil is not going to get cheaper and secondly, that within the next couple of decades, if the present rate of consumption is maintained, the world's oil supplies could very well be depleted. These two factors have led to the development of small, highly sophisticated and economical engines with greater out out and higher performance than their much larger predecessors. Furthermore, large sums of money are being spent on the development of alternative fuels and viable replacements for petrol; this is evident in South Africa with Optimal Energy, building in Cape Town, South Africa's first battery operated car, the Jole.

Finally, Chapter 4 examined the level of confidence on the passenger car market. The level of confidence significantly affects the level of economic activity in the country. According to Bruton (1985:284) the state of the economy at any one time is largely determined by expectations and the prevalent levels of optimism. A definite correlation between the business confidence index and the annual percentage change in the new passenger car market was identified, therefore, the business confidence index proved to be a very good indicator of the performance of the new passenger car market.

A close relation between the consumer confidence index and the annual percentage change in the new passenger car market was also identified. If a consumer feels pessimistic about the economy and what he is likely to benefit from the economy, the person is more likely to be more sensitive to price and income changes than under normal circumstances.

From the above it is evident that there are a number of determinants that influence the new passenger car market. The study illustrated that the new passenger car market is located in an economy characterised by low growth and fairly low average incomes. One of the most important findings from this study was that many of the economic practices found in the theory were being applied in the new passenger car market. An intermediate economy faces major challenges in world markets. However, unlike underdeveloped economies, it has the technological, industrial and human resource capacity to enter world automotive markets. South Africa is a middle income country. In this important respect it has the potential to take advantage of emerging opportunities.

After analysing the determinants of demand for passenger cars a conclusion may be drawn that firstly, there is a definite link between the theory of demand for durable goods and the theory of demand for passenger cars Secondly, after statistically analysing the determinants of demand in Chapter 4, it became clear that the micro-economic variables played a major role in shaping the new passenger car market.

There is still scope for further research; the new passenger car market has changed drastically since 2005. Motor manufacturers have seen sales of new

passenger cars increase at record breaking levels, therefore an analysis into the new passenger car market post 2005 would be warranted, so as to understand the causes of such increases in sales. As a follow-up to this study, research to determine how the determinants of demand influences new passenger car sales.

With plus minus 5,3 million people living with HIV/AIDS, South Africa is ranking top globally considering its high infection rate and the size of its population (approximately 43.6 million) (Ostheimer, 2004:1). This could have a profound effect on the motor industry, more importantly, demand for passenger cars, as consumers will refrain from purchases as a result of foreseeable medical expenses. Therefore, the impact of HIV/AIDS on the new passenger car market is also an issue that needs to be further investigated.

LIST OF SOURCES

ARMSTRONG, A.C. & ODLING-SMEE, J.C. 1978. The demand for new cars – a theoretical model of replacement demand. *Oxford bulletin of economics and statistics*, 40(8):281-302.

BAILS, D.G. & PEPPERS, L.C. 1982. *Business fluctuations: forecasting techniques and applications*. New Jersey: Prentice-Hall Inc.

BARNES, J. 2003. Extending the MIDP to 2012 – challenges confronting the SA automotive industry. PE Technikon Presentation, 31 March 2003.

BELL, T. 2001. Where has all the growth gone? South African manufacturing Industry 1970 – 2000, Johannesburg, National Institute of Economic Policy, Occasional Paper Series, No. 21.

BELL, T & NKOSI, M. 2003. South African motor industry policy in a cloud of uncertainty. Johannesburg, National Institute of Economic Policy.

BOVY, P.H.L., LOOS, A.L. & DE JONG, G.C. 1992. Effects of the opening of the Amsterdam orbital motorway. Final report, Rijkswaterstaat: Transportation and Traffic Division, Rotterdam.

BRUTON, N. 1981. Supply and demand factors in the motor vehicle manufacturing Industry in South Africa. South Africa: Honours treatise; Bookbinding Services.

BRUTON, N. 1985. A theoretical introduction to forecasting demand for motor vehicles in South Africa. South Africa: Masters' thesis; Bookbinding Services.

BRUTON, N. 1991. Structure, Conduct and performance of the passenger car manufacturing industry in South Africa. South Africa: Doctorate dissertation; Bookbinding Services.

BURRIS, M.W. & PENDYALA, R.M. 2002. Discrete choice models of traveller participation in differential time of day pricing programs. *Transport Policy*, 9(3):241-252.

CLARKSON, G. 1963. The theme of consumer demand: a critical appraisal. USA: Prentice-Hall.

COLE, A.S., McBRIDE, D.L. & SCALES, W.I. 1990. The automotive industry – industry commission. Report No.5. 17 December 1990.

CRAIN, K. 2002. The industry is changing – fast. *Automotive News*, Vol. 77 Issue 6008.

DARGAY, J. & GATELY, D. 1999. Income's effect on car and vehicle ownership, worldwide: 1960-2015. *Transportation Research*, 33(2).

DAVIS, L. 2003. A dynamic model of demand for durable goods that consume energy. University of Wisconsin-Madison. Dec. 17.

DE JONG, G.C. & GUNN, H.F. 2001. Recent evidence on car cost and time elasticities of travel demand in Europe. *Journal of transport economics and policy*, 35(2):137-160, May.

DE JONG, G. 2004. Drivers of demand for passenger transport worldwide. Rand Europe and Delft University of Technology.

DE LONG, B. 2002. Macroeconomics. United States: Gary Burke.

DEATON, A. & MUELLBAUER, J. 1980. Economics and consumer behaviour. Cambridge: Cambridge University Press.

DELTA MARKETING INSTITUTE (DMI), undated.

DUBIN, J.A. & MCFADDEN, D.L. 1984. An econometric analysis of residential electric appliance holdings and consumption. *Econometrica, Econometric Society*, 52(2):345-62, March.

- DUNCAN, D. 1997. "We are Motor Men" – The making of the South African motor industry. South Africa: Whittles.
- DORNBUSCH, R., FISCHER, S. & STARTZ, R. 1999. Macroeconomics – 2nd ed. USA, Irwin McGraw-Hill Book.
- EC-DGTREN/Eurostat. 2000. *EU Transport in Figures, Statistical Pocket Book 2000*. EUROPEAN Commission - Directorate-General for Energy and Transport / Eurostat, Brussels.
- EXPEDITE CONSORTIUM. 2002. Expedite final publishable report; Report prepared for the European Commission. Leiden, The Netherlands: Rand Europe.
- FARRELL, M.J. 1954. The demand for cars in the United States. *Journal of the royal statistical society. Series A*, 171-201.
- FRIJKA, T. 1973. The future of population growth. Canada: John Wiley.
- GAKENHEIMER, R. 1999. Urban mobility in the developing world. *Transportation research Part A*, (33):671 – 689.
- GALBRAITH, L. 2000. South African automotive yearbook & directory. 4th ed.
- GIULIANO, G. 2003. Travel, location and race/ethnicity. *Transportation research Part A*, (37): 351–372.
- GLAISTER, S. & GRAHAM, D. 2000. The effect of fuel prices on motorists. London: AA motoring policy unit and the UK petroleum industry association.
- GUNN, H.F. 2000. An introduction to the valuation of travel time savings and losses. (*In* Hensher, D.A. & Button, K.J. *Handbook of Transport Modelling*. Amsterdam: Pergamon.)
- GEEL, F.C. & Grey, B. 2011. Scientific assignment. Port Elizabeth: Lectern.

HAGUE CONSULTING GROUP AND DUTCH MINISTRY OF TRANSPORT. 1990. Het landelijk modelsysteem verkeer en vervoer, modelbeschrijving, Rijkswaterstaat, Rotterdam.

HARBERGER, A.C. 1967. The demand for durable goods. 4th impression. Chicago and London: University of Chicago Press.

HYMAN, D.N. 1989. Economics. USA: Van Hoffman Press.

INGRAM, G.K. & LIU, Z. 1998. Motorisation and road provision in countries and cities. World Bank: Washington, D.C.

Irinne News. <http://www.irinnews.org>. Date of access: 12 November. 2012.

JOHANNSON, O. & SCHIPPER, L. 1997. Measuring the long-run fuel demand for cars. *Journal of transport economics and policy*, 31(3):277-292.

JONG, G.C., DALY, A.J., VELLAY, C., PIETERS, M. & HOFMAN, F. 2003. A model for time of day and mode choice using error components logit. *Transportation Research E (Logistics and Transportation Review)*, (39):245-268.

JONG, G.C., KROES, E.P., PLASMEIJER, R., SANDERS, P. & WARFFEMIUS, P. 2004. The value of reliability. Paper presented at the European Transport Conference, Strasbourg, 2004.

KENWORTHY, J.R. & LAUBE, F.B. 1999. Patterns of automobile dependence in cities: an international overview of key physical and economic dimensions with some implications for urban policy. *Transportation Research*, (33): 691-723.

KENWORTHY, J.R. & LAUBE, F.B. 2001. UITP cities millennium database for sustainable Transport. International Union of Public Transport, Brussels.

KERSHOFF, G. 2000. Measuring business and consumer confidence in South Africa. South Africa: Stellenbosch.

- KOOREMAN, P. 1996. The economics of household behaviour. London: Macmillan.
- KOTLER, P. 2000. Marketing management. The millennium edition. London: Prentice Hall International.
- LECOMPTE, M.D., MILLROY, W.L. & PREISSLE, J. 1993. The handbook of qualitative research in education. Hardcover.
- LEEDY, P.D. & ORMROD, J.E. 2002. Practical research: planning and design. 7th ed. New Jersey: Prentice-Hall.
- LEWIS-BECK, M. 1980. Applied regression. California: Sage.
- MARKS, A.P. & BROWN, R.J. 1981. A new approach to car ownership - forecasting in South Africa. *The civil engineer in South Africa*, 23(12):575-582.
- MULHEARN, C. & VANE, H. 1999. Economics. London: Mac Millan.
- McGOWAN, D. 1984. Consumer Economics. 2nd ed. USA: Allyn and Bacon.
- MOHR, P. 1998. Economic indicators. Cape Town: CTP Book Printers.
- MOHR, P. & FOURIE, L. 2004. Economics. 3rd ed. Pretoria: Van Schaik.
- MOKHTARIAN, P.L. 2001. Telecommunications and travel. Paper presented at the 2001 meeting of the Transportation Research Board, Washington, D.C.
- MOSTERT, J.W. 2002. Micro-economics: A South African perspective. Cape Town: Juta.
- MOUTON, J. & MARAIS, H.C. 1992. Basic concepts in the methodology of the social science. Pretoria: HSRC.
- NATIONAL ACADEMY OF ENGINEERING. 2003. Personal cars and China. United States: The national Academies Press.

NATIONAL ASSOCIATION OF AUTOMOBILE MANUFACTURERS OF SOUTH AFRICA. <http://www.NAAMSA.co.za>. Date of access: 12 May. 2012.

NEWMAN, P. & KENWORTHY, J. 2000. The ten myths of automobile dependence. *World transport policy and practice*, 6(1):15-25.

NEIUWENHUIZEN, P., JOUERT, P. & VILJOEN, P. 1977. The South African Component manufacturing industry. Johannesburg: Federation of Component Manufactures Association.

NICHOLSON, W. 2001. Microeconomics theory. 7th ed. USA: Thomson Learning.

NICHOLSON, W. 2002. Microeconomics theory. 8th ed. USA: Thomson Learning.

NIJKAMP, P. & PEPPING, G. 1998. Meta-analysis for explaining the variance in public transport demand elasticities in Europe. *Journal of transportation and statistics*, 1(1):1-14.

OBE, R. 2003. Economics of the motor industry, PE Technikon. Faculty of Management, MBA Unit.

OFFICE FOR THE STUDY OF AUTOMOTIVE TRANSPORTATION (OSAT), *et al.* 2001. Contribution of the automotive industry to the U.S. economy in 1998: The nation and its fifty states. University of Michigan.

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD), 1983. Long-term outlook for the World Automobile Industry. Paris.

OSTHEIMER, A. 2004. The impact of HIV/AIDS on the South African economy. South Africa.

Response Group Trendline. <http://www.RGT.co.za>: Date of access: 12 September, 2009.

PARKIN, M. & KING, D. 2005. Economics. 2nd ed, USA: Addison-Wesley.

RHYS, G. 2003. Economics of the motor industry. PE Technikon presentation, 31 March.

RHYS, G. 2003. The modern motor industry: nowhere for the inefficient to hide. *The journal of current economic analysis and policy*, 2(1).

SALVATORE, D. 2001. Managerial economics in a global economy. 4th ed. Harcourt College Publishers.

SCENES CONSORTIUM. 2001. Scenes transport forecasting model: calibration and forecast scenario results. Report for the European Commission DGTREN, MEP, Cambridge: Cambridge University Press.

SCHAFER, A. & VICTOR, D.G. 2000. The future mobility of the world population.

SCHILLER, B. 1991. The economy today. USA: McGraw-Hill.

SMALL, K. & WINSTON, C. 1999. The demand for transportation: models and applications. (*In* Essays in transportation economics and policy, Brookings Institute.)

SMIT, P.C., DAMS, D.J., MOSTERT, J.W., OOSTHUIZEN, A.J., VAN DER VYVER, T.C. & VAN GASS, W. 1996. Economics: a South African perspective. South Africa: Juta.

SMITH, R.P. 1975. Consumer demand for cars in the USA. Cambridge: Cambridge University Press.

SOLMAN, J. Undated. Economics. Hertfordshire: Harvester Wheatsheaf.

SOUTH AFRICAN RESERVE BANK. <http://www.SARB.co.za>. Date of access: 12 September, 2009.

STOCKMAN, A.C. 1999. Introduction to economics. 2nd ed. USA: The Dryden.

TRACE CONSORTIUM 1998. Elasticity handbook: elasticities for prototypical contexts. Deliverable 5 in the trace project for the European

Commission. Hague Consulting Group. The Hague: *Transportation Research A*, (34)171-205.

TURNEY, B. & ROBB, G. 1971. *Research in education: an introduction*. Hinsdale, Illinois: Dryden.

UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE.
<http://www.umtri.umich.edu>: Date of access: 21 September, 2009.

VAN DALEN, D.B. 1979. *Understanding educational research*. McGraw-Hill.

VICTORIA TRANSPORT POLICY INSTITUTE. 2003. *TDM Encyclopaedia – transportation elasticities: how prices and other factors affect travel behaviour*. Victoria, Canada: Victoria Transport Policy Institute.

WATSON, D.S. 1972. *Price theory and its uses*. 3rd ed. Boston: Houghton Mifflin.

WIKIPEDIA. Disposable income. http://en.wikipedia.org/wiki/Disposable_income. Date of access: 24 September, 2009.