CHAPTER 3

EMPIRICAL REVIEW OF THE DETERMINANTS OF INTRA-INDUSTRY TRADE PATTERNS

3.1 INTRODUCTION

The principal objective of this chapter of the thesis is to provide an empirical review of the determinants of IIT patterns. The empirical evidence supporting IIT theories of horizontally differentiated IIT (HIIT) and vertically differentiated intra-industry (VIIT) is extensive. In particular, a large proportion of empirical studies validate the importance of country-specific factors, such as market size, living standards, absolute and relative economic distance and geographical distance in determining the intensity of IIT. The industry-specific factors, such as EoS, product differentiation and industry structure, are among the common factors that have been empirically tested in the IIT literature. Additional determinants that have also been assessed in the empirical literature include regional integration, FDI associated with MNCs, and trade barriers, among others. The success of investigating the impact of industry-specific factors on IIT patterns has been limited in the empirical literature. On the other hand, the examination of country factors on IIT patterns has performed better. This has led to most studies focusing on investigating the impact of country and industry factors on IIT patterns separately.

This chapter is structured as follows: Section 3.2 provides a review of the past IIT studies conducted for South Africa. Section 3.3 provides a survey of the empirical literature of the determinants of IIT patterns followed by a revision of industry studies of IIT (fabric, textiles and apparel, automobile and automobile parts, information and technology [IT] industries, and food processing industry, etc.) in Section 3.4. Lastly, Section 3.5 summarises and concludes the chapter.

3.2 PREVIOUS SOUTH AFRICAN INTRA-INDUSTRY TRADE STUDIES

Most of the empirical studies conducted for South Africa (Isemonger, 2000; Parr, 1994; Peterssen, 2002; 2005; Sichei *et al*., 2007), although useful, did not partition total IIT (TIIT) into HIIT and VIIT patterns, with the exception of Al-Malwali (2005). Using HS data, Isemonger (2000) and concludes the existence of rising IIT levels for the South African economy for the period 1993 to 1996, in contrast to predictions by Simson (1987) and Parr

(1994). In Al-Mawali (2005), IIT was disentangled into HIIT and VIIT and henceforth empirically examined several country-specific determinants of TIIT, HIIT and VIIT for South Africa's manufacturing sector (SITC) covering the period 1994 to 2004. His study employed Kandogan's (2003a; 2003b) methodology to decompose TIIT into horizontal IIT and vertical IIT patterns, instead of using the traditional G-L index. In his study, he established that market size, geographical distance, trade barriers and trade intensity are significant influences affecting South Africa's bilateral IIT. His study did not consider the impact of industry-specific determinants on IIT patterns for South Africa.

More recently, the IIT research conducted for South Africa includes an empirical investigation of factors that determine IIT in selected services (airfreight, education and training, financial services, legal services, etc.) between South Africa and the United States for the period 1994 to 2002 (Sichei *et. al.*, 2007). This study indicated that differences in per capita income and market size negatively affect IIT, while US FDI positively affects unaffiliated IIT in selected services. The study concludes that South Africa–US IIT in selected services is largely influenced by country factors that are similar to those affecting IIT in final products between North–South trade. Accordingly, their study was unable to decompose TIIT into VIIT and HIIT due to data constraints.

It is important to point out that almost all of the previous South African IIT research has been conducted on an economy-wide or manufacturing-wide basis (Al-Malwali, 2005; Isemonger, 2000; Parr, 1994) highlighting the need for IIT research focusing on specific industries. Thus, this thesis differs from previous studies conducted for South Africa in that it investigates both country- and industry-specific determinants of IIT patterns for a strategic industrial sector in South Africa.

3.3 AN EMPIRICAL REVIEW OF THE DETERMINANTS OF INTRA-INDUSTRY TRADE LITERATURE

As already mentioned, the majority of past studies examine the role of country-specific factors, such as market size, living standards, absolute and relative economic distance and geographical distance on IIT patterns. On the other hand, fewer studies have examined industry-specific factors on IIT patterns. Likewise, fewer studies have examined the determinants of IIT in intermediate products and components (Ando, 2006; Fukao *et al.*, 2003; Türkan, 2005; 2009). Moreover, the empirical IIT research investigating determinants of IIT patterns is sparse for single industries and sectors (Montout *et al*., 2002; Kind & Hathcote, 2004). Thus, the empirical IIT literature focusing on a single industry is less explored.

3.3.1 Economic size

According to the empirical literature, the larger the size of the market as proxied by the bilateral average of GDP of the two partners *i* and *j*, the greater the benefits that can be derived from potential EoS (supply) and the greater the demand for differentiated products thereby contributing to higher levels of IIT. Almost all empirical IIT studies examine the impact of this variable on IIT and its patterns have found that it positively influenced IIT (Al-Mawali, 2005; Byun & Lee, 2005; Chemsripong, Lee and Agbola, 2005). Thus, a larger average market size is expected to benefit from the potential EoS in production and trade and, as a result, increases the variety and quality of differentiated products for HIIT and VIIT respectively.

3.3.2 Standard of living

Several empirical studies measure average standard of living by using GDP per capita expressed as an average of the bilateral trading partners *i* and *j*. Countries with high levels of per capita incomes are associated with high levels of economic development, and thus are expected to increase the share of IIT. The level of per capita income (GDPC) is also sometimes used as a proxy for the level of capital-labour ratio (supply perspective) (Helpman & Krugman, 1985), as well as a proxy for the ability to purchase better varieties and sophistication of differentiated products (demand perspective) (Lancaster, 1980).

3.3.3 Economic distance

Similar to market size, absolute economic distance as proxied by absolute difference in per capita income levels between trading partners is commonly used. According to the Linder (1961) hypothesis, trade between countries that possess similar per capita incomes will be intensified if country *i* specialises in producing differentiated products and exports these products to country *j* with similar demand compositions. According to Helpman & Krugman (1985), *a priori*, the more similar the relative factor endowments between *i* and *j*, the higher the intensity of bilateral HIIT. A negative sign for HIIT (Helpman & Krugman, 1985) is expected where absolute economic distance is proxied by differences in capital-labour endowment ratios as used in Clark &Stanley (1999). Conversely, the larger the gap in per capita income or GDP per capita (or capital-labour ratio) between trading partners *i* and *j*, the higher the level of bilateral VIIT. Thus, if the absolute difference in per capita GDP between countries is large, the share of VIIT in total IIT is likely to increase and thus a positive sign for this explanatory variable is hypothesised as in Falvey & Kierzkowski (1987).

It is also argued that large per capita income gaps between trading partners *i* and *j* occur as a result of greater levels of inequality of economic development and have been investigated by Hirschberg, Sheldon & Dayton (1994), Gullstrand (2002), Kind & Hathcote (2004). Durkin & Krygier (2000) and Fukao *et al*. (2003) find evidence of a positive association between differences in GDP per capita with VIIT reflecting larger differences in relative wages that stimulates VIIT. The study by Gullstrand (2002) focuses on analysing demand patterns and VIIT between the North (EU countries) and the South (lower income countries reveals that income distribution, per capita income (and their interaction) and average market size are important for VIIT. The implication is that the two partners can typically specialise in different varieties of quality so long as production occurs with differing intensities (Gullstrand, 2002). Moreover, several studies use additional explanatory variables, such as public expenditure on education, electric power consumption per capita, and so forth in an attempt to capture similarities and dissimilarities between trading partners (Zhang, van Witteloostuijn & Zhou, 2005).

3.3.4 Relative difference in economic size

Several studies use relative difference in economic size or relative economic distance to capture the influence of the relative difference in factor proportions and endowments between nations. It is regarded as a better measure than absolute difference in market size, as the second measure is sensitive to the trading partner's size whereas the former is standardised and normalised to one. Fontangé, Freudenberg & Péridy (1997) found that VIIT is positively influenced by a larger relative difference in economic size, implying that dissimilar countries in respect of factor endowments and technologies trade in products differentiated by quality (Falvey & Kierzkowski, 1987). On the other hand, a larger relative difference in economic size negatively affects horizontal IIT, indicating that similar countries trade in products differentiated by variety (Helpman & Krugman, 1985). In the context of international production and fragmentation, the market size of the trading partner is expected to promote larger fragmentation of the production process between nations (Türkan, 2009). In the studies by Fontagné & Freudenberg (1997), Thorpe & Zhang (2005) and Zhang & Li (2006), the difference in economic size is positively associated with VIIT and negatively associated with HIIT.

3.3.5 Geographical distance

The geographic proximity between bilateral trading partners *i* and *j*, as measured by a distance variable, is presented in the empirical IIT literature as a key determinant influencing IIT. Greater distances impose large transport costs and trade costs thereby reducing the intensity of IIT. Most empirical studies find that geographical distance negatively influences IIT (Fukao *et al*., 2003; Chemsripong *et al*., 2005; Türkan, 2005; Okubo, 2007). However, several studies find IIT to be positively influenced by distance (Kind & Hathcote, 2004; Zhang *et al*., 2005). As a result of greater regional integration, advancements in ICT and a reduction in international transport costs (shipping, air and road), it may be that distance does not necessarily deter IIT as is commonly assumed.

MNCs outsource various stages of processing, production and sub-assembly to developing countries. The emergence of international production sharing requires establishing strong and cost-effective production and service links. Thus, huge international transport costs adversely affect VIIT. Besides geographical distance as a proxy for trade costs, Clark (2005) uses *ad valorem* shipping charges as a proxy for international transport charges as a determinant of VIIT. As expected, international transport charges negatively influence the vertical share of IIT.

3.3.6 Foreign direct investment and multinational involvement

In recent years, advancing globalisation and the rise of international production networks have led to increased intra-firm trade through FDI flows related to multinational activities especially in the world automobile industry. Rising IIT and increasing FDI are associated with increasing multinational activity, as firms locate parts of their production operations across countries (OECD, 2002). The empirical literature suggests a positive relationship between IIT and multinational firm activity but an ambiguous relationship between IIT patterns and FDI (Aturupane *et al*., 1999). Multinational firms and their FDI strategies play a pivotal role in fragmentation theory of international production and VIIT (Feenstra & Hanson, 1997; Fukao *et al*., 2003; Kimaru, 2006). Several studies have empirically examined the effects of FDI on IIT and presuppose that it is strongly associated with the activity levels of multinational firms (Lee, 1992; Hu & Ma, 1999). This is so, because it becomes very difficult to empirically disentangle FDI from MNC activities given the complex integration strategies of MNCs and FDI strategies (Yeaple, 2003). More specifically, Yeaple (2003) shows that MNCs can be both vertically and horizontally integrated by establishing affiliates and structure of FDI in some foreign nations to benefit from factor price differentials and in other nations to avoid transport costs. Thus, it is commonly assumed that most FDI flows are consistent with multinational activities, especially in the context of developing countries where MNCs set up foreign affiliates to produce relatively labour-intensive component products that can be re-exported for assembly back to the host developed countries (North–South FDI flows and trade).

Several studies examine the influence of FDI on IIT trade patterns and conclude that the larger the FDI, the greater the levels of IIT. Veeramani (2009) assesses the impacts of FDI associated with multinational engagements and considers interactions with trade barriers on the intensity of IIT in India’s manufacturing industries. He reports FDI to be positively correlated with IIT, suggesting that IIT levels increase with greater multinational involvement. He also finds interactions between trade barriers and FDI to negatively influence IIT, reflecting the presence of horizontal multinational activities associated with market-seeking FDI which displaces IIT. The study by Okubo (2007) investigates the role of technology transfer through Japanese FDI on IIT between Japan and selected Asian countries using a simultaneous equations approach. The study concludes that the transfer of Japanese technology via FDI as proxied by technology exports of Japanese affiliates improves VIIT levels.

The empirical literature also shows that FDI can affect horizontal and vertical patterns of IIT in different ways (Zhang & Li, 2006; Chang, 2009). Zhang & Li (2006) find FDI to be positively influenced by HIIT and negatively influenced by VIIT. Similarly, Chang (2009) find that FDI positively influence HIIT and negatively influence VIIT in the IT industry among US, Asian and EU markets. On the other hand, Zhang *et al*. (2005) find a negative sign on the FDI coefficient, implying that greater FDI activities displace trade and reduce VIIT, resulting in some agglomeration effects of FDI. Thus, a negative sign on the FDI coefficient implies that VIIT and FDI may act as trade substitutes, as hypothesised by Caves (1981). Other authors such as Fukao *et al*. (2003) and Wakasugi (2007) examine the role of FDI in the context of VIIT for East Asia trade and find a positive relationship between FDI and the share of VIIT. Aturupane *et al*. (1999) and Zhang *et al*. (2005) reveal a positive relationship between FDI and VIIT.

3.3.7 Trade barriers

Trade barriers is used as a proxy for trade costs and includes natural barriers (distance, land and border), manmade barriers (cultural and language) and tariff and non-tariff barriers (NTBs). See Anderson & van Wincoop (2004) for a survey of trade costs and their effects on IIT, suggesting that trade costs do indeed matter. Hence, the level of trade barriers has important implications for the level of IIT. Since trade barriers are difficult to measure, the majority of empirical studies use tariffs as a proxy for trade barriers (Lee, 1992; Al-Mawali, 2005; Kind & Hathcote, 2004; Veeramani, 2009), although imperfect in capturing the effects of NTBs. The influence of NTBs on IIT has received less attention in the IIT empirical literature compared to tariffs. Fontagné & Freudenberg (1997) attempt to identify the impact of NTBs on HIIT and VIIT in their study of IIT in the European Union (EU). Sharma (2004) uses a measure of the effective rate of assistance (ERA) instead of tariffs as a proxy for trade barriers to examine their influence on IIT in Australian manufacturing. In Kimura *et al.* (2007), he argues that duty drawbacks assist in reducing the impact of trade barriers by reducing tariffs and thus reinforce IIT. The effect of NTBs on IIT has not been adequately explored in the IIT empirical literature (Gruen, 1999).

Most studies find that a reduction in trade barriers (tariffs) increased IIT (Hellvin, 1996; Sharma, 2004; Zhang *et al*., 2005; Veeramani, 2009). Sharma (2004) examines the impact of artificial trade barriers as measured by the ERA on Australia's manufacturing IIT patterns and find that it negatively influenced both VIIT and HIIT in the pre-liberalisation period. In contrast, there are a limited number of studies that reveal a positive relationship between trade barriers and IIT (Kind & Hathcote, 2004; Al-Mawali, 2005). In particular, Al-Mawali (2005) relates the positive impact of the level of tariffs on bilateral IIT in South Africa's manufacturing sector to provisions of the MIDP that is argued to encourage multinational activity. However, the tariff data used in his study was not specifically applied to the automobile industry as is done in this study. Kind & Hathcote (2004) use tariff data applied to the clothing sector and find a similar positive impact of tariffs on IIT between the US and fabric-trading partners.

Besides tariffs, this study introduces a novel industry explanatory variable, namely automotive assistance, which can take the form of several instruments, for example duty drawbacks, subsidies and investment incentives, and so forth that are typically provided under the direction of selective government policy aimed at strengthening the domestic industry especially protecting producers to increase domestic production in an attempt to enhance exports and to provide employment. This variable is expected to capture the effects of assistance or protection afforded to a *selected* industry such as the automobile industry on the intensity of IIT patterns. The description of the proxy for this explanatory variable will be discussed in Chapter 6 of the thesis.

3.3.8 Economies of scale

According Krugman & Helpman (1985) and others, EoS is a vital determinant for the existence of IIT in the production of differentiated products in the context of monopolistic competition. Schmitt and Yu (2001) establish a positive causal link between the degree of EoS, the volume of IIT and the share of trade in production. By contrast, Davis (1995) and Bernhofen (2001) argue that EoS may not be a necessary condition for the presence of IIT. The empirical literature proposes the examination of the effects of EoS on IIT levels (Aturupane *et al*., 1999; Byun & Lee, 2005; Faustino & Leitão, 2007; Montout *et al*., 2002; Sharma, 2004; Thorpe & Zhang, 2005;).

A number of studies use minimum efficient scale (MES) as a proxy for EoS (Clark, 1993; Hu & Ma, 1999; Montout *et al*., 2002). In the case of HIIT, Montout *et al.* (2002) find a negative sign on the MES coefficient for a small number of firms, whereas Aturupane *et al*. (1999) reveal a positive sign on the MES coefficient for a large number of firms in the context of VIIT suggesting that greater EoS stimulates VIIT. Other studies reveal a positive sign on the EoS coefficient for HIIT and IIT (Hu & Ma, 1999; Sharma, 2004) and a negative coefficient for VIIT (Byun & Lee, 2005). The study by Veeramani (2009) argues that the negative sign on the MES coefficient indicates that product homogeneity discourages IIT (HIIT). Typically, when scale economies are large (small), it is associated with increased (low) output which is concentrated in a small (large) number of firms or plants resulting in lower (higher) cost per unit of output thereby reinforcing (reducing) IIT. Clark (2005); Türkan (2005) and Faustino & Leitão (2007) find no statistical evidence of EoS influencing the intensity of IIT patterns.

Alternately, a negative coefficient is also found on MES for VIIT, supporting the argument that larger plant sizes are conversant with lower units costs of production thus reducing the incentive to outsource production activities and thereby reducing the propensity to engage in IIT differentiated by quality (Clark & Stanley, 1999; Feenstra & Hanson, 1997; Türkan, 2005) especially in the context of international production and fragmentation of the production process.

3.3.9 Regional integration

Several studies assess the impact of regional integration on levels of IIT (Menon & Dixon, 1996; Sharma, 2004; Montout *et al.*, 2002; Chemsripong *et al.*, 2005; Umemoto, 2005; Chang, 2009). Trade agreements serve to reduce trade barriers between trading countries and therefore cause an increase in IIT. Most studies reveal a positive relationship between regional integration and IIT. Montout *et al.* (2002) confirm the significant role of regional integration in NAFTA on IIT for the automobile industry. In the study by Chemsripong *et al.* (2005), the entry of Thailand into the APEC stimulated IIT in manufactured goods with other APEC partner countries. Similarly, Umemoto (2005) argues that the Korea–Japan FTA is likely to contribute to significant growth of IIT in automotive parts between them. In Chang's (2009) investigation of the determinants of VIIT and HIIT in the information technology (IT) industry among Asian, the US and EU markets, he argues that regional trade associations such as the Association of South East Asian Nations (ASEAN) strengthen VIIT in the IT industry between Asian and EU firms. By contrast, a few studies reveal that regional integration is associated with lower IIT (Al-Malwali, 2005; Chang, 2009) indicating that regional integration may in fact be a barrier to the expansion of IIT with trading partners.

3.3.10 Product differentiation

According to theory, the degree of product differentiation (PD) is an important determinant of IIT. Thus the degree of product differentiation on IIT patterns has been assessed by a number of authors (Hellvin, 1996; Hu & Ma, 1999; Bernhofen & Hafeez, 2001; Sharma, 2004; Clark, 2005; Veeramani, 2009; Faustino & Leitão, 2007; Chang, 2009). However, the empirical results of the effects of product differentiation on IIT are quite mixed. Several studies differentiate between vertical product differentiation and horizontal product differentiation (Bernhofen & Hafeez, 2001; Byun & Lee, 2005; Faustino & Leitão, 2007). Bernhofen & Hafeez's (2001) investigation of industry determinants of IIT in an oligopolistic framework uses demand (industry) size and two product differentiation proxies, namely relative differences in R&D intensity and relative differences in value added per worker. All industry coefficients exhibited the expected negative signs *a priori* according to the reciprocal-markets model whereby differences in demand size and industry productivity increase the intensity of IIT.

In Byun & Lee (2005), horizontal product differentiation is positively associated with HIIT, reflecting the greater degree of product differentiation (demand size) by variety the higher the HIIT levels. Some empirical studies of IIT report no statistical evidence to support the claim that product differentiation has any significant impact on the intensity of IIT (Sharma, 2004; Veeramani, 2009), indicating that the degree of product differentiation is not important in explaining IIT. The insignificant findings of the impact of the product differentiation variable on IIT may be attributable to the reliability of the difference proxies for product differentiation as an explanatory variable. Byun & Lee (2005) argue that an improved measure of product differentiation is perhaps warranted to improve its significance as an explanatory variable for explaining IIT patterns. On the other hand, Hu & Ma (1999) and Chang (2009) find a positive association between VIIT and PD.

3.3.11 Trade openness

There is evidence that the extent of trade openness is also a key factor influencing IIT patterns. Several studies use a variable of trade orientation as some measure of openness to trade and find that it positively influences the strength of IIT. Following Balassa & Bauwens (1987), Lee (1992) and others (Clark, 2005; Thorpe & Zhang, 2005; Zhang & Li, 2006), trade orientation is proxied by constructing the residuals from a regression of per capita trade on per capita income and population.

Related to trade openness, Sharma (2004) investigates the influence of trade liberation on determinants of IIT. In Sharma's (2004) study of Australian manufacturing, he decomposes IIT into components of HIIT and VIIT for pre- and post-liberalisation episodes. He finds trade barriers measured by the effective rate of assistance (ERA) to have a significant negative impact on both HIIT and VIIT patterns prior to liberalisation but no meaningful impact post-liberalisation. Also, the study by Chemsripong *et al.* (2005) investigates the determinants of IIT in manufacturers between Thailand and APEC countries. They consider pre-APEC and post-APEC scenarios. In the pre-APEC period, their results indicate that differences in levels of economic development, transport and information costs (geographical distance) were negatively related to IIT, while similarities in levels of economic development, capital intensity, culture and trade openness were positively related to IIT. In the post-APEC era, economic size is positively related to IIT although the effect was weaker. This study does not distinguish between HIIT and VIIT.

3.3.12 Exchange rate

Few studies examined the impact of the exchange rate on IIT levels (Hirchberg *et al*., 1996; Fontagne *et al*., 1997; Montout *et al*., 2002; Byun & Lee, 2005; Thorpe & Zhang, 2005; Sichei *et. al*., 2007). The trade literature is unclear regarding the influence of the exchange rate on IIT (Thorpe & Zhang, 2005). In Montout *et al.* (2002), depreciation of the bilateral exchange rate positively influenced both HIIT and VIIT in NAFTA's automobile industry. On the other hand, Hirchberg *et al*. (1996) found that the exchange rate negatively influenced IIT, while Türkan (2009) found no significant impact of the exchange rate on IIT.

3.3.13 Miscellaneous factors

Additional factors such as technology differences between trading partners (technology gap) and technology intensity have been assessed on IIT by Clark (2005), Al-Malwali (2005) and Sichei *et al*. (2007). The outcome of human capital differences on IIT types has also been investigated by Torstensson (1996), Al-Malwali (2005), Türkan (2005), Byun & Lee (2005) and Faustino & Leitão (2007). In addition to geographical barriers, other natural trade barriers (such as landlockedness and common border) and manmade barriers (such as culture and common language) were also found to influence IIT. The impact of landlockedness (Al-Mawali, 2005), common border (Hirschberg *et al*., 1994) and common language (Kimaru *et al*., 2007) and culture (Chemsripong *et al*., 2005) have also been considered by several authors, where landlockedness was found to deter IIT while common border, language and culture stimulates IIT.

Despite the fact that most empirical studies investigate the determinants of IIT for trade in final products, very few studies seek to understand the determinants of IIT in intermediate goods (Türkan, 2005; 2009; Fukao *et al*., 2003; Ando, 2006; Kimaru, 2007). The study by Türkan (2005) investigates the determinants of IIT for trade in total, final and intermediate products. In his study, Türkan (2005) examines bilateral trade data for manufacturing between Turkey and nine OECD countries over the period 1985 to 2000. He found that country-specific factors contributed the most explanatory power for both IIT in final and intermediate products relative to industry-specific factors that exhibited weak explanations for both IIT categories. In other words, industry-specific factors could not adequately explain IIT in final and intermediate goods. In his study he also established that IIT in intermediate goods is positively influenced by average size and human capital differences, whilst negatively affected by distance and differences in GDP per capita.

3.4 EMPIRICAL EVIDENCE OF DETERMINANTS OF IIT PATTERNS WITH SPECIFIC REFERENCE TO INDUSTRY

Empirical IIT studies have been conducted in several industries; namely food processing sector (Hirschberg *et al.*, 1994); milk products (Fertö, 2005); toy industry (Tharakan & Kerstens, 1995); fabrics (Kind & Hathcote, 2004); textiles and apparel (Clark & Reese, 2004), electrical machinery and components (Fukao *et al*., 2003), machinery parts and components (Ando, 2006; Kimaru, *et al*., 2007) and the IT industry (Chang, 2009). The latest IIT studies applied to the automobile and auto parts industries that analysed several determinants of bilateral IIT (HIIT and VIIT) include Montout *et al*. (2002), Umemoto (2005) and Türkan (2009) for NAFTA, Korea–Japan and Austria respectively.[10] The impacts of several determinants on IIT patterns investigated in these studies have already been discussed in Section 3.3 of this chapter under various (appropriate) subheadings.

Kind & Hathcote (2004) examine IIT between the US and ninety-two countries for four SITC categories in the fabric industry. Their main findings suggest that levels of economic development, market size and the trade deficit are negatively correlated with IIT, while trade barriers and distance are positively associated with it. However, their study does not consider the determinants of pattern of IIT in the fabric industry. Chang (2009) investigates the determinants of VIIT and HIIT in the IT industry among the Asian, US and EU markets. He concludes that per capita GDP, FDI, product differentiation and regional integration, among others, are key determinants of VIT and HIIT in the IT industry in the Asia, US and EU regions. More specifically, his study revealed that the dominant IIT pattern in the IT industry is HIIT and that IT firms' FDI strategies emerge to be market-seeking in host regions.

10 Umemoto (2005) and Türkan (2009) are unpublished working papers.

The study by Montout *et al*. (2002) examines the structure and determinants of IIT for the automobile and automotive parts industries in NAFTA using HS 6-digit level data. Their study distinguishes between goods of varying quality (of different unit values) from trade in varieties of goods (of similar unit values). According to Montout *et al*. (2002), the primary determinants of HIIT between NAFTA's automotive trading partners include economic distance and market size. The only industry variable, namely MES (as a proxy for EoS), was found to be negatively correlated with HIIT in the case of automobiles. Montout *et al.* (2002) conclude that the substantial rise in HIIT in NAFTA's automobile industry may reflect the international production strategies of multinational firms.

In Umemoto (2005), the determinants of HIIT and VIIT between Japan and Korea were investigated using HS 6-digit level data for automotive parts. The econometric results reveal that smaller differences in market size and transportation costs are major factors positively influencing IIT between Korea and Japan. This study concludes that the Korea–Japan FTA (regional integration) is likely to stimulate IIT in automobile parts. In this study, the effects of country factors on IIT patterns were examined, whilst no industry factors were considered.

The latest unpublished study by Türkan (2009) examines country determinants of VIIT and international fragmentation of the production process for Austria's automobile parts industry. In his study he finds that average market size, differences in per capita GDP and FDI positively influence VIIT, whereas distance negatively affects it. One shortcoming of his study is the fact that the author does not consider the impact of industry-specific variables on VIIT and the fragmentation process of production.

3.5 SUMMARY AND CONCLUDING REMARKS

This chapter of the thesis provided an empirical review of the determinants of IIT, VIIT and HIIT literature. More specifically, several empirical determinants and their impact on IIT, VIIT and HIIT were discussed.

This thesis improves on previous studies by investigating *country-specific* variables as well as attempting to include several *industry-specific* variables that may potentially influence IIT in the automobile industry. More specifically, the thesis investigates the potential impact of relative differences in economic size, geographical distance, regional integration, FDI associated with MNC activities, exchange rate, degree of product differentiation, EoS, tariffs and automotive assistance, trade openness and the trade imbalance on VIIT and HIIT patterns in the South African automobile industry. This thesis introduces a new industry factor to be considered in the investigation of the determinants of IIT patterns, namely, the impact if automotive assistance on the intensity of IIT patterns between the bilateral trading partners in the automobile industry.

CHAPTER 4

TRADE POLICY REFORMS AND PERFORMANCE OF SOUTH AFRICA'S AUTOMOBILE INDUSTRY

4.1 INTRODUCTION

This chapter of the thesis provides a descriptive analysis of automotive policy reforms and the performance of the domestic industry. The chapter is ordered as follows: Section 4.2 elicits an overview of the development of automotive policy reforms in the South African automobile industry over the past five decades or so, focusing on why policy reforms were initiated and the consequences thereof. Also in Section 4.2, a brief discussion covering the key elements of the new policy, namely, the Automotive Production and Development Programme (APDP), which is expected to be implemented in 2013, is offered. Section 4.3 provides a synopsis of the impact of policy reforms on the industry's performance with reference to the structure of the industry, production and sales, productivity, employment, automotive employment and the automotive trade balance for the period 1995 to 2007. It is important to point out that the data for certain industry variables provided and discussed here are obtained mainly from various issues of NAAMSA's annual reports and are quoted in *South African rand* values. This differs from the trade data and data for economic variables used in the empirical investigations of this thesis, especially in Chapters 5 and 7, where data is measured in *US dollar* terms. Finally, Section 4.4 summarises the chapter and offers concluding remarks.

Subsequent to years of intense protectionist policies, the automobile industry in South Africa experienced major trade policy reforms and in recent years the policy stance has become more liberalised (see Damoense & Agbola, 2009). The automobile sector contributes some 7.53 per cent of the national economy's gross domestic product (GDP) and employs over 320,000 persons[11] (NAAMSA, 2007). The industry is also the largest manufacturing sector in South Africa accounting for about 21 per cent of manufacturing output. The domestic automobile industry is ranked 20th in the world according to total vehicle production,

11 The automobile sector here includes vehicle assembly, manufacturing of vehicle components, tyres and motor trade (motor trade includes vehicle retailing, distribution, servicing and maintenance).

preceding Australia, Sweden and Taiwan by producing some 600,000 units of total vehicles or completely built-up units (CBUs). By 2020, domestic vehicle production is expected to double (1.2 million units) (DTI, 2008). In 2006, shares of automotive exports and imports in the national economy's total merchandise exports and imports were estimated to be 8.5 per cent and 15.5 per cent respectively (WTO, 2008). South Africa mainly exports CBUs to Japan, Australia, EU countries and the United States of America (NAFTA); with respective shares (as a percentage of the value of total CBU exports) of 29 per cent, 20 per cent, 20.2 per cent and 11 per cent (NAAMSA, 2007).

Trade and industrial policy in the South African automotive industry has received much attention in recent years. Automotive policy since 1989 has become increasingly export-orientated as a reaction to the changing international competitive environment. Recent amendments to government policy and the changing economic environment have meant that the industry may become increasingly fragile. The MIDP has been operational since September 1995 and is expected to run until 2012. Mid-term Reviews (MTRs) of the MIDP occurred in 1998/1999, 2002/2003 and 2005/2006 and resulted in the MIDP being extended twice until 2007 and 2012 respectively. The main thrust of the MTR (2002/3) includes a programme of further tariff reductions as well as the phasing down of import–export complementation (IEC) provisions as indicated in Table 4.2. Black (2007) argues that the IEC (export subsidy) is inconsistent with World Trade Organization (WTO) rules and largely led to the 2005/06 MTR of the MIDP.

The DTI argues that zero tariffs are actually applied to South African vehicles through the import rebate credit certificate (IRCC) system that neutralises the impact of import tariffs (CompCom, 2005). This is confirmed by Twine, who states that the MIDP is a duty neutral programme if it operates optimally (*Business Report*, 2005). Several authors have discussed the impact of policy reforms taking place in the South African automotive industry extensively in the South African economic literature with differing views (Black, 2001; Black and Mitchell, 2002; Black, 2007; Damoense & Simon, 2004; Damoense & Agbola, 2009; Flatters, 2003; 2005).

In recent years, trade agreements have been established between South Africa and several regions. South Africa as part of South Africa Customs Union (SACU) has developed important ties with countries of the North American Free Trade Agreement (NAFTA) through the Africa Growth Opportunity Act (AGOA) established in January 2001. Under AGOA, complete duty exemptions on most CBUs and CKDs are obtainable (*FocusReports*, 2006). For instance, through the AGOA, BMW SA has been awarded the opportunity to export left-hand drive 3-series models to the USA, and DaimlerChrysler SA to export new C-Class models, including left-hand drive models, also to the USA (DTI, 2004). The European Free Trade Area (EFTA) and preferential trade agreements (PTAs) have recently been established with India and MERCOSUR in 2004.

4.2 AUTOMOTIVE POLICY REFORMS IN SOUTH AFRICA

4.2.1 Local content programme

Historically, the industrial development of the industry developed within a general framework of protectionist policies through the use of prohibitive tariffs, quantitative restrictions (QRs) and mandatory domestic content protection. Table 4.1 provides an overview of policy reforms in the South African automobile industry from 1961 to 2012. In June 1961, the government introduced domestic content requirement policy that operated under Phases I to VI of the Local Content Programme (LCP) which ran until August 1995. The overall objective of the LCP was to encourage increased usage of domestic components for assembling final motor vehicles. In June 1961, the government implemented Phase I of the LCP with the primary objective of promoting the gradual development of the South African automotive manufacturing industry. Phase I of the LCP continued until June 1964. Under this scheme, the local content on components of vehicles was increased from 15 per cent to 40 per cent on a weight basis (BTI, 1988).

Between 1 July 1964 and the end of 1969, Phase II of the LCP was applied to the industry. The salient feature of the Phase II of LCP was the “manufactured model” scheme where the local content target was set at 45 per cent based on weight. Producers were allowed to declare and classify their models as “manufactured” when the specified target of 45 per cent was achieved. This scheme provided assemblers with bonus import permits as well as exempting them from paying excise duties based on the achievement of their local content levels. By the end of 1969, the local content target had risen to 55 per cent on a weight basis.

Table 4.1 Evolution of government interventionist policies in the automobile industry

Period	Automotive policy	Key elements
1961–1989	Phase I–V of LCP	Local content policy (LCP) scheme introduced with varying mandatory weight-based domestic content targets.
1989–1995	Phase VI of LCP	Local content requirements amended to a value-based system. An excise duty rebate scheme was introduced.
1995–2000	MIDP (including the Reviews of 1998/9, 2003 and 2005)	Local content regulations abolished. Tariff phase-down schedule for imported vehicles (CBUs) and components (CKDs) reduced to 40 per cent and 30 per cent respectively by 2002. Tariffs were reduced on average by 3.5 per cent and 2.5 per cent per annum respectively for CBUs and CKDs. Import-export complementation (IEC) scheme introduced. Similar to the excise duty rebate system. Duty-free allowance (DFA) and small vehicle incentive (SVI) schemes implemented.
2000–2007		Tariff phase-down continued until 2007, reaching 30 per cent for CBUs and 25 per cent for CKDs. Tariffs were reduced by 2 and 1 per cent per annum for CBUs and CKDs respectively. IEC phase-down schedule begins from 2003 through to 2007. The DFA scheme remains in operation. The SVI scheme to be phased down and eventually discontinued by 2003. The introduction of the Productive Asset Allowance (PAA) of 20 per cent in 2002.
2008–2012		Tariff phase-down is expected to continue until 2012, reaching 25 per cent for CBUs and 20 per cent for CKDs. Tariff rates are expected to decrease by 1 per cent per annum from 2008 until 2012. IEC phase-down continues and is expected to reach 70 per cent by 2012. The DFA scheme remains until 2012. The PAA remains at 20 per cent until 2009.

Sources: DTI (2008); Damoense &Agbola (2009c)

The year 1970 was a standstill year during which all domestic manufacturers were expected to attain a *net* local content of 50 per cent[12]. Phase III of the LCP was introduced on 1 January 1971 and lasted until December 1976. In terms of Phase III, net local content of manufactured vehicles was required to rise to 66 per cent by the end of 1976. The excise duty rebate scheme was adjusted to account for the net measure of local content target. Phase IV

12 Certain imported materials such as components manufactured from imported unprocessed materials, imported unmachined materials and imported unmachined castings and forgings were also treated as local materials for local content analysis (BTI, 1979).

of the LCP was characterised as a standstill period with no increments in local content targets, and commenced on 1 January 1977 and lasted until December 1979. The two-year standstill period, 1977 to 1979, was granted to OEMs so that they could consolidate their profitability status given the severe losses that they had incurred under Phase III (BTI, 1988). This was particularly with regard to the fall in vehicle sales volumes that had occurred during the sharp economic downturn between September 1974 and December 1977.

Phase V of the LCP was introduced on 1 January 1980 and continued until the end of February 1989. The minimum weight-based local content target under this phase remained at 66 percent. During this time, local content was based on a weighted average measure, which allowed models that achieved less than the prescribed 66 per cent target to be offset by other models that had achieved more than the 66 percent local content target levels (Black, 1991). That is, OEMs were not required to achieve the target percentage on every individual model but across the entire model range. Prior to the mid-1980s, export growth in automotive products was inadequate. In 1985, for the first time, export incentives were awarded to OEMs to encourage automotive export growth. This came in the form of an export credit of R4 per kilogram (BTI, 1988). Phase V did not succeed in reducing excessive net foreign exchange consumption by the motor industry and led to a shift in the assessment of domestic content from a weight-based programme (Phase I–V) to a *value-based scheme*; namely Phase VI of the LCP. Part of the failure of Phase V can be attributed to significant disinvestment by US-based OEMs, namely Ford and General Motors (GM), as a result of sanctions and political instability in the South African economy.

The government pursued export-orientation strategies to promote the industry, with Phase VI of the LCP being implemented on 1 March 1989. However, protection levels for completely built-up units (CBUs) remained at prohibitive levels (Black, 1996). Imported CBUs were subject to a 100 per cent *ad valorem* import duty plus a 15 per cent import surcharge on passenger cars (5 per cent on commercial vehicles) equal to 115 per cent (MITG, 1994). The Phase VI scheme assessed local content in terms of *value* instead of *weight* as in the previous five phases. The objective of policies implemented under Phase VI was to significantly reduce the industry's import bill by at least 50 per cent (BTI, 1989). The focus of this programme remained the objective of saving foreign currency with an emphasis on enhancing automotive exports. A key feature of the Phase VI programme was the import-export arrangements linked to value-based domestic content targets. Eligible automotive exports could count as local content value, while export credits in lieu of reductions in foreign exchange usage on imports were granted, which contributed significantly to the growth of automotive exports. This meant that real local content levels were actually reduced from 66 to 50 per cent (Black, 2001). Total automotive exports grew at a compound annual average growth rate of about 28 per cent in real South African rand terms under Phase VI over the period 1989 to 1994 (Damoense & Simon, 2004). Even though the industry experienced rapid export growth, Phase VI did not adequately lessen foreign exchange usage by the motor industry as the policy had intended.

Other failures associated with Phase VI include the proliferation of new vehicle models and small production volumes, high vehicle prices, cost pressures and inadequate domestic content levels incorporated in assembled vehicles. As a result of several challenges faced by the local industry coupled with global and institutional changes, the South African government implemented a new policy (MIDP) that recognised the importance of greater trade liberalisation and foreign investment. Under the MIDP, domestic content regulations were abolished and a process of tariff reduction was applied to assembled vehicles and components.

4.2.2 Motor Industry Development Programme (MIDP): 1995–2012

4.2.2.1 MIDP (Phase I): 1995–2000

The first phase of the MIDP started in September 1995 and was projected to last until 1999. Owing to the stagnant performance of the automotive industry in the 1970s through to the 1990s, a reform of automotive policy emerged following recommendations made by the Motor Industry Task group (MITG) in accordance with WTO and GATT obligations. The MIDP became effective in September 1995 and reflected an increasing gearing of policy towards expanding the export possibilities of OEMs and component producers. The MIDP can be distinguished from Phase VI by the fact that excise duties were replaced by tariffs and no minimum local content regulations applied. In addition, the programme imposed a gradual reduction in tariff rates for passenger cars and motor components. Despite the lowering of import tariffs, protection of the local motor industry still remained high by world standards. Other key features of the MIDP include the introduction of a duty-free allowance (DFA) and a small vehicle incentive (SVI) scheme.

The principal objectives of the MIDP include (DTI, 1998; NAAMSA, 1999):

(i) Developing a globally integrated and competitive domestic motor vehicle and component auto industry.

(ii) Stabilising long-term employment levels in the industry.

(iii) Improving the affordability and quality of vehicles.

(iv) Advancing the promotion of exports and improving the sector's trade balance.

(v) Contributing significantly to the economy's growth and development.

From the initial year of the MIDP, tariffs on imported CBUs were reduced to 65 per cent, while tariffs on original equipment components (CKDs) were lowered to 49 per cent. According to the tariff phase-down schedule, tariffs on CBUs were to be reduced gradually to 40 per cent and tariffs on CKDs to 30 per cent over an eight-year period by the year 2002. It is important to highlight that the tariff phase-down programme has proceeded faster than the requirements of WTO regulations. The reduction in tariffs in the automotive industry has led to greater demand for imported CBUs and imported components used in local assembly and exporting of CBUs.

The MIDP's export support scheme, the IEC, was introduced to encourage OEMs and component suppliers to further enhance the exporting of automotive parts and passenger vehicles. The idea was that OEMs must earn sufficient foreign exchange by exporting in order to partly compensate for the foreign exchange used to import the necessary components. The local content value of exports may be used to rebate the duty payable on CBUs and CKDs. Import rebate credit certificates (IRCCs) were issued and then used to offset duties payable. However, IEC arrangements contribute to higher effective rates of protection for the industry (Flatters, 2003).

Other government support mechanisms include a duty-free allowance (DFA) equal to 27 per cent of the manufacturer's wholesale value of the vehicle, which may be rebated against the duty payable on imported CKDs. The rationale behind the introduction of the DFA was to permit OEMs to import certain high value auto parts, which were not available locally or were relatively expensive on world markets, partly or fully duty-free. In addition to the DFA, the SVI offered a further allowance of 3 per cent for every R1,000 below a wholesale vehicle price of R40,000. The aim of the SVI was to promote the production of smaller, cheaper fuel-efficient motorcars. The scheme has supported the reduction in price of entry-level vehicles causing price wars in the lower end of the vehicle market, which benefited vehicle buyers. The lowering of tariffs in conjunction with the IEC and the DFA presented component manufacturers with the opportunity for flexible sourcing arrangements for foreign suppliers.

4.2.2.2 MIDP (Phase II): 2000–2007

In July 1999, a Mid-term Review Committee (MTRC) was established to review the impact of the latest MIDP on the automotive industry. The MTRC recommended, among other things, a further reduction in tariffs on imported components and assembled vehicles from 2002 up till 2007; tariffs on CBUs should be lowered by 2 per cent annually until the tariff reaches 30 per cent in 2007. In terms of CKDs, the Committee recommended a tariff reduction from 30 per cent in 2002 to 25 per cent by 2007; a reduction of 1 per cent annually. In 2004, import duty rates of 36 and 28 per cent were applied to imports of CBUs and automotive components respectively (DTI, 2004).

According to Table 4.2 columns 2 and 3, tariffs fell by 2 per cent per annum from 2002 to 2007 and thereafter will decline by 1 per cent per annum until the MIDP expires in 2012. Also in Table 4.2, columns 4 and 5 provide the phase-down schedule for IEC provisions according to eligible export performance until 2012. Importantly, export credits (import rebate credit certificates) granted against imports are tied to export performance. In addition, the existing DFA of 27 per cent remains part of the policy.

Over the last two decades, fundamental structural shifts have occurred in the composition of the South African car market and the production of smaller, cheaper and more fuel-efficient models especially encouraged by the SVI allowance scheme under the MIDP. This trend is in line with worldwide demand patterns for cars. However, the SVI allowance has resulted in a distortion in the small car segment of the vehicle market by way of imposing higher welfare costs on the local industry. It is argued that the SVI gave firms an incentive to continue producing and promoting vehicles that embodied dated technology and were possibly of lower quality. The MTRC proposed a phasing-out programme for the SVI, which would be gradual so as to limit the adverse impact that its eventual sudden withdrawal might have on the industry. The SVI was phased out in 2003.

Table 4.2 Provisions under the MIDP (as amended according to the Review of 2003) until 2012

Year	Import duty		Value of export performance	Ratio of exports to imports in value terms		
	Built-up vehicles (%)	Original equipment components (%)	Built-up vehicles & components (excl. tooling)	Components, HV & tooling *exported*: CBU light motor vehicles *imported*	Components, vehicles & tooling *exported*: Components, HV & tooling *imported*:	CBU light vehicles
1999	50.5	37.5	100	100:75	100:100	
2000	47.0	35.0	100	100:70		
2001	43.5	32.5	100	100:70		
2002	40.0	30.0	100	100:65		
2003	38.0	29.0	94	100:60		
2004	36.0	28.0	90	100:60		
2005	34.0	27.0	86	100:60		
2006	32.0	26.0	82	100:60		
2007	30.0	25.0	78	100:60		
2008	29.0	24.0	74	100:60		
2009	28.0	23.0	70	100:60		
2010	27.0	22.0	70	100:60		
2011	26.0	21.0	70	100:60		
2012	25.0	20.0	70	100:60		

Source: NAAMSA (2007)
*Notes: *HV= heavy motor vehicles, CBU=completely built-up units.*
***PAA and DFA will remain until 2012*

Initially, under the MIDP, OEMs were allowed to import component parts equivalent in value to export components by earning export credits. Export credits will now be lowered gradually, although not removed completely, under the revised MIDP. From 2007, OEMs and component producers earned less export credits for the exporting of automotive products to offset imports thereby effectively reducing the export subsidy to the industry. The policy aims to achieve a balance in support of both export automotive products and domestic motor products in an attempt to encourage localisation and maintain higher export volumes.

Another government support scheme, the productive asset allowance (PAA), was introduced in 2002. The introduction of the PAA aims to assist in platform rationalisation and to encourage investments. PAA duty credits are calculated at 20 per cent of qualifying investment value in qualifying assets, which will be spread in equal amounts over a period of five years. This duty credit will only be allowed to offset duties applied to imported cars and is likely to contribute to increased importation of CBUs. A disadvantage of the PAA is that it benefits vehicle assemblers and not component producers.

Vehicle prices remain a contentious issue in South Africa. The DTI (1999) argues that vehicle price inflation increased slower than the consumer price index (CPI) under the MIDP, indicating that real vehicle prices have dropped since its inception. In support, NAAMSA (2007) argues that the vehicle inflation index has been consistently lower than the CPI. For example, in 1995 and 2003, consumer prices increased by 8.7 and 5.9 percent compared to vehicle price inflation (VPI) increasing by 8.2 and 3.9 per cent respectively for the same period. However, the computed vehicle price inflation index (Statics South Africa) may not necessarily be an accurate measure of vehicle prices. A recent investigation into domestic vehicle prices by the Competition Commission of South Africa (CompCom, 2005) suggests that vehicle prices may in fact be in the region of 15 per cent higher relative to car prices in Europe. Therefore, there is potential for vehicle prices to drop more if tariffs are further liberalised, subsidies are lowered and greater EoS are experienced.

Flatters (2003) argues that although nominal tariffs have been falling, effective protection in the industry remains high. This is supported by Damoense & Agbola (2009), who adopt a partial equilibrium methodology initially developed by Takacs (1992), to investigate the impact of policy reforms on the welfare of consumers, producers and society as a whole. The results of the simulation analysis comparing the impact of policy for 1996 and 2006 indicate that, following the removal of domestic content requirements and reduction in tariffs, there has been a significant reduction in consumer welfare loss and societal deadweight loss in the automobile industry, while tariff revenue to the South African government has significantly decreased. The results demonstrate that further reductions in tariffs applied to CBUs and CKDs are expected to result in a larger decrease in efficiency losses, thus leading to an improvement in the performance of the South African automobile industry (see Damoense & Agbola, 2009).

4.2.2.3 MIDP (Phase III): 2008–2012

Phase III of the MIDP is based primarily on the recommendations of the 2002/03 MTR of the MIDP. The amendments made to the MIDP became effective in 2008 and are expected to continue until 2012. The third phase of the MIDP is set to provide transitional support for the introduction of a new programme when the MIDP expires in 2012. Starting from 1 January 2008, tariffs applied to imported CBUs and CKDs will be phased down by 1 percent per annum to reach a level of 25 percent and 20 percent respectively by 1 January 2012. The IEC scheme will continue to be phased down according to Table 4.2, producing a reduction of 4 per cent per annum in the eligible export value of exports for import credit purposes until 2009.

The valuation of eligible exports for the purposes of import duty rebates will remain at 70 per cent per annum from 2009 until 2012 when the IEC will eventually be discontinued and the MIDP expires. It has been argued that IEC (export subsidy) provisions is countervailing to WTO rules. The DFA of 27 per cent will continue to operate during the remaining term of the MIDP.

4.2.3 Automotive and Production Development Programme (APDP)

The proposal of the 2005/06 MIDP MTR led to the eventual announcement of the APDP on 30 August 2008, which is expected to begin in 2013 and last until 2020. As part of the MTR of 2005/06, the PAA is expected to be replaced by the automotive investment assistance (AIA) starting in June 2009 and ending in 2020.

The main features of this novel programme are summarised in Table 4.3. Not surprisingly, the IEC scheme (export subsidy) will be discontinued and replaced by a production incentive allowance (PIA) (production subsidy) as of 2013. The DTI (2008) argues that the production incentive allowance is predicted to stimulate increasing domestic value (content) levels along the automotive supply value chain that can potentially contribute to positive employment effects.

Table 4.3 Automotive and Production Development Programme (APDP)

Key features of APDP	Description	Period
Automotive investment assistance (AIA)	AIA is expected to replace the PAA and will be equal to 20 per cent of qualifying investment awarded over a three-year period. AIA is expected to be supplemented by discretionary company specific allowances.	June 2009-2020
Tariff 'freeze' programme	Tariffs to remain at 25 and 20 per cent for CBUs and CKDs respectively for the period 2012 (final year of MIDP) until 2020.	January 2013-2020
Local assembly allowance (LAA)	Duty credits available to OEMs based on 18–20 per cent of the value of domestically produced LMVs.	
Production incentive allowance (Value-added support)	PIA is expected to replace IEC. Duty credits of between 50–55 per cent of value-added can be rebated by OEMs.	

Source: DTI (2008)

According to the DTI (2008), the support offered by the local assembly allowance is expected to encourage high volume vehicle production in accordance with the 2020 production target of doubling vehicle production (600,000 to 1.2 million units of vehicles). The new APDP discontinues several mechanisms of the MIDP which appears to be substituted with more sophisticated incentive structures, as argued by Damoense & Simon (2004). A surprising feature of the APDP is the implementation of a tariff 'freeze' programme. One motivating argument put forth by the DTI (2008) for the fixed applied tariff levels of 25 and 20 per cent for CBUs and CKDs respectively is necessary to provide protection for the domestic industry so as to validate the existence of continued local vehicle assembly in South Africa. The industry faces major challenges in view of the credit crisis and the global recession to intensify the components industry by increasing manufacturing capacity. The strength of first-tier suppliers that have established international production connections with MNCs has forced smaller local component firms to exit the industry (*FocusReports*, 2006).

4.3 PERFORMANCE OF SOUTH AFRICA'S AUTOMOBILE INDUSTRY: IMPACT OF POLICY REFORMS

In order to place key performance indicators in perspective, the growth and development of the local industry following policy reforms over the period 1995 to 2006 are shown in Table 4.4.

Table 4.4 Performance of the South African automobile industry, 1995–2006

Performance indicators	1995	2003	2006
Production (thousands of vehicles)	389,476	421,965	587,719
Domestic sales	373,712	295,304	407,860
Export sales	15,764	126,661	179,859
Exports % domestic production (%)	4	30.0	30.6
Imports % of local market (%)	5.5	22.8	42.9
New vehicle sales revenue (R billion)	-	59,4	118,4
Employees (thousand of persons)	308,600	304,900	320,400
Automotive exports (R billion)	4,2	40,7	55,1
Automotive imports (R billion)	16,4	49,8	88,5
Automotive trade balance (R billion)	(12,2)	(9,1)	(33,4)

Source: NAAMSA annual reports, various

Since the inception of the MIDP in 1995, domestic production has increased by about a third, which is mainly attributable to export sales of CBUs increasing from 15,764 to 179,859 units from 1995 to 2006; a phenomenal increase of over 1,000 per cent. On the other hand, domestic sales of CBUs increased by only 9 per cent for the same period. In addition, the value of export components (CKDs) increased from R3,318 million to R30,503 million between 1995 and 2006. The share of CKD exports in total automotive exports declined from 83 per cent to 38 per cent, while the share of CBU exports increased from 17 per cent to 42 per cent from 1995 to 2006.

On the import side, vehicle imports as a percentage of the local market increased from 5.5 per cent in 1995 to 42.9 per cent by 2006. The tariff policy as part of the MIDP has partly contributed to rising imports as tariffs fell from 65 per cent in 1995 to 32 and 26 per cent respectively for CBUs and CKDs by 2006. This clearly illustrates that the livelihood of the South African automobile manufacturing industry is highly dependent on trade, providing a case for probing trading patterns in the automobile industry.

4.3.1 Structure of the industry

Table 4.5 shows vehicle production by each of the eight South African OEMs for 2006 to 2007. These eight original equipment manufacturers (OEMs) (Volkswagen SA, Daimler-Chrysler SA, BMW SA, Toyota SA, Nissan SA, Ford Motor Company of SA, General Motors SA and Fiat Auto SA), produce a little under 600,000 total vehicle units per annum in South Africa. Besides the eight OEMs, there are approximately 150 registered and some 400 independent component suppliers of automotive parts (NAAMSA, 2005). As shown in Table 4.5, between 2006 and 2007, General Motors, Ford and Fiat experienced significant reductions in total vehicle production in the South African market. Overall, total vehicle production fell by 9.1 per cent between 2006–2007.

Post-1995, all OEMs are currently majority foreign owned. The changing global environment and national policies have led to the re-entering of the US MNCs (GM and Ford) after disinvesting in the early 1980s. Since the mid-1990s, the automotive industry has been one of the most successful recipients of FDI inflows in all of South Africa’s manufacturing industries, especially through increased foreign ownership of local OEMs by multinational firms (Toyota Japan, General Motors, DaimlerChrysler, etc.). Local OEMs are now largely integrated into the global production networks of multinational auto firms (Damoense & Simon, 2004).

Table 4.5 Vehicle production by OEM in South Africa, 2006–2007

OEM	2006	2007	% Change
Cars			
BMW	54,782	50,168	–8.4
Fiat	2,680	1,516	–43.4
Ford	29,424	11,797	–59.9
General Motors	29,219	10,737	–63.3
Mercedes-Benz	34,696	23,335	–32.7
Nissan	11,034	13,205	19.7
Toyota	45,590	53,787	18.0
Volkswagen	127,057	111,473	–12.3
Total cars	334,482	276,018	–17.5
Commercial vehicles			
DAF	365	425	16.4
Fiat	4,450	2,578	–42.1
Ford	49,152	56,790	15.5
Land Rover	2,250	2,650	17.8
Ford Total	51,402	59,440	15.6
Isuzu	24,120	22,085	–8.4
MAN	3,207	3,575	11.5
Mazda	19,140	23,713	23.9
Mercedes-Benz	8,279	6,637	–19.8
Mitsubishi	7,680	8,586	11.8
Nissan	33,661	35,586	5.7
Scania	1,530	1,590	3.9
Toyota	97,160	91,898	–5.4
Volkswagen	1,023	1,079	5.5
Volvo Truck	1,220	1,280	4.9
Total commercial vehicles	253,237	258,472	2.1
Total vehicles	**587,719**	**534,490**	**–9.1**

Source: *Ward's World Vehicle Data Book* (2008)

Table 4.6 provides comparative statistics of the South African automobile industry and selected automobile producing nations, including Australia, India, Brazil and others in an international context. Automobile industries in developing and developed countries are naturally pivotal to their national economies for several reasons already mentioned. Comparative domestic production and sales data (units of vehicles), employment data and data of several indicators are reported in Table 4.6. For instance, the importance of these industries in their national economies' manufacturing and trade accounts are shown by looking at the export and import shares of automotive products in terms of the economy's total merchandise exports and imports, ranging from 0.8 per cent (India), 1.5 per cent (China), 13.9 per cent (Turkey) and 15.3 per cent (South Africa).

Table 4.6 also shows that Australia and South Africa are both net importers of vehicles as vehicle production is lower than consumption. Australia produces only about a third of vehicles (717,743 units) consumed domestically, whereas South Africa produces 78,218 units of vehicles less than the quantity of vehicles purchased domestically, with imports accounting for the shortfall. As net exporters of vehicles, Spain, Brazil and Turkey produce significantly more than is consumed domestically; 50, 80 and 20 per cent, respectively. It is often argued that the numbers of OEMs are too many given the limited size of the domestic market (Damoense & Simon, 2004). Table 4.6 also computes the average number of vehicles produced per OEM, indicating that South African and Australian OEMs produce 66,811 and 83,060 units of vehicles respectively, which is significantly lower than the other comparators, such as China (555,154 units), Brazil (330,091 units) and Turkey (219,883 units).

Overall, South Africa compares inadequately to emerging automotive producers such as Brazil, India and China as shown in Table 4.6. For instance, eight OEMs are too many given the relatively small size of the domestic market. Reducing the number of OEMs and promoting efficient production techniques are recommended. Additionally, research and development (R&D) activities in the South African automotive industry is low by international standards and should be increased.

Table 4.6 Comparative indicators of selected automotive producing nations, 2007

Country/Indicator	South Africa	India	China	Australia	Sweden	Spain	Turkey	Brazil
Domestic production (thousand units) (a)	534	2,250	8,882	332	316	2,890	1,099	2,971
Domestic sales (thousand units) (b)	613	1,990	8,792	1,050	359	1,939	622	2,486
(a)-(b)*	(79)	260	90	(718)	43	951	477	485
Number of OEMs** (c)	8	13	16	4	2	15	5	9
(a)/(c)#	67	173	555	83	181	193	220	330
Employment♣ (thousand no.) (d)	131	297	2,538	45	85	220	183	479
Persons per vehicle	6.1	82.5	33.2	1.4	1.9	1.5	7.4	7.5
Automotive export share in merchandise exports (%)♦	8.5	2.6	1.5	2.6	-	-	13.9	9.5
Automotive import share in merchandise imports (%)♦	15.3	0.8	2.3	11.8	-	-	9.5	6.2
GDP per capita (US$ bn)	3,823	748	1,015	42,569	46,446	22,730	1,267	3,837
GDP % annual growth	5.1	9.2	11.4	3.9	2.6	3.8	5.0	5.4

Sources: Compiled from various publications: *Ward's Automotive Data Book* (2008), WTO (2008), LABORSTA (ILO, 2009).

*Notes: *The difference between domestic production and domestic sales indicates the direction of trade in vehicles (units), where negative values (in parenthesis) denotes net importers and positive values denotes net exporters.*

***Number of vehicle manufacturers (OEMs) only*

♣ LABORSTA, SIC data, China.online and Indiastatonline, includes vehicles and parts.

#Average number of vehicles produced per OEM

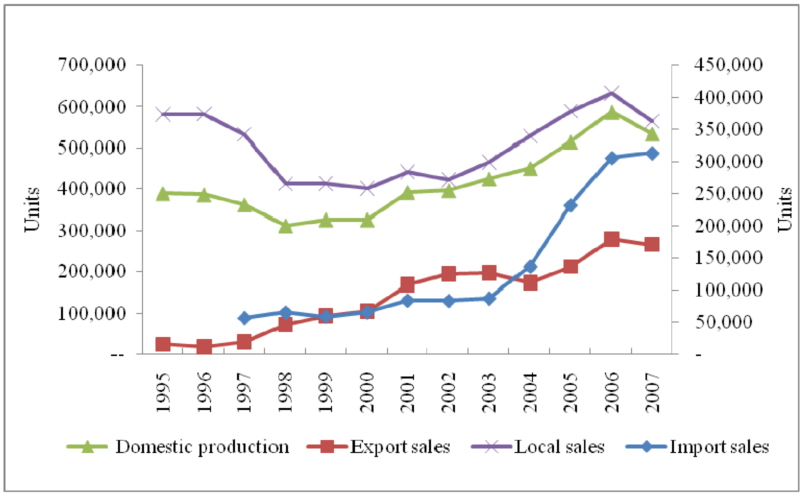
♦2006 values (WTO, 2008)

4.3.2 Production and sales

In 1995, at the start of the MIDP, domestic production slowed down until 1998 and then began to increase steadily from 2002 until 2006. The gap between domestic production and local sales has become smaller since 1995 indicating some lowering of export sales of CBUs. On the other hand, the importation of CBUs increased sharply from 2003. Figure 4.1 describes trends in domestic vehicle production and import sales of CBUs.

According to the President of NAAMSA, the number of model platforms (models) has declined from 42 to 22 models and the average volume per model has increased from 8,515 to 22,609 units. Presently, domestic content levels in CBUs range from 40 per cent to over 60 per cent. Net profits before tax as a measure of industry profitability of all OEMs increased more than fourfold from R2,032 million in 1995 to R8,744 million in 2006 (NAAMSA, 2007). Profitability has been positively influenced by the stable macroeconomic environment, strong consumer demand, investment and trading conditions and government policy.

Figure 4.1 Domestic vehicle production and vehicle imports (units), 1995–2007



Source: Computed from Quantec database and NAAMSA (2007)
*Notes: *Vehicle production includes passenger cars, light medium and heavy commercial vehicles.*
***Domestic production equals sales of locally produced CBUs (local sales) and exports sales of CBUs.*
****Import sales data from 1997–2007*

As shown in Table 4.7, capital expenditures by OEMs increased substantially from R846,8 billion in 1995 to R3,095 billion in 2007 (NAAMSA, 2002; 2007). However, from 2006 to 2007, capital expenditure declined to almost half from R6,249 billion to R3,095 billion. The uncertainty of the MIDP is cited as the main reason for lower investments in the industry (NAAMSA, 2008). According to Table 4.7, in 2007, 79 per cent of total capital expenditure involves OEM support in respect of export related investments and production facilities.

Table 4.7 Capital expenditure for new vehicle manufacturing, 1995–2007

Description	**1995 (Rm)**	**2000 (Rm)**	**2003 (Rm)**	**2007 (Rm)**
Product, local content, export investments and production facilities	733,8 (0.87)	1800,1 (0.84)	1989,4 (0.86)	2458,7 (0.79)
Land and buildings	34,9 (0.04)	109,7 (0.07)	141,5 (0.06)	382,4 (0.12)
Support infrastructure (IT, R&D, Technical, etc.)	788,1 (0.09)	140,6 (0.09)	193,9 (0.08)	254,4 (0.08)
Total	**8,468**	**1561,5**	**2324,8**	**3095,5**

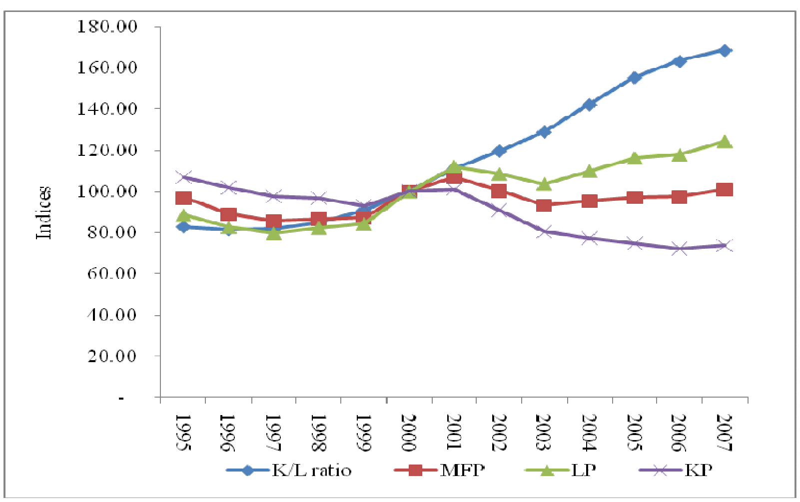
Source: NAAMSA Annual reports, various issues
Notes: Figures in parenthesis denotes shares in total capital expenditure

In 2002 to 2003, significant investments for exports were undertaken by OEMs, which include Toyota investing R3,5 billion to double production capacity within three years, VWSA investing R2 billion, BMW SA investing R2,1 billion for production of the new-generation 3-series BMW, and so on (DTI, 2003). More recently, in 2006, GM invested 330 US billion dollars in the production of Hummer vehicles and VWSA invested 1 US billion dollars for new models, a new paint facility and a new truck and bus assembly plant (*FocusReports*, 2006). These investment programmes have largely been driven by the government's MIDP incentive programme. From Table 4.7, there is a need to increase the proportion of support infrastructure (IT, R&D, Technical, etc.) in total capital expenditure, which is currently less than 1 per cent.

4.3.3 Productivity

Figure 4.2 shows the relationship between multifactor productivity (MFP), labour productivity (LP), capital productivity (KP) and the capital-labour ratio (K/L) for the automobile industry for the period 1995 to 2007. A slight upward trend in MFP performance is observed over the period. MFP is typically used as a measure of production efficiency and is regarded as a better measure of each of the productivity indices; that is, how effectively the combinations of labour and capital inputs are used in production operations.

Figure 4.2 Productivity indices and capital-labour ratio, 1995–2007



Source: Computed from Quantec database
Notes: Index 2000 = 100
Industry trends, motor vehicles parts and accessories (SIC data 381–383)

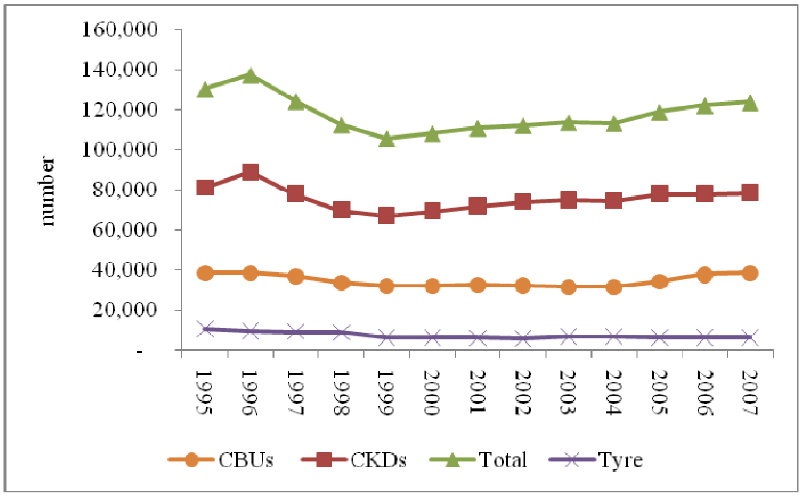
Capital per worker is increasing as greater usage of capital inputs (e.g. tooling and machines) makes the use of labour more effective. Between 1995 and 2007, the number of formal industry workers increased by an average annual growth rate (weighted) of 1.04 per cent and fixed capital stock increased by 8.35 per cent over same the period, reflecting a small increase in employment and substantial technological progress in automobile manufacturing respectively. Rising labour productivity (3.74 per cent) and falling capital productivity (–3.26 per cent) trends reveal some substitution of labour inputs in favour of fixed capital inputs in the automobile industry. In addition, real fixed investment realised a 13.72 per cent average annual growth rate over the 1995 to 2007 period.

According to Figure 4.2, the upward trend in the capital-labour (K/L) ratio reflects the high capital intensity of the automobile industry, which grew at an annual average rate of 7.23 per cent between 1995 and 2007. Alleyne & Subramanian (2001) reveal that South Africa produces and exports (comparative advantage) capital-intensive products relative to labour-intensive products when trading with higher income trading partners, despite its labour abundance. Furthermore, as illustrated in Figure 4.2, the relationship between MFP and the capital-labour ratio (K/L) can be viewed as an indication of downsizing and greater mechanisation in the automobile industry.

4.3.4 Industry employment

Figure 4.3 show trends in the industry's employment levels for the period 1995 to 2007. In 1995, 38,621 workers were employed in vehicle manufacturing and 81,000 workers in component manufacturing (NAAMSA, 2003). By 2007, 38,700 and 78,500 persons were employed in assembly and component manufacturing respectively (NAAMSA, 2007). More specifically, between 1995 and 2007, employment in vehicle assembly, component manufacturing and the total industry increased by 0.20 per cent and decreased by –3.09 per cent and –2.02 per cent respectively. Flatters (2003) argue that the export subsidisation programme under the MIDP may have been successful in increasing automotive exports but has also resulted in jobs being sacrificed.

Figure 4.3 Industry employment, 1995–2007



Source: NAAMSA (2002; 2007)
Notes: Projected value based on Jan–Jun 2007

4.3.5 Automotive exports

The automobile sector in South Africa has experienced substantial growth in trade and foreign investment in recent years. The success of automotive exports has largely been stimulated by the provisions of the MIDP, especially the IEC arrangements whereby OEMs have the opportunity to rebate import duties for export purposes. This has led to South African OEMs increasing production for export markets.

The share of component exports in total automotive exports in nominal rand terms has been decreasing: 83 per cent in 1995 to 58 per cent in 2006. Conversely, the share of CBU exports in total automotive exports in nominal rand terms has been increasing: 17 per cent in 1995 to 42 per cent by 2006[13]. The rise in share of CBU exports is mainly attributable to MNCs operating in the South African vehicle market and cross-border connections facilitated by reduced international transport costs providing opportunities to exports.

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[13] Note that the value of the export shares in this chapter differs from that reported in Chapter 5. This chapter (Chapter 4) uses NAAMSA data in *South African rands* whilst Chapter 5 adopts HS 6-digit data in *US dollars* to compute the respective shares of automotive exports. Overall, the findings are similar in that both chapters report falling shares of CKD exports and rising CBU exports.

Table 4.8 shows South Africa's main automotive trading partners for exports of CBUs and automotive components. In 2006, South Africa exported 71.8 per cent of the value of total component exports (CKDs) and 20.2 per cent of the value of total CBU exports to countries of the EU (United Kingdom, Germany and France).

Table 4.8 South Africa's automotive exports by region/country, 2000–2006

Automotive exports	2000	2001	2002	2003	2004	2005	2006
	(Rb)	(Rb)	(Rb)	(Rb)	(Rb)	(Rb)	(Rb)
South Africa to world	20,0	30,0	40,1	40,7	39,2	44,7	54,4
Light vehicles	7,0	10,9	16,4	18,7	17,0	21,4	23,9
Automotive components	12,6	18,6	22,9	21,3	21,7	23,3	30,5
South Africa to NAFTA	%	%	%	%	%	%	%
Light vehicles	7.3	17.9	22.6	19.5	13.9	3.8	10.9
Automotive components	10.1	12.5	11.1	8.9	8.4	11.1	11.0
South Africa to EU	%	%	%	%	%	%	%
Light vehicles	52.8	37.6	29.9	19.5	24.5	23.6	20.2
Automotive components	69.8	70.5	70.85	69.9	71.2	71.4	71.8
South Africa to SADC	%	%	%	%	%	%	%
Light vehicles	11.9	9.2	10.2	5.6	3.9	4.2	4.7
Automotive components	5.6	5.8	6.2	5.8	5.5	4.6	4.3
South Africa to other	%	%	%	%	%	%	%
Light vehicles:							
Australia	12	10	11	15	19	24	20
Japan	11	13	18	35	32	35	29
Other	54	31	22	9	7	9	14
Automotive components:							
Australia	-	0.8	1.4	2.3	2.1	2.8	1.7
Japan	-	1.7	3.2	2.6	2.3	1.2	2.4
MERCOSUR (Argentina/Brazil)	0.4	0.5	0.4	0.7	0.3	1.0	0.9
Other	-	14.0	13.0	14.5	14.3	14.1	11.6

Source: Compiled from NAAMSA various annual reports

The share of CBUs from SA to the EU in 2006 shows a drop from 52.8 per cent in 2000. Also in 2006, South Africa exported 10.9 per cent of the value of total component exports and 11.0 per cent of the value of total CBU exports to the United States, a member of the North American Free Trade Area (NAFTA). Table 4.8 also shows that exports of automotive products to selected countries (Australia, Japan and China) of the APEC and Brazil (MERCOSUR) are steadily increasing.

4.3.6 Automotive industry trade balance

The automobile industry is a large net consumer of foreign currency; in 2006 automotive imports amounted to R88,5 billion and exports were valued at R55,1 billion. As indicated in

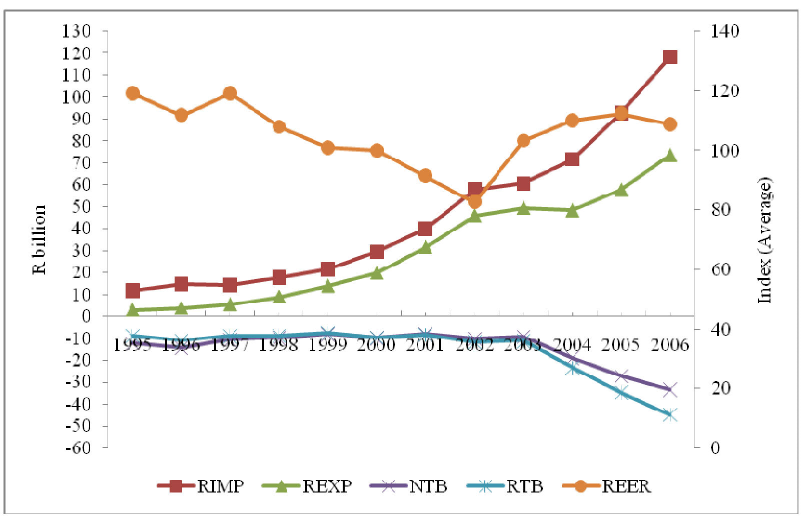
Table 4.9, despite the local industry's exceptional growth in automotive exports it remains a net importer of automotive products and experienced an automotive trade deficit of R33,4 billion in 2006. The value of the automotive trade deficit is significantly weaker in real terms (R44.7 billion).

Table 4.9 South Africa's automotive industry trade balance, 1995–2006

Year	Imports (Rb)	Exports (Rb)	Trade Balance (Rb)
1995	16,4	4,2	(12,2)
1996	19,2	5,1	(14,2)
1997	17,2	6,6	(10,6)
1998	19,9	10,1	(9,8)
1999	22,8	14,8	(8,0)
2000	29,7	20,0	(9,7)
2001	38,0	30,0	(8,0)
2002	50,2	40,1	(10,1)
2003	49,8	40,7	(9,1)
2004	58,0	39,2	(18,8)
2005	72,5	45,3	(27,2)
2006	88,5	55,1	(33,4)

Source: NAAMSA (2007)
Notes: Nominal values.

Figure 4.4 Automotive industry trade balance and the real effective exchange rate (REER), 1995–2006



Source: Author's compilation from NAAMSA (2007), SARB (2009).

The volatile exchange rate has important pass-through effects for the industry's trade deficit. Figure 4.4 shows movements in the real effective exchange rate (REER) for the period 1995 to 2007. Between 1995 and 2001, the REER depreciated, contributing to some improvement in the value of the trade deficit balance from R12.2 billion to R8.0 billion. On the other hand, from 2002 to 2005, the REER appreciated contributing to an increase in the real value of imports (RIMP) relative to the value of exports (REXP), causing an enlargement of the industry's trade deficit from R8.8 billion to R44.7 billion in real terms. Of course, the lowering of tariffs applied to the industry also contributed to rising real imports. Tariffs were reduced from between 40 and 30 per cent in 2002 to between 32 and 26 per cent in 2006.

4.4 SUMMARY AND CONCLUSIONS

The automobile industry in South Africa remains regulated and protected despite liberalisation efforts by the government since 1995. The South African government has succeeded in constructing the auto industry into a successful exporting sector on the back of extensive government support (tariff assistance and export subsidisation). However, this has not occurred without costs to consumers and certain industry stakeholders. It is well known in international trade theory that such mechanisms cause distortionary effects and tend to largely protect producers by increasing effective protection to the industry and also contributing to greater welfare losses imposed on vehicle consumers and society.

In view of the new industry policy that is expected to be introduced in 2013, the stance of the government is to keep tariffs fixed at 20 and 25 per cent for CKDs and CBUs respectively, while at the same time discontinuing the import–export complementation (IEC) scheme and subsequently replacing it with production subsidies (see Table 4.6). Theoretically, compared to tariffs and export subsidies (as the IEC scheme), production subsidies appear to be less distortionary as they result in the avoidance of increasing inefficient domestic production and subsequent losses in consumer surplus. Therefore, the introduction of production subsidies as part of the APDP is expected to have a more positive impact on consumer welfare than export subsidy-type measures. Further tariff liberalisation is also recommended for future automotive policy.

A concerning fact is the inability of the industry to create sustainable jobs, in view of the fact that the local industry is facing important challenges caused by globalisation and intense competition from emerging economies. The MIDP's IEC scheme have mainly facilitated

OEM investment strategies and have contributed to improved machinery and tooling, and technology improvements the OEMs' contribution to supporting infrastructure (IT, R&D, technical, etc.) is very low and should be encouraged to increase to at least to 5 per cent of total capital expenditures by the end of 2020.

Overall, trade in automotive products in the South African automobile industry is significant and is vital for the growth and development of the local industry and national economy. Thus, a useful exercise is to better understand the pattern of trade underlying this strategic industry and the determinants thereof. Since increasing the share of IIT types in total trade in the automobile industry is expected to yield less expensive adjustment costs compared to increasing the share of inter-industry trade in total trade, IIT should be encouraged. Thus, the potential impacts of country and industry determinants on IIT patterns in the South African automobile industry are important to investigate. These are the main hypotheses presented in this thesis and will be discussed and evaluated in Chapters 5 through to 8.