THE NEW ECONOMIC GEOGRAPHY OF A SADC FREE TRADE AREA

THESIS

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By

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DECLARATION

Except for the references specifically indicated in the text, and such help as I have acknowledged, this thesis is wholly my own work and has not been submitted for degree purposes at any other university.

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14 January, 2004

ABSTRACT

The current implementation of a free trade area in SADC has given rise to concerns that the present location of industry in the region will be adversely affected. Specifically, many of the smaller and less-developed countries fear that this change will result in a loss of their industry towards the more developed members, and particularly towards South Africa.

This study uses the framework of the new economic geography to address these concerns. The new economic geography is a body of theory that has arisen in the last decade and allows for a dynamic analysis of the process of regional integration. Studies of such dynamic effects in the developing country context are exceedingly scarce, and particularly so in southern Africa. Another area of little research is in the comparison of the evolving industrial structure of different regional blocs. Thus, in response to this gap in the literature and in order to address the concerns of polarisation of industry within the SADC region, a two-pronged empirical approach is taken. The study first conducts a review of the spatial distribution of industry within SADC from 1970 to 1999. This is achieved through the calculation and examination of industrial locational Gini coefficients, measuring the relative degree of concentration of 28 ISIC (rev 2) industries for the years 1970, 1980, 1985, 1990, 1995 and 1999. Secondly, an empirical comparison is conducted with other blocs that are in the process of deepening regional integration, namely the European Union and Mercosur. Again, this is done through the calculation of locational Gini coefficients for individual industries for all three blocs at five year intervals from 1980 to 1995, and then for 1999.

The average level of concentration within SADC is found to increase steadily from 1970 to 1990. Between 1990 and 1995, the level of concentration increases further, but at a lower rate, and, by 1999 industry begins to disperse. The Gini coefficient is a relative measure, and thus does not measure the absolute level of concentration. Thus, much of the increase in concentration seen is towards peripheral countries. To further interpret the Gini, the changes in concentration are compared to the absolute changes in manufacturing employment in South Africa. From this analysis, eight of the 28 industries analysed

show particular tendencies to concentrate in the periphery. These are beverages, textiles, wearing apparel, paper and products, rubber products, other non-metallic mineral products, transport equipment, and professional and scientific equipment. Likewise, another six industries become more concentrated in South Africa over this time, namely food products, printing and publishing, industrial chemicals, petroleum refineries, miscellaneous petroleum and coal products, and electrical machinery. According to the Gini coefficient, the tobacco industry is by far the most concentrated, while the wood products industry is the most dispersed. It is also found that scale-intensive industries tend to be among the most concentrated.

In the cross-bloc comparison, Mercosur has the lowest level of aggregate concentration with an average Gini of 0.08 in 1999. This compares with Ginis of 0.28 for the EU, and 0.22 for SADC. The EU has the largest increase in concentration over the period, while the concentration in Mercosur falls during the 1980s, increases in the mid 1990s and then falls again by 1999. A common theme, however, between all three blocs is a trend towards dispersion in the late 1990s. This is particularly apparent in SADC and Mercosur where the Gini decreases in value, while in the EU, the Gini only increases marginally in this period. Other studies of the EU have indicated that industry was starting to disperse at this time. This finding would be more apparent at a greater level of industrial disaggregation.

The following industries are found to be agglomerated above the average level in all three blocs: tobacco, miscellaneous petroleum and coal products, and pottery china and earthenware. Conversely, transport equipment, paper and products, machinery except electrical, plastic products, rubber products, and fabricated metal products tend to be more dispersed across all three. Perhaps more interesting is that there appears to be some commonality between industries that become more agglomerated across all three blocs, while industries that dispersed tend to be region specific. The industries that show universal agglomeration tendencies are the highly sensitive wearing apparel and textiles industries, in addition to industrial chemicals, printing and publishing, iron and steel, and plastic products. In relation to SADC, the first two of these industries show an increased

concentration in the periphery, as in the EU, while the remaining industries show tendencies to concentrate in the core.

The new economic geography predicts that, as the presently high levels of transport costs begin to fall in SADC, industry will tend to concentrate in the core. However, the results of this study indicate that the effect on manufacturing is, to a large extent, sector specific, with some manufacturing industries concentrating in the core and others in the periphery. The study therefore concludes that the mass polarization of industry from the smaller countries in SADC towards South Africa is unlikely to occur with the further reduction in trade costs. Although certain industries may be attracted towards the core, the high degree of wage disparity in the region and present trade concessions from developed markets overseas towards the peripheral countries, will make these countries an attractive location, particularly for export orientated firms.

Two main policy recommendations result from the study. Firstly, individual countries in SADC need to promote those industries that show concentration tendencies in their country. Secondly, in order for the periphery to maximize their gain from the free trade area, transport costs within the region need to be reduced rapidly and effectively.

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Chapter 1: Introduction

In recent years there has been a global surge in favour of regional integration (Kose and Riezman, 2000; McCarthy, 1999; Tsikata, 1999; Kirkpatrick 1998). This movement has seen the formation of the North American Free Trade Agreement (NAFTA), the Southern Cone Common Market (MERCOSUR) in Latin America, the Association of South East Asian Nations (ASEAN), the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA), and the enlargement and deepening of the European Union. The establishment of regional integration agreements has been particularly popular in Africa, where more regional integration and cooperation agreements have been signed than on any other continent (Radelet, 1997:1). These have included the East African Community (EAC), the Southern African Customs Union (SACU), SADC, COMESA, the Economic Community of West African States (ECOWAS), and the Union Economique et Monetaire de l'Ouest Afrique (UEMOA) amid numerous others.

Regional integration agreements (RIAs) have been implemented in various forms between developed countries (as in the EU) and developing countries (such as the EAC and SADC), or involving both, as in the case of NAFTA. They are all, however, generally aimed at removing discrimination between foreign and domestic goods, services, and factors of production (Balassa, 1976). Presently, between 55 and 60 percent of world trade occurs within such regional trading blocs (Schiff and Winters, 1998:178).

Of particular interest in the case of southern Africa is the integration of countries of unequal size and levels of development. Literature regarding this topic has, however, diverged widely over the years. The New International Economic Order of the 1970s saw globalisation leading to unequal development and gains biased against the less-developed countries (Krugman and Venables, 1995:858). Conversely, Ross Perot (quoted in Krugman and Venables, 1995:858) warned at the inception of NAFTA of a "great sucking sound" to the South, with particular reference to the relocation of industry from America to Mexico.

Polarisation of industry is an area of great concern amongst the countries of SADC as the region moves towards deeper levels of regional integration. The group is in the process of implementing a free trade area which should be fully functional by 2012. The main cause for concern is South Africa's overwhelming economic and political dominance within the region, to which it contributes 77 percent of regional gross domestic product (GDP) and 84 percent of manufacturing value added (MVA) (World Bank, 2003). Although this concern is highly apparent and vocal, little concrete research has been done to address the issue. If left unresolved this could severely hamper progress towards a regional free trade area.

Studies that have modelled the potential impact of a free trade area in SADC have tended to focus on static welfare effects. The results of these studies indicate that such static effects are likely to be small. Thus, there is a need to investigate the possible dynamic effects of such a regional agreement, where the impact of the RIA may be greater. Investigating all the possible dynamic effects would be an exceedingly difficult and complex task; this study will therefore focus on the dynamic locational distribution of the manufacturing industry. This is an area of research that is becoming more and more popular as the number of RIAs has increased, and particularly so with the expansion and deepening of the European Union. The beginning of the 1990s saw a resurgence of interest in the geographical distribution of industry at which time the theory of the new economic geography started gaining popularity.

The theoretical framework of the new economic geography provides economists with more of the tools necessary to explain and model regional disparities in industry than the standard neoclassical model or alternate methods of regional analysis. To date, much research within this framework has taken place in the EU and North America, but very little within the developing world. It would thus be useful to apply this analysis to a developing region context both to test the theory and to provide an alternative method of analysis for these countries. Additionally, there are very few studies that have compared the distribution of manufacturing across different blocs. Those that have, focus on

comparing the EU to North America with other regional groupings, especially among developing countries, being ignored. In comparing alternate blocs it will be possible to investigate whether industries are affected in similar ways across different regional groupings.

This study will use the tools of the new economic geography to investigate the regional distribution of manufacturing within the SADC region from 1970 to 1999, and compare this to the experience of two other regional blocs, the EU and Mercosur. In so doing, the study will examine how individual manufacturing industries are currently spatially distributed, how this has changed in the last 30 years, and draw inferences from other regional blocs about which industries have a tendency to agglomerate and which tend to disperse. The study will begin in Chapter 2 by providing a brief overview of the three regional blocs that will be used in the analysis, with a particular focus on SADC. Chapter 3 will then provide the rationale for, and introduce the theoretical framework of, the new economic geography. The second part of the chapter will review the empirical evidence for the theory and various criticisms that have been levelled at it. Chapter 4 will survey studies of RIAs based on the new economic geography that have been done within SADC, the EU, North America and Mercosur. This leads into the empirical section of the study where the methodology of the analysis will be presented in the first part of Chapter 5. The empirical investigation will consist of an overview of the changing distribution of collective and individual manufacturing industries in SADC, which will then be compared to the regional experience of the EU and Mercosur. Chapter 6 will conclude with the results of the study and possible areas for further research.

Chapter 2: Regional Integration Agreements

2.1 Introduction

This chapter will provide an introduction to regional trade agreements. It will then proceed to outline the three regional blocs used in the analysis, SADC, Mercosur and the EU, with the focus on SADC. The overview will give a brief history and economic profile of each RIA and highlight important features of the agreements. The three blocs chosen provide examples of regional blocs at different levels of integration, with the first two in a developing country context and the EU, generally, in a developed country context. An important feature of each agreement is the high level of internal economic disparity.

2.2 Types of regional trade agreements

There are four traditional forms of RIAs, explained as follows.

1. *Free Trade Area* (FTA) – This is the most common form of integration and involves the elimination of tariffs among member countries whilst each country maintains its own tariff and protection policy *vis-à-vis* the outside world, thus requiring strict rules of origin. A recent example is NAFTA, incorporating the USA, Canada and Mexico.
2. *Customs Union* (CU) – This, the second step of regional integration, requires the region to adopt a common external tariff and completely eliminate internal trade barriers. This can be seen in the Southern African Customs Union (SACU) involving Botswana, Lesotho, Namibia, South Africa and Swaziland.
3. *Common Market* – In addition to the case of a customs union above, restrictions on the movement of labour and capital are removed amongst member countries; an example of a common market currently being implemented is the Caribbean Community and Common Market (CARICOM).
4. *Economic Union* – This is the most comprehensive form of regional integration where national economic policies and institutions are unified with supreme institutions having jurisdiction in all member countries. If a common currency is adopted the area becomes a *monetary union* as well. Each country, however,

remains a separate political entity. The European Union is an example (Appleyard and Field, 1998:353-355; Radelet 1997:3).

2.3 The Southern African Development Community (SADC)

2.3.1 Introduction

There are numerous bilateral and multilateral agreements within Southern Africa (McCarthy, 1999). The origins of regional integration within Southern Africa can be traced back to the formation of the Southern African Customs Union (SACU) in the late nineteenth century. Subsequent agreements were largely focused on reducing dependence on first world countries and apartheid South Africa (Steel and Evans, 1986:3), such as SADC, COMESA and its predecessor, the PTA. These agreements tend to overlap each other, and in addition, contain a complex network of bilateral agreements resulting in conflict between the different organisations, especially with the concurrent implementation of a free trade area in COMESA and in SADC. This causes problems as a number of SADC members are also members of COMESA.

2.3.2 Overview of SADC

The Southern African Development Community (SADC) was initiated in 1980 primarily as a means of regional co-ordination, as opposed to trade integration, and was then known as the Southern African Development Co-ordination Conference (SADCC). The main goals of SADCC, as set out in the 1982 *Programme of Action,* were as follows.

- to reduce economic dependence especially, but not exclusively, on South Africa;
- to forge links to create an equitable sub-regional grouping;
- to mobilize resources to promote and implement sub-regional integration policies; and
- to secure international co-operation for economic liberation and collective self-reliance (Tsikata 1999:2).

The nine initial members were Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe. With the demise of apartheid in South Africa, and calls from COMESA for a merger, the 1990s saw a re-modelling of the group. This transformation included the renaming of SADCC as SADC, the Southern African Development Community, and an altered mandate to incorporate South Africa as an official trading partner in conjunction with the adoption of new trade policies. This resulted in the subsequent accession of five new members, Namibia, South Africa, the Democratic Republic of Congo, Mauritius and the Seychelles, to bring the total membership up to fourteen countries. As with the previous arrangement, in the new SADC, each member was assigned a sectoral responsibility, such as industry (Tanzania), food security (Zimbabwe), transport and communications (Mozambique) and finance (South Africa) (Ramsamy, 2000). However, recent developments (such as the irony of Tanzania's responsibility for industry, and Zimbabwe for food security) have seen the consolidation of the 21 previously nationally-based co-ordination units into four directorates that are centrally-based, namely, trade and industry, finance and investment; infrastructure and services; food, agriculture and natural resources; and social and human development and special programmes. As an advance to the initial 'loose' co-ordination arrangement of SADCC, the new SADC looked towards greater trade integration (Cattaneo, 1998:14). SADCC had achieved a measured degree of success, namely through increasing aid inflows to the region and improved transport and communication networks (Cattaneo, 1998:15). This newfound enthusiasm, however, was short-lived, as there was little progress during the early 1990s. The lack of progress has been attributed to a number of chronic factors, namely, lack of political commitment of member states, organisational inefficiency and bureaucracy (Leistner, 1992:4-5; Leistner, 1995:272), poor capacity (Mills, 2003:1), and a focus on short-term national considerations (The Danish Ministry of Foreign Affairs, cited in Tsikata, 1999:2-3). Evidence of the lack of real commitment is the fact that, to date, only 10 out of the 21 SADC protocols initiated have been ratified (Mills, 2003:1).

In light of their new agenda and a desire to advance further, SADC agreed to form an FTA (Cattaneo, 1998:1). Following on from this, the most recent attempt at restructuring has seen the development of a Regional Indicative Strategic Development Plan, and a re-organisation of member subscriptions. In the previous arrangement, each member's subscription consisted of an equal contribution of US$800,000 per annum. This, however, placed an unequal burden on the smaller countries leading to Seychelles giving notice of membership, and 'non-participation' of the DRC due to financial arrears. The new formula bases subscriptions on GDP size and ability to pay, with South Africa contributing 20 percent of the budget, while the smaller countries pay a minimum of 5 percent (Mills, 2003:3).

The SADC Protocol on Trade achieved the two thirds majority needed to enter into force with Zambia's ratification on the 25th of January 2000, while it was technically launched on 1st September 2000. The Protocol aimed for the gradual implementation of a free trade area with 85 percent liberalisation by 2008 and 100 percent by 2012 (Sadcreview, 2002:5). This allows for asymmetrical tariff reductions between SACU and the other SADC members. For example, by 2008, SACU is scheduled to have almost entirely completed its commitment to the protocol, while the remaining countries will have applied between 60 and 80 percent of their proposed tariff reductions (Imani Development, 2003:33).

To date eleven countries have ratified the SADC Protocol on Trade. Angola and the DRC, although currently excluded, have initiated processes to join the FTA, while Seychelles has recently given notice of withdrawal of its SADC membership (BIDPA, 2003:2; McCarthy, 2003:4). The rules of origin for the FTA have been agreed upon with the exception of wheat products. The status of implementation of the Protocol is as follows.

Table 2.1: Implementation of the SADC Protocol on Trade

Country	Date of completion	Other…
Malawi	2012	100% coverage
Mauritius	2012	100% coverage
Mozambique	2012	100% coverage
SACU	97% coverage by 2008 100% coverage by 2012	
Tanzania	2012	SADC offer not implemented
Zambia	2012	44.5% of tariffs reduced to zero in 2001
Zimbabwe	86.7% coverage by 2012 for SADC 90.1% coverage for South Africa	Only the offer to South Africa has been implemented

Source: Sadcreview, 2002:1

Table 2.2: SADC in figures: General indicators

	Land area	Population	GDP	GDP growth	GDP per capita	MVA	US$ exchange rate	Trade as % of GDP	Bank rate
	Km^2	Millions	Constant 1995 US$ millions	%	Constant 1995 US$	Constant US$ millions	Year Avg	%	%
Year		2002	2001	2002	2001	2001	2002	2001	2002
Angola	1,247,000	13.9	7,095	3.2	525	305	43.7	136	150
Botswana	585,000	1.73	7,000	6.3	4,130	313	11.4	86	6.3
Congo, D.R.	2,345,409	54.9	4,457	-4.5	85	-	18	35	344
Lesotho	30,355	2.25	1,161	4.0	563	69	11.9	119	9.48
Malawi	118,484	10.6	1,714	-1.5	163	202	14.8	64	86.6
Mauritius	1,865	1.21	5,222	7.2	4,352	1,064	6.4	127	29.96
Mozambique	790,380	17.7	3,852	13.9	213	696	21.9	66	20704
Namibia	824,269	1.8	4,270	2.7	2,383	440	9.2	120	10.57
Seychelles	455	0.08	490	-8.1	5,939	105	6	198	5.85
South Africa	1,223,201	45.42	175,901	2.2	4,068	31,552	10.1	53	10.51
Swaziland	17,000	1.02	1,633	1.6	1,529	456	11.7	150	10.45
Tanzania	945,000	34.57	6,784	5.7	197	473	4.6	40	978.9
Zambia	752,614	10.3	4,166	4.9	405	431	21*	64	30
Zimbabwe	390,757	13,8	7,172	-8.4	559	1,042	133.2	43	55.04

Source: Sadcbankers (2003), World Bank (2003)

The SADC region represents a cumulative GDP of US$ 230 billion, however, the majority of this value (almost 77 percent) is contributed by South Africa (see Table 2.2). GDP per capita varies widely within the group with similar income levels amongst Botswana, Mauritius, and South Africa, and Namibia to a lesser extent. The Seychelles tops the group, primarily because of their small population. The remaining countries have extremely low levels of GDP per capita with none exceeding US$ 600. The DRC and Malawi have the lowest income levels per capita.

South Africa's dominance in manufacturing value added (MVA) is even more apparent, contributing almost 89 percent of the total SADC MVA in 1980. However, this share has fallen marginally to 84 percent as of 2001. Likewise, South Africa's share of manufacturing employment fell from 73 percent in 1980 to 70 percent in 1999 (see table 5.2). The other countries with notable manufacturing contributions are Mauritius, Tanzania and Zimbabwe, with Zimbabwe being the next largest manufacturing country after South Africa with 8.3 percent of total manufacturing employment.

For SADC as a whole, MVA has grown by an annual average of 4.5 percent between 1982 and 2002 (see Table 2.4). However, this growth has been highly erratic for most countries. The most notable growth rate in MVA was seen in Mozambique which averaged 18.8 percent in the decade ending 2002; much of this has been due to rapid growth in the last few years, particularly in 2001, when MVA grew by 27.2 percent. Lesotho and Mauritius stand out with growth rates nearing 10 percent per annum. On the other hand, Angola, the DRC, Malawi and Zimbabwe have witnessed negative growth rates during one of the two decades.

There has been a negative trend in terms of the share of manufacturing to GDP, with the regional average falling from 15.3 percent in 1990 to 12.0 percent in 2002 (Table 2.3). This has been spurred by significant declines in the manufacturing sector in Zimbabwe, Zambia and Malawi, and marginal declines in South Africa. The exceptions to this trend are Lesotho, Mauritius, Mozambique and the Seychelles, who have managed to maintain or increase their share of MVA to GDP.

In employment terms[1], there was an overall increase in manufacturing employment from 1980 to 1999 in all countries with the exception of Mozambique and Zambia, with particularly large increases in Botswana, Lesotho, Mauritius and Swaziland. Lesotho's contribution increased by five fold over the entire period, again with the majority of the increase occurring in the 1980s and a 375 percent increase in actual employment over the two decades.

Botswana, Mauritius, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe all experienced employment growth in the 1980s, while manufacturing employment fell in the 1990s. Employment in Mauritius more than doubled in the 1980s, with only a slight fall in the 1990s. The increase in Mauritius's share of overall manufacturing employment from 2.3 percent in 1980 to almost 5 percent in 1999 shows the increased importance of the country in the region. Likewise, Botswana's share of manufacturing employment increased substantially by 268 percent in the 1980s, and remained somewhat constant during the 1990s. Mozambique, Zambia and Zimbabwe all experienced large reductions in employment in the 1990s after slight increases in the 1980s.

Malawi was the only country that showed a fall in actual employment together with their overall contribution in the 1980s, although by the end of the period, the level of contribution increased back to 1980 levels at 2 percent of the SADC total. Unfortunately, data for Namibia could not be sourced for the 1980s due to its economic and political union with South Africa at that time. However, from 1994 to 1999, employment grew by 9 percent and the country's share of total SADC manufacturing employment by 0.1 percent to 1.1 percent.

[1] Shares of employment rather than MVA are used as the empirical analysis in chapter 5 is based on manufacturing employment figures. See Appendix 6.

Countries that stand out in particular are the small SACU countries, namely Botswana, Lesotho and Swaziland, which, more than other countries with the exception of Mauritius, all substantially increased their share of overall manufacturing employment over the last 20 years.

Table 2.3: Share of manufacturing sector to GDP (%)

	1990	**2000**	**2002**
Angola	5	2.9	4.3
Botswana	4.9	5	4.4
DRC	14.6	2.4	2.6
Lesotho	13.9	15.2	16.5
Malawi	13.6	1.61	0.9
Mauritius	23.57	23.63	22.5
Mozambique	10.7*	12	14.2**
Namibia	13.8	10.2	9.6**
Seychelles	10.1	14.5	14.5***
South Africa	23.63	18.58	18.83
Swaziland	29.1	24.9	25.1**
Tanzania	9.27	7.5	7.44**
Zambia	31.6	10	10**
Zimbabwe	20.5	17.4	17.7**
Average	15.3	11.8	12.0
* 1991 figure			
** 2001 figure			
***2000 figure			

Source: World Bank (2003)

Table 2.4: Manufacturing value added: Actual levels and real growth

	1980	1990	2001	1982-1992	1992-2002	2001	2002
Angola	535	290	305	**-11.3**	**3.7**	**10**	**-**
Botswana	68	201	313	**12.4**	**4.3**	**-0.1**	**2**
Congo, Dem. Rep.	-	-	-	**-3.7**	**-**	**-**	**-**
Lesotho	17	35	69	**8.4**	**5.3**	**7.5**	**8.9**
Malawi	129	194	202	**4.4**	**-1.4**	**-14.2**	**-11.4**
Mauritius	245	596	1,064	**10.5**	**5.3**	**6.7**	**2.3**
Mozambique	213	213	696	**-**	**18.8**	**27.2**	**6.2**
Namibia	232	335	440	**0.5**	**3.3**	**5.9**	**6.3**
Seychelles	31	51	105	**9.9**	**5.7**	**-8.7**	**3**
South Africa	25,614	29,060	31,552	**0.7**	**2.2**	**3.6**	**4**
Swaziland	86	349	456	**19.7**	**2.6**	**0.9**	**1.6**
Tanzania	-	350	473	**-**	**4.3**	**5**	**7.8**
Zambia	240	367	431	**5.7**	**1.8**	**4.2**	**5.8**
Zimbabwe	1,010	1,405	1,042	**3.2**	**-2.5**	**-19**	**-12**
Total / Average	28,635	33,681	37,463	**4.3**	**3.8**	**4.8**	**3.5**

World Bank (2003)

Almost all countries in the region are heavily reliant on external trade, particularly of primary products to the developed world, especially the EU, with trade values often exceeding GDP. With the exception of SACU, internal SADC trade generally represents a small proportion of the total trade of countries involved. However, there are a number of bilateral agreements within the region which are discussed below.

2.4 Bilateral and other existing trade agreements in SADC

At present, there are over 14 bilateral trade agreements within SADC (Page, 1998; Kabemba, 1996). Kabemba (1996:4) states the official position of the SADC as being that these agreements will remain in operation until superseded by the FTA. Due to the numerous quantity of such agreements, the following section will list only those dealing with South Africa and Zimbabwe, traditionally[2] the two most important trading partners within SADC.

2.4.1 South Africa – Zimbabwe

This agreement dates back in various forms to the 1903 Customs Union Convention, and has been amended and reorganised a number of times since. The latest major change was in 1964. Under this agreement certain South African and Zimbabwean goods are subject to lower tariff rates in the partner country, though there is a slight asymmetrical bias toward Zimbabwe (Cattaneo, 1998:21). However, in a reversal of preferences, South Africa raised import duties on textiles in 1992, which led to an erosion of Zimbabwe's relative margin of preference and tension between the two countries (Cattaneo, 1998:22). Subsequently, South Africa agreed to reinstate Zimbabwe's preferences to a certain degree (MBendi, 2003; Cattaneo, 1998:22).

2.4.2 South Africa – Malawi

This highly unequal arrangement began in 1990 and allows duty free access for most Malawian goods into the South African market, so long as there is local content of 25 percent or more (Cattaneo, 1998:23). This however, does not apply to certain agricultural products and coffee, tea and sugar for which an import permit is required (Cattaneo, 1998:23). South African goods on the other hand are only afforded the standard most-favoured-nation (MFN) treatment offered to all World Trade Organisation (WTO) members (MBendi, 2003). The trade agreement is said to have led to a significant increase in Malawian exports and substantial South African investment, especially in sectors with high import duties in South Africa.

[2] This is true over the period of analysis, but recently Zimbabwe's importance as a regional trading partner has diminished significantly along with its economy.

2.4.3 South Africa - Mozambique

Again, an unequal preferential trade agreement, the Mozambique concession allows for a limited number of Mozambican goods to enter South Africa, either duty free, or with substantial duty cutbacks (MBendi, 2003; Cattaneo, 1998:23). The local content requirement is 35 percent (GATT, 1993: 50). However, this agreement was not listed among Mozambique's bilateral agreements with the WTO (WTO, 2003).

2.4.4 Zimbabwe – Botswana

This agreement dates back to 1956, and allows for reciprocal duty-free and import licence free access of certain locally produced goods (Zim Trade, 2003; Kabemba, 1996:13). The agreement is one of the most important in SADC with the exception of those with South Africa, as trade between the two countries accounts for a substantial portion of intra-regional trade (Kabemba, 1996:9-13). The agreement is currently under re-negotiation (Mpofu, 2003).

2.4.5 Zimbabwe – Namibia

This agreement came into effect in 1992 (Cattaneo, 1998:24). It is a reciprocal agreement where all locally produced goods can be traded duty-free between the two countries, so long as Namibia does not re-export to other SACU countries. The goods, however, are still subject to excise duties (Cattaneo, 1998:24), and a 25 percent local content provision requirement (Zim Trade, 2003).

2.4.6 Zimbabwe – Mozambique

Like the Botswana agreement, this arrangement provides for a number of locally produced goods to receive reciprocal duty-free access (WTO, 2001; Cattaneo, 1998:25, Kabemba, 1996:31-34).

2.4.7 Zimbabwe – Malawi

Zimbabwe and Malawi entered into a Free Trade Agreement on 1 May 1995. The agreement covers almost all goods conforming to the rules of origin (Zim Trade, 2003; Imani, 1997).

2.4.8 The Southern African Customs Union (SACU)

SACU comprises of Botswana, Lesotho, Namibia, Swaziland (collectively referred to as the BLNS countries) and South Africa. Officially, SACU has been around in one form or another since 1889. The crux of the agreement revolves around the free trade of manufactured goods, the maintenance of a common external tariff (CET) against the rest of the world, and conformity of the BLNS countries to South Africa's tariff laws, although this has now changed somewhat in the new SACU agreement (McCarthy, 2003; Cattaneo, 1998:8). A new revenue sharing agreement was reached in 2002 after dissatisfaction by the member countries with the previous agreement formulated in South Africa's apartheid years (McCarthy, 2003; Hartzenberg, 2000). Due to the overall dominance of the South African economy the revenue sharing formula is geared towards the smaller BLNS countries in order to compensate them for lost customs revenue, trade diversion towards South Africa, loss of sovereignty and possible polarised growth biased towards South Africa (McCarthy, 2003:3-4). Customs revenue constitutes a major proportion of government revenue for the BLNS and has thus been a key factor in the new agreement (World Bank, 1997:196-197). However, McCarthy (2003:6) argues that the issue of trade diversion is becoming less and less important as SACU's external tariffs continue to be reduced, as with the loss of sovereignty as the new agreement is more democratically focused. The issue of polarisation is a little bit more difficult to address, as great discrepancies in economic power continues to exist. However, the relatively high growth rates (as discussed in terms of manufacturing in SADC) of the BLNS countries as compared to other countries in SADC indicate that these countries have not lost absolutely. Indeed, McCarthy (2003:5) shows how the SACU countries have benefited from macroeconomic convergence and stability through their union with South Africa. The issue of industrial progression of the BLNS countries is high on the SACU agenda with the establishment of a development fund, and a view towards the

establishment of a common industrial policy (McCarthy, 2003:9). Finally, it is argued that a successful SACU is essential to the further spread of regional agreements in southern Africa, and particularly for SADC (McCarthy, 2003:1). The SACU agreement shows the rest of southern Africa how the much smaller BLNS countries can successfully achieve the current levels of integration with the larger South Africa.

2.4.9 The Common Monetary Area (CMA)

A set of bilateral agreements between South Africa and Lesotho, Namibia and Swaziland resulted in the CMA. Here, free movement of capital is ensured with each of the smaller countries relying to different extents on the Rand (Cattaneo, 1998:13). The agreement does not, however, equate to a common market as the fourth BLNS state, Botswana, is not presently a signatory, and there is not free mobility of labour (Cattaneo, 1998:13).

2.4.10 The Common Market for Eastern and Southern Africa (COMESA)

COMESA evolved out of the Preferential Trade Area for Eastern and Southern African States (PTA) established in 1983. At present there are 21 member countries, including all SADC states with the exception of South Africa, Botswana, Lesotho, Mozambique and Tanzania. In addition the following countries from Eastern Africa and the Indian Ocean region are part of the agreement: Burundi, Comoros, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, and Uganda (Ngwenya, 1999). As of 2000, an FTA has been established amongst 9 members, with the aim to implement a customs union by 2004. Those dual members of SADC that are members of the FTA include Malawi, Mauritius, Zambia and Zimbabwe (European Community, 2002:3). The convergence of objectives and memberships between COMESA and SADC has led to recent tensions in the region as SADC countries constitute almost half of COMESA's membership. Indeed, the present aims and objectives of the two organisations are surprisingly similar with an emphasis on trade integration as well as regional co-operation in transport, communications, agriculture and industry (Ngwenya, 1999; Cattaneo, 1998:18).

The formation of the FTA and move towards the customs union also poses problems for joint members of SACU. Lesotho, a previous member of COMESA, pulled out of the COMESA agreement just before the formation of the FTA, but Namibia and Swaziland have been granted special derogations in terms of tariff reductions (Cattaneo, 1998:18). Despite problems revolving around dual membership between SADC, SACU and COMESA there appear to be administrative benefits through the adoption of common customs procedures (Sadcreview, 2002:6).

2.4.11 The Cotonou Agreement

With the expiry of the Lome IV agreement, the EU agreed to continue to provide preferential access to its market for all SADC countries excluding South Africa through the Cotonou agreement. This agreement was signed in June 2000 and ensures that the same privileges will extend until 2008. Tariffs into the EU will be reduced to nil by 2005 on most products from the region, the critical factor being the level of preferences currently being offered. On the reverse side, SADC countries are expected to reduce their barriers from 2008 until 2020 (Stahl, 2000:87-88). As from 2008, the focus will be on the establishment of reciprocal trade relationships in the form of economic partnership agreements (EPAs). Individual countries will have to decide whether they will negotiate as an independent body, or as part of a regional group. Additionally, the countries will have to choose which bloc to negotiate as part of, as they may be part of more than one that seeks to establish an EPA such as SADC, SACU, COMESA, or the EAC (see Table 2.5).

2.4.12 The Africa Growth and Opportunity Act (AGOA)

AGOA entered into force in October 2000, providing duty free access for a number of products into the USA from qualifying African countries. The initial agreement is for an eight-year period expiring in 2008; however, it is envisaged that it is likely to be extended further. Tied into the agreement are strict eligibility requirements, such as conforming to international labour laws and various other reformist principles, including removing restrictions to US investment. Products not eligible include specific textile products and certain agricultural products like cotton, rice, sugar and groundnuts (Stahl, 2000:89). So

far, ten of the SADC countries are eligible for AGOA and have obtained the necessary export visa approval for textiles and clothing (Sadcreview, 2002:1). The combined exports of these countries under the provisions of AGOA reached US$7.6 billion in 2001, with oil and mineral products contributing the largest share. Discounting these products (which, due to falling oil prices, led to an aggregate decrease) USA imports increased by 10.7 percent, with particularly strong growth in automotive products, and apparel increasing by 28 percent (Sadcreview, 2002:1). The Trade Promotion Authority Bill provides more relaxed 'rules of origin' for certain products coming from 'less developed countries' until October 2004, Botswana and Namibia included.

The AGOA agreement has led to a number of benefits particularly for the smaller SADC countries, such as the boost to Lesotho's textile industry and the founding of a large cotton producing and processing farm in Namibia (Madizwa, 2003:5). In total, it is estimated that in the first two years of AGOA, 20,000 new jobs were directly established as a result (Sadcreview, 2002:1). There have also been talks on US-led efforts at capacity building in the region (Sadcreview, 2002:2).

The result of this complex network of RIAs and bilateral trade agreements in Southern Africa is that there is presently near free trade amongst almost all SADC countries, with the notable exception of imports *from* South Africa. The tables below indicate the complex cross-linkages in membership of different RIAs, and the current status of trade within the bloc.

Table 2.5: SADC countries' membership of regional integration groupings

Country	CMA	COMESA	EAC	IOC	SACU	SADC
Angola		X				X
Botswana					X	X
Congo (DR)		X				X
Lesotho	X				X	X
Malawi		X				X
Mauritius		X		X		X
Mozambique						X
Namibia	X	X*			X	X
Seychelles		X		X		X*
South Africa	X				X	X
Swaziland	X	X			X	X
Tanzania			X			X
Zambia		X				X
Zimbabwe		X				X

EAC = East African Community
IOC = Indian Ocean Commission
* Given notice of withdrawal
Source: European Community (2002:3); Imani Development (1998:18).

Table 2.6: Current status of reciprocal trade within SADC

	Angola	Botswana	Congo (DR)	Lesotho	Malawi	Mauritius	Mozambique	Namibia	Seychelles	South Africa	Swaziland	Tanzania	Zambia	Zimbabwe
Angola														
Botswana				F	F	P	P	F		F	F	P	P	F
Congo (DR)														
Lesotho		F			P	P	P	F		F	F	P	P	P
Malawi		F		P		F	P	P		P	P	P	F	F
Mauritius		P		P	F		P	P		P	P	P	F	F
Mozambique		P		P	P	P		P		P	P	P	P	P
Namibia		F		F	P	P	P			F	F	P	P	F
Seychelles														
South Africa		F		F	F	P	P	F			F	P	P	P
Swaziland		F		F	P	P	P	F		F		P	P	P
Tanzania		P		P	P	P	P	P		P	P		P	P
Zambia		P		P	F	F	P	P		P	P	P		F
Zimbabwe		F		P	F	F	P	P		P	P	P	F	

F = Free trade imports

P = Preferential trade imports

2.5 The Southern Cone Common Market (MERCOSUR)

The treaty of Asunsion in March 1991 established the free trade area of Mercosur between the countries of Argentina, Brazil, Paraguay and Uruguay. In 1996 two other countries, Bolivia and Chile were included as associate members. Combined, these countries represent 230 million people with a combined GDP of US$ 570 billion (Mills, 2000:15; Taccone and Nogueira, 2003:43). However, as with SADC, the economic balance is heavily biased in favor of two principle countries, Brazil and Argentina, which contribute 97 percent of the GDP of the full members (Mills, 2000: 15).

Table 2.7: Mercosur general statistics, 2002

	Argentina	Brazil	Paraguay	Uruguay
GDP (US$ billion)	102.3	450.9	4.6	12
GDP growth %	-11.6	1.1	-2.6	-8.6
Industrial Production	-12.2	2.1	1.3	-12.6
Unemployment rate	12.8	19.4	10.8	15.9
Change in CPI	41	12.5	14.6	24.7
Borrowing rate	39.3	19.2	20.9	33.5
Exports (US$ billion)	25.7	60.4	1	1.9
Imports (US$ billion)	9	47.2	1	2.2
FDI (US$ billion)	1.5	13.4	0.1	0.2

Source: IADB (2003)

Prior to the establishment of Mercosur, the current members had been involved in a number of failed regional integration agreements including the Latin American Free Trade Association (LAFTA), the Andean Pact, the Central American Common Market, and the Latin American Integration Area (LAIA) (Richards, 1997:136). The cause of failure of these initiatives has largely been put down to the difficulties of integrating countries of "radically disparate levels of development" (Richards, 1997:136). The members of Mercosur also followed a largely inward-focused and centralized system of economic management and trade. This included high import tariffs, heavy government management of foreign trade, export-enhancing exchange rate policies and a generally protectionist regime (Bertelsmann-Scott and Mutschler, 2000:2). As would be expected,

this led to low intra-regional trade as each country sought to keep out neighboring imports. However, under severe pressure from the global recession in the 1980s and their high levels of external indebtedness, Argentina and Brazil made a deal with the IMF which created a paradigm shift in focus towards liberalization (Richards, 1997:134).

The establishment of Mercosur was pre-dated by two highly important agreements between Brazil and Argentina. In 1986 a number of sectorally focused protocols were signed between the two governments which were then solidified in the 1989 Treaty of Integration, Cooperation, and Development. This laid the foundation, and provided the direction, for a free trade area to be established within the next decade (Richards, 1997:139).

The two smaller countries, Paraguay and Uraguay both entered Mercosur after long periods of inward-focused industrialisation. As with the smaller countries of SADC, concerns were raised that integration with the larger, more advanced economies would lead to de-industrialisation of the smaller countries and a shift back to reliance on primary good production and exports (Richards, 1997:144-145).

Regional integration in the Mercosur has been conducted in two distinct phases. The first phase, beginning in the early 1980s, formalized in 1990, and concluded in December 1994, saw the removal of tariffs on 85 percent of regional trade (Mills, 2000:14; Giannetti da Fonseca, 2000:63). The second phase, that of implementing a customs union, is currently in progress, with full convergence of tariff lines envisaged by 2006 (Mills, 2000:14). The motor industry accounts for 25-30 percent of intra-Mercosur trade, and has been a source of antagonism between Brazil and Argentina (Gonclaves, 2000:21).

The attempt at regional integration during the last decade has largely been met with success (Mills, 2000:13). This is in part the result of a great degree of commitment by member states. For example, it took a mere four years since the Treaty of Asuncion for the majority of products within the region to face zero-rated tariffs and the common

external tariff (CET) to be implemented. However, to date there are still a number of sensitive and capital goods that are exempt from the CET such as computers and most noticeably the automobile industry (Baer *et al*, 2002:271).

Success was seen during the 1990s when intra-regional trade increased five times, from US$4 billion in 1990 to US$20 billion in 1998 (Giannetti da Fonseca, 2000:63) while foreign direct investment increased by an even greater amount, from US$2.6 billion in 1990 to US$26.6 billion in 1997 (Mills, 2000:14). As a means of comparison, Mercosur's trade with the rest of the world trebled over this period (Bertelsmann-Scott and Mutschler, 1999:2). This resulted in an increase in intra-Mercosur exports from 9 to 25 percent of the total (IADB in Baer *et al*, 2002:269). The two largest countries, Brazil and Argentina, both showed significant increases in exports and imports with the rest of Mercosur. During the 1990s, Brazil's exports to Mercosur grew by 23 percent and Argentina's by 19 percent in comparison to their average export growth of 6 and 8 percent respectively. Likewise, Mercosur imports to Brazil increased by 15 percent and to Argentina by 30 percent in contrast to average figures of 12 and 25 percent respectively (Baer *et al*, 2002:271). Mercosur's average tariff rate fell from 41 percent in 1986 to 12 percent towards the turn of the century. The changing trade flows seen over the 1990s have led to a much higher degree of regional interdependence. At the end of the 1990s this led to Brazil providing the market for one third of Argentina's total exports, and a massive 90 percent of Argentina's automotive exports. The role of Brazil's market was even more significant for the two smaller countries, accounting for 40 percent of Paraguay's exports and 35 percent of Uruguay's (Baer *et al*, 2002:273).

Baer *et al* (2002:273) attribute this large increase in intra-regional trade in large part to the macro-economic strategies put in place in Argentina and Brazil over this period. This can be seen in the rapid yearly changes in trade flows depending on the (non-market) pegged strength of the currencies.

The sharp growth in intra-bloc trade until 1998 was reversed with a recession in the region starting in 1999, and the onset of the regional economic crisis in 2001. This crisis had a major impact on the internal trade in goods, which in 2002 fell 36 percent on the previous year to 55 percent of their 2000 value (Taccone and Nogueira, 2003:26). The fall in trade value significantly outweighed the fall in the external trade of Mercosur of 10 percent over 2001 to 2002 (Taccone and Nogueira, 2003:26). By far the most important trading partners of Mercosur are the EU and NAFTA which each account for roughly a third of the region's total trade.

Central to the success of Mercosur has been the elimination of conflict and the commitment to democratization in the region, which has allowed a smooth progress of implementation of agreements (Mills, 2000:14). This commitment by the smaller countries has meant that economic asymmetry has not hindered progress (Mills, 2000: 15). Gonclaves (2000) and Phillips (2000) emphasize the critical importance of "political will" in the success of Mercosur, and stress that without this will, attempts at regional integration would have failed. This is evident in the renewed negotiations since the economic crisis in the region where concrete commitments to progress have been made by the new governments (Taccone and Nogueira, 2003). Perhaps another contributing factor has been the relatively small number of member states, which has encouraged rapid discussion and short implementation periods (Mills, 2000:15). Also significant has been government responses to needs and areas of concern to partner countries. For example, as Argentina's trade deficit with Brazil increased rapidly after the Treaty of Asuncion, the government of Brazil decided to buy wheat and petroleum from Argentina, and as the crisis of 2001 progressed, Brazil agreed to a voluntary export restraint (VER) with Argentina to halt the vibrant growth in shoe exports (Baer *et al*, 2002:275-276).

The regional integration of Mercosur is moving beyond the aspect of trade and is currently including talks of harmonization of other macroeconomic policies, such as inflation targets and levels of internal and external indebtedness (Gonclaves, 2000:20). This was emphasized in the Mercosur Re-launch Program in 2000, where the members established targets for macroeconomic variables (Taccone and Nogueira, 2003:90).

However, since the crisis, these talks have been superceded by discussion on the "natural and artificial asymmetries among the sub-region's economies and their different productive configurations" (Taccone and Nogueira, 2003:86). These talks have been supplemented by a move to improve regional infrastructure with the particular aim of promoting development in peripheral regions (Taccone and Nogueira, 2003:139). The volatility of exchange rates in the two largest countries has had a disruptive effect on intra-regional trade and consequently there are currently talks regarding the establishment of a monetary union, or creating a common currency between Brazil and Argentina (Baer *et al*, 2002:289).

Far from remaining insular, Mercosur has negotiated or is in the process of negotiating a number of new free trade agreements with external countries. These include the Andean Community, Mexico and Canada, with the view towards a Free Trade of the Americas (FTAA), as well as a free trade area with SACU.

Free trade agreements between Mercosur, Chile and Bolivia were signed into effect in 1996, making the two nations associate members of the bloc. However, Chile's agreement expires in 2004, by which time it is hoped that Chile will become a full member of Mercosur. Progress in the last few years has been slow, however, although a new agreement signed in 2002 envisages free sectoral trade by 2006 (Taccone and Nogueira, 2003:132).

There have been talks of establishing a South Atlantic Free Trade Area, with political and industrial talks occurring between SADC (more particularly South Africa) and Mercosur. This, however, would be difficult to implement due to the high opportunity cost of negotiations, which have already proved cumbersome enough within the SADC region. Additionally, trade between the two blocs is primarily dominated by four countries, South Africa, Angola, Brazil and Argentina; the remaining countries are unlikely to place an FTA with Mercosur high on the agenda. This has led to South Africa taking the lead in negotiating an FTA between SACU and Mercosur. During the period 1989 – 1998 South Africa's exports to Argentina and Brazil rose by an average annual rate of 35 and 31

percent respectively, while imports from the same countries rose by 29 and 18 percent (Stahl, 2000:91). However, such an agreement between South Africa and Mercosur could significantly affect the competitive advantage enjoyed by non-SACU SADC countries.

2.6 The European Union (EU)

The European Union is at the forefront of contemporary regional integration practice, theory and research. This is because the union is currently the most progressive and economically important integrated bloc of independent countries (McCarthy, 2002:5). An economic union has been established between all countries involved, with a monetary union existing amongst a number of the key members. There is much that could be written about the EU, but this section will focus on the current inequalities in the region and the ways in which the bloc has tried to overcome them.

Table 2.8: EU general statistics

	GDP (constant 1995 US$ billions)	GDP per capita (constant 1995 US$)	Population (thousands)	MVA as % of exports	Manufacturing value added (constant 1995 US$ billions)
	2001	2001	2001	2001	1999
Austria	270	33,172	8132	82	51
Belgium	321	31,218	10286	79	59
Denmark	207	38,710	5359	65	28
Finland	167	32,121	5188	86	39
France	1,805	30,492	59190.6	82	296
Germany	2,702	32,813	82333	86	525
Greece	145	13,669	10590.87	52	15
Ireland	113	29,401	3839	88	34
Italy	1,225	21,144	57948	88	236
Luxembourg	25	56,382	441	-	3
Netherlands	503	31,333	16039	70	76
Portugal	131	13,109	10024	85	23
Spain	723	17,595	41117	78	122
Sweden	281	31,627	8894	84	41
United Kingdom	1,335	22,697	58800	80	229

Source: World Bank (2003), UNIDO (2003)

The European Union is based on four founding treaties culminating in the group's establishment. These have resulted in the following:

- The European Coal and Steel Community (ECSC). This treaty was signed on the 18th of April 1951, entered into force on the 23rd of July 1952 and expired on the 23rd of July 2002. This agreement coincided with the expiry of the Marshall Plan and a desire within Europe to establish a permanent organisation for economic and financial cooperation (Goodman, 1996:39).
- The European Economic Community (EEC). Signed in Rome on the 25th of March 1957, the treaty entered into force on the 1st of January 1958.
- The European Atomic Energy Community (Euratom), signed at the same time as the EEC.
- The Treaty on European Union, signed in Maastricht on the 7th of February 1992 and entered into force on the 1st of November 1993. With this treaty, a political and economic union was established among member states, resulting in the European Union being formed (World Bank, 2003).

The founding member states were France, Germany, Belgium, Italy, the Netherlands and Luxembourg. After four waves of accessions, membership has grown to a total of fifteen countries, with a further fourteen eastern and southern European countries set to join. Countries that entered the Union at various stages up to the present include Denmark, Ireland, United Kingdom (1972), Greece (1979), Portugal, Spain (1985), Austria, Finland and Sweden (1995).

The inclusion of Ireland, Greece, Portugal and Spain created a new dimension, in that they were relatively poorer and less industrialised than the existing members. The GDP per capita and MVA contribution for this group of countries is significantly lower than those of the older and richer members. At the time of writing, the ten most favoured regions in the EU were three times richer than the ten poorest. This has led to a strong focus on uplifting peripheral regions through the use of structural funds (Lebre de Freitas *et al*, 2003:270). European Union policy is based on the premise that competitive markets lead to inequality, therefore substantial redistributive funds are necessary to

avoid agglomeration (Molle, 1997:429). This inequality is likely to increase with the recent extension efforts of the EU. Thus funds are have been created that are channelled firstly to traditionally underdeveloped regions, i.e. those which are agriculturally orientated, have little manufacturing or services industry and which are deficient in infrastructure, and secondly to regions of industrial decline (Molle, 1997:436).

There are three such funds that aim to increase economic and social cohesion, the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the European Agricultural Guarantee and Guidance Fund (EAGGF) (Goodman, 1996:234). The ESF provides finance to less developed regions (not necessarily whole countries) whose GDP per capita is less than 75 percent of the EU average, and regions of significant unemployment or remoteness. A core focus of the ESF fund is to assist in restructuring that may occur as a result of integration. Additionally, the Cohesion Fund, established in 1994, aimed to remove large social and economic differences that would prevent the successful implementation of the economic and monetary union. The EU regional cohesion fund aims towards achieving a point where the "degree to which disparities in social and economic welfare between different regions or groups within the Community are politically and socially tolerable" (Molle. 1997:429). In particular, the Cohesion Fund focused on providing finance for environmental and transport infrastructure projects to countries with a GNP per capita less than 90 percent of the EU average. The Structural and Cohesion Funds have played a large part in reforming the infrastructural deficiencies in the periphery. This is seen through the funds' contributing approximately 15 percent of total investment in Greece in the latter part of the 1990s, with comparable figures of 14 percent in Portugal, 10 percent in Ireland, and 6 percent in Spain (Barry, 2002:9). The 2000 to 2006 budget of the EU provides EUR 195 billion for regional aid and EUR 18 billion for the Cohesion Fund.

The upcoming accession of a large number of eastern and central European countries has led to a further review, and increased the importance of these structural funds (Pelkmans and Casey, 2003:208; Shutt *et al*, 2002). This is because the nations joining are generally less developed than existing members, and many are still in transition from command

economies (Paas, 2003:1). The candidate countries can be divided into two groups according to admission periods into the EU. The first group, formed in 1997, is termed the Luxembourg group, and includes Poland, the Czech Republic, Hungary, Estonia, Slovenia and Cyprus. The second group (the so-called Helsinki group), formed two years later in 1999, includes Latvia, Lithuania, Bulgaria, Romania, Slovakia and Malta (Paas, 2003:2-3).

Like SADC, the structure of trade from the peripheral regions in the EU to the core countries consists largely of natural resource-based products and some traditional industry. However, as integration has proceeded, the share of new industry has been increasing in peripheral country exports (Barry, 2002:6). Thus, including the EU in this study will provide some interesting comparisons and lessons for SADC.

2.7 Conclusion

The RIAs of SADC, Mercosur and the EU provide interesting cases for analysis and comparison. All three consist of members of radically different economic size and levels of development, and all are looking to further their integration. SADC is presently the least integrated as it is still in the process of implementing a free trade area. Although there are a significant number of bilateral and other multilateral agreements within the bloc, progress towards the FTA has been slow. Mercosur has moved relatively more swiftly and is currently in the process of implementing a customs union. However, the recent economic problems within the region have meant that the rapid progress towards integration of the 1990s has been slowed down. The European Union is by far the most integrated bloc and is on its way towards the implementation of an economic union, with the major issue at the moment being the accession of new less-developed countries into the group. Against this background a number of theories of regional integration have developed. The next chapter will outline the major theories leading to a focus on the new economic geography.

Chapter 3: The Theory of Regional Integration with a Focus on the New Economic Geography

3.1 Introduction

Baldwin and Venables (1995) describe the development of regional integration theory as taking place in three phases, firstly, the traditional theory, and then two further extensions that take into account imperfect competition and growth theory. The traditional theory investigates international trade arising from comparative advantage in perfectly competitive markets, and is based on work originating from the 1950s and 1960s. The second phase, initiated in the 1970s and 1980s, incorporates imperfect competition, and economies of scale into models of international trade. The third phase, that has arisen in the last decade or so, builds on the base of imperfect competition and incorporates the long-term effects of investment and economic growth into a new theory of economic geography.

It is generally acknowledged that many regional integration agreements (RIAs) have failed and consequently that the rationale for the 'old regionalism' of the 1960s is not sufficient, particularly with regard to the analysis of developing countries (Kennes, 1998). This failure has, amongst other reasons, been attributed to bad governance, a lack of infrastructure, large disparities between member states, and small or negative welfare effects (Kennes, 1998:28). The 'new regionalism' incorporating the second and third phases of theory attempts to include more 'real world' factors into the regional integration literature, such as the effects of increasing returns to scale, external economies of scale, transport costs, capital mobility, and demand with regard to international location theory (Krugman, 1991a). In particular, Krugman (1991a:x) highlighted the increasing role that capital mobility plays across borders, and the failure of contemporary international trade models to incorporate the above factors into international trade theory.

This chapter will begin by outlining static effects as a criterion for evaluating RIAs. It will then show how dynamic analysis has entered into the theoretical framework, which will lead into the focus of the chapter, namely the 'new economic geography' (NEG).

3.2 Traditional static analysis

In neo-classical theory, regional integration is generally evaluated in terms of static effects, which are once-off shifts in trade patterns and production (Kirkpatrick, 1998:8). The RIA is successful if the static effects lead towards free trade which results in a more efficient allocation of resources and thus an increase in overall welfare. This analysis is based on the standard neo-classical assumptions of international economics in which resources are internationally immobile, while goods are traded freely, without transport costs (Krugman, 1991a:1-6). Production takes place under constant returns to scale and diminishing marginal returns. The basis for trade is assumed to be a country's comparative advantage, as described in the traditional Heckscher-Ohlin model.

Static effects are generally divided into trade creation and trade diversion (Viner, 1950). Trade creation is defined as "taking place whenever economic integration leads to a shift in product origin from a domestic producer whose resource costs are higher to a member producer whose resource costs are lower" (Appleyard and Field, 2001:356). As this is a move towards free trade and a 'first best scenario', the welfare effects are assumed to be positive. Trade diversion, on the other hand, is when production is shifted from a non-member producer whose resource costs are lower to a high-cost member producer (Appleyard and Field, 2001:356). This is consequently seen to be less efficient and therefore welfare-reducing. Preferential trade areas are traditionally viewed as being welfare-increasing when trade creation outweighs trade diversion and *vice versa* (Cattaneo, 1998:81).

However, amongst developing countries, the benefits of 'South-South' integration are perceived to lie in the potential for trade diversion as a method for industrialisation through import substitution (Puga and Venables, 1997:7; Thomas, 1998:41). Thus with the formation of an RIA "previously unemployed resources are put to use in high cost industrial production without a loss of output elsewhere; real income grows, even though the resources are used inefficiently in world market terms" (McCarthy, 1999:380). When assessing RIAs among developing countries, which are already at a prior state of

disadvantage, one must focus on the benefits and costs to the member countries, and not necessarily world welfare (Fernandez, 1998:46). With the failure of less developed countries in Africa to realise the promised 'comparative advantages' of free trade, the option of industrialisation, even with inefficient production, appears to provide "more gains than no production at all" (Axline, 1984:8-9).

Other static benefits from regional integration may include administrative savings as the complex and numerous intra-regional tariff regimes disappear (Appleyard and Field, 2001:360). The increased size of the trading bloc may lead to an improvement in the member countries terms of trade, as well as ensuring greater bargaining power on the world scene (Appleyard and Field, 2001:360).

The extent of the static effects will depend on a number of factors, such as

1. the country's ratio of external trade to GDP,
2. a large economic area (as trade creation rather than trade diversion is more likely to occur),
3. complementary production structures,
4. competitive economies of member states (produce similar goods so production will shift to the most efficient producer),
5. the percentage of trade with members,
6. large differences in costs of production ,
7. high initial trade barriers,
8. elasticity of supply and demand curves (Kirkpatrick 1998:9; Mutambara 2001:85).

It has been argued that the conditions in SADC according to the above criteria are not conducive to large static gains within the region, namely production structures are not complementary, only a small proportion of trade is within the region, and members compete for the same overseas markets (Kirkpatrick, 1998:9). This is not to discount the possibility that trade creation or trade diversion may occur, as international experience has shown. Bayoumi and Eichengreen (1997), Frankel and Wei (1996), Soloaga and

Winters (1999) and Sapir (1997) find that in the case of the EU a significant amount of trade diversion occurred. Puga and Venables (1997:7) find that a PTA among LDCs leads to trade diversion; however the study by Soloaga and Winters (1999) found little confirmation of trade diversion occurring in Latin America. Holden (1996:61) argues that the possibilities for trade creation in SADC are low, while the occurrence of trade diversion (mainly towards South Africa) is more likely. This in itself represents a redistribution of income from the already poor countries to the relatively richer South Africa (Holden, 1996:61). However, in general, and more specifically in the developing country case, static effects are viewed as small and possibly negative and therefore the rationale for integration must be found elsewhere (Winters, 1999:23).

Additionally, traditional trade theories provide a somewhat unsatisfactory explanation for the layout of industry. The customary explanation of differentiated production structures revolves around an explanation of differences in underlying characteristics, such as diverse geographical characteristics, factor endowments and technological factors (Ottaviano and Puga, 1997:2). Thus, the integration of regions will lead to specialization according to somewhat static comparative advantage. This tends to lead to economic activities being equitably distributed across space (Ottaviano and Puga, 1997:2). It is therefore argued that comparative advantage, although useful, "provides a weak explanation for the remarkable spatial concentration of activity" (Ottaviano and Puga, 1997:2). This shortfall is particularly evident the more mobile factors become (Ottaviano and Puga, 1997:2).

3.3 Dynamic analysis

With the limited role that static effects are likely to play, proponents of regional integration have turned to the dynamic effects for justification (Carim, 1997:338). The "mystical role" of dynamic effects in regional integration is a relatively new but increasingly important field of research (Winters, 1999:23), and reflects a new wave of literature that has emerged since the 1970s modelling the effects of regional integration with imperfect competition (Krugman, 1991a:6).

Winters (1999:23) defines dynamic effects as "anything that affects a country's rate of economic growth over the medium term". Dynamic effects are thus the ongoing economic structure and performance effects of a country joining an RIA, such as investment and the relocation of industry (Appleyard and Field, 2001:361).

There is little and inconclusive research with regards to the dynamic effects of regional integration amongst countries of different sizes, and in particular amongst developing countries. This has largely been because modelling dynamic effects is empirically more difficult than modelling static effects, and consequently the popularity of this dimension of international economics has been somewhat neglected, although its importance has recently been well noted (McCarthy, 1999:382; Holmes and Smith, 1998:67). This new approach includes "the belated introduction into trade theory of features of economic reality – economies of scale, external economies and learning effects – long considered essential in the study of regional economics and economic development" (The National Economic and Social Council quoted in McCarthy, 1999:321). Thus, dynamic effects incorporate a variety of factors that cannot be strictly fitted into the above static analysis. Through integration, production as a whole may be more efficient due to certain dynamic effects (such as economies of scale), but theory shows that some countries may benefit more than others, and some may lose absolutely. What distinguishes these dynamic effects from those involved in trade creation and diversion is that the process is ongoing, and not necessarily a once-off phenomenon based on a 'static' comparative advantage. Comparative advantage may be created, and lost.

Within the available literature, many authors have stressed the importance of dynamic effects and their overall beneficial effect on income dispersion. In a cross-sectional regression, Henrekson *et al* (1997) find that European integration has significantly benefited member growth rates. The Cecchini report (Holmes and Smith, 1998:64) points to dynamic effects in the EU of up to 5 percent of GDP in the last few years of the 1980s. Henrekson *et al* (1996:14) find that membership of the EC had a significant effect on post-1975 growth and in a later paper argue that the medium-term growth bonus may be up to double that of the static effect (Henrekson *et al,* 1997:1538).

Due to the "mystical role" that dynamic effects play, they are often difficult to pinpoint. However, dynamic effects can arise in the following ways:

i. Increased economic efficiency

There is likely to be greater overall efficiency with integration, through increased competition and pressure for higher productivity (Mutambara, 2001:89). The Cecchini report (Holmes and Smith, 1998:68) highlights the beneficial effect of regional integration on corporate behaviour. Specialisation may result, arising from economies of scale and greater intra-industry as opposed to inter-industry trade.

ii. Increased capacity utilisation and industrial maturity

It is also likely that an RIA will lead to greater capacity utilisation as access to larger union markets are opened up. An RIA provides an opportunity for infant industries to mature in a larger protected market before facing the greater competition of the wider world. Kennes (1998:31) argues that "successful South-South integration would facilitate future North-South integration", thus paving the route for further world integration.

iii. Investment effects

There may also be changes in the patterns of internal and foreign investment. Greater investment may occur due to lower risk and uncertainty in the market, and by firms wanting to invest in the union in order to avoid being 'frozen out' by high external tariffs later. Blomstrom (1997), notes that an RIA can promote FDI inflows. These inflows of investment could further increase competition, backward and forward linkages, and increase labour skills.

iv. Increased credibility and security

Schiff and Winters (1998b:50) emphasise the role joining an RIA plays in increasing the country's credibility and security. This may be highly important in the case of developing countries as investor confidence is often critically low. Indeed, "in some

cases the reduction in uncertainty resulting from an RIA may even be a necessary precondition to realizing gains from liberalisation at all" (Fernandez, 1998:46). It is important that the removal of tariff barriers be implemented in conjunction with an agreement not to introduce alternate measures of equivalent effect (Holmes and Smith 1998:69). Mercosur and particularly the EEC have been used as examples of how regional integration has been successful in promoting security and decreasing the threat of war (Schiff and Winters 1998b:51). Furthermore, Schiff and Winters (1998b:50) claim that these resultant effects alone outweigh any negative static effects that may occur.

Fernandez (1998:39-44) sums up the credibility and signalling effects in his analysis of the 'non-traditional' gains from an RIA in being through;

- Time Inconsistency – This refers to the locking in effects of an RIA, with the benefits being both economic and political. Fernandez echoes Schiff and Winters (1998) in claiming that the formation of an RIA removes the surprise factor of radical political and economic policy changes. However, for this benefit to be effective, the cost of exit from the RIA must be sufficiently high so that member countries do not renege on agreements. In addition to trade liberalisation, the country is also more likely to progress with other micro and macro reforms. This was the case with the 'new' SADC in 1992. The majority of members were undergoing domestic macroeconomic reform at the same time as trade reform. Politically, the RIA will supersede any changes in government, further enhancing credibility. This aspect of the SADC FTA has been put under pressure by the current economic and political turmoil in Zimbabwe.
- Signalling – The RIA will indicate to the rest of the world the type of government that implements it, the position of that government, the condition of the economy, and the pattern of future relations. This is based on the assumption of significant information asymmetries and significant costs of entering the RIA.
- Insurance - The costs of participating in the RIA are viewed as a premium for insurance against possible future events. This could be a general world trade war,

and guaranteed access of low wage countries to developed country markets (an arena of high competition).

- Bargaining Power – The RIA will serve to decrease transaction costs when negotiating, and increase bargaining power with current members.
- Co-ordination Device – The RIA serves as a political focus point, allows a long term focus and facilitates co-ordination of other policies.

v. Faster transfer of technology

Grossman and Helpman (1991) (in Holmes and Smith, 1998:70) show how regional integration can benefit growth through "facilitating international flows of knowledge, reducing duplication of innovative effort, market size effects, and resource reallocation effects". Holden (1996:55) and Coe and Helpman (1995) claim that increased trade flows and greater integration can lead to higher knowledge flows, technology and R&D. Ben-David (1996) emphasises the importance of contact and spillovers, and Coe *et al* (1997) show that total factor productivity growth is related to the interaction of the openness of the economy (measured as imports/GDP) and its access to foreign knowledge. This particular dynamic effect is further discussed in section 3.5.5.

vi. Increased exports

The increase in economic growth within individual countries in the region may also lead to increased exports for the other member countries (Holden, 1996:55). Thus, even if all members to not grow to the same extent, as the point below argues, those that do not grow as much will still benefit from the expansion of other countries in the region.

vii. Polarisation / redistribution of industry

In addition to the above beneficial dynamic effects, the presence of increasing returns, falling transport costs and external economies may lead to a skewed distribution of benefits. The occurrence of polarisation, the cumulative worsening of the relative or absolute economic position of a member state, is a well-documented possibility, and often a major concern of smaller countries in regional agreements (Mutambara, 2001:89; Imani Development, 2001:7). Although it has been argued that the smaller countries will

benefit to a greater degree than their developed partners (Krugman and Venables, 1995:858), the smaller countries of SADC (i.e. all countries other than South Africa) are concerned that the above dynamic benefits will accrue disproportionately towards the larger, relatively more advanced countries of South Africa and, until recently, possibly Zimbabwe (SADCb, 2000:36). If polarisation effects are perceived by the smaller countries to be large the integration agreement is likely to break down. Progress towards free trade thus needs to be perceived as advantageous by all participating members; if members believe they will lose disproportionately the RIA will fail. To investigate this issue of polarisation more fully we turn to the new body of international trade theory based on economic geography.

3.4 The theory of the new economic geography

3.4.1 The history

It has already been argued that the above dynamic effects do not fit well into traditionnal neoclassical theory, primarily as they imply increasing returns as opposed to constant returns to scale. As such, a new body of theory has emerged since the 1970s that incorporates economies of scale. The main focal point of this revolution was Dixit and Stiglitz's (1977) formalisation of monopolistic competition which, although termed by Krugman (1991a) as being 'somewhat farfetched', provides a useful, simple and fairly accurate method of analysis. Towards the end of the 1970s theorists began to apply this apparatus of industrial organisation to international trade, and later to technological change and economic growth. Thus, a relationship began to emerge between 'new trade' and 'new growth' theory, which in turn planted the seeds for the 'new economic geography' theories of the 1990s (Fujita *et al*, 1999:3).

The new economic geography as a body of theory has therefore emerged as an amalgamation of various theories to embody geographical themes within accepted economic theory. In addition, a particular benefit of the theory is that it incorporates the real world phenomena of increasing returns, monopolistic competition and transport costs into a model used to analyse trade and industrial location. As stated earlier, neoclassical

models based on comparative advantage and constant returns to scale fail to explain concentrations of economic activity (such as the highly concentrated Silicon Valley), as the explanation of differentiated production structures revolves around an explanation of differences in underlying characteristics, such as diverse geographical factors, factor endowments and technological factors (Ottaviano and Puga 1997:2). As each region specializes according to comparative advantage, an equitable distribution of economic activity should take place. While regional science and the urban systems literature acknowledge agglomeration occurrences, they fail to explain how such situations arise and evolve in a sound theoretical manner acceptable to economists.

New theories of trade, based on increasing returns and imperfect competition, have arisen that are better able to explain how countries with similar factor endowments and comparative advantages could develop different production structures based on relative access to markets (Ottaviano and Puga 1997:4). However, they too fail to adequately explain how specialization of regions in the production of specific industries arises. Additionally, the new theories of trade tend to suggest that the development of industrial production occurs smoothly and simultaneously in different countries. This does not hold up empirically, as industrialisation tends to move in rapid waves, where it spreads from one country to another (Ottaviano and Puga 1997:6).

In addition to its roots in the new trade theories, the NEG has incorporated a substantial heritage from locational economics and regional science. Martin (1999:66-67) provides a useful history of the origins of economic geography through its base in locational economics. The history begins in German location theory with such works as Johann von Thunen's (1826) *The Isolated State* and Walter Christaller's (1933) *Central Places in Southern Germany*. This was built up with Lösch (1940) later in the twentieth century with his book, *The Economics of Location* (Quinzii and Thisse, 1990:1102). Out of this body emerged two branches of theory, that of regional science and economic geography. The field of German locational economics grew into the realm of regional science, becoming highly mathematical and abstract. The other branch, that of economic geography, was empirically focused. Unlike the neoclassically-based location theory,

economic geography attempted to borrow concepts from other branches of economic theory, including Keynesian business cycle models, Myrdal's (1957) cumulative causation and notions of uneven accumulation from the Marxists. Martin (1999:66) follows this further into the 1980s where economic geography enveloped French regulation theory, Schumpeterian technological evolution models, and sociological and institutional economics. Thus, a more qualitative and speculative approach was founded that emphasized diversity as opposed to uniformity (Peck, 2000:61; Sheppard, 2000:99). There was a focus on primary data collection, mid-level theorising and great scepticism about "maximisation-equilibrium modes and *ceteris paribus* reasoning" (Peck, 2000:61). Here, geographers picked up on certain heterodox traditions of economics that were left out by mainstream economists (Sheppard, 2000:99).

Economic geography continued to depart further from acceptable mainstream economics (Krugman, 2000:50). This was until a number of "highly prominent writers" (Martin 1999:66) from trade, growth and geography, such as Paul Krugman, Michael Porter, Robert Barro, Xavier Sala-i-Martin, Barry Eichengreen, Lawrence Katz, Anthony Venables and Danny Quah, amongst others, initiated the body of the new economic geography in the early 1990s (Martin 1999:67). These authors sought to include aspects of theory and reality that were discarded by economists and geographers alike and form them into a model acceptable to economists. In evidence of the growing importance of the NEG as a body of theory, a number of well-respected research institutions such as the Center for Economic Performance (at the London School of Economics), the European Center for Economic Policy Research (CEPR), the World Bank and the Oxford Review of Economic Policy have all initiated research groups to investigate the 'new economic geography' (Martin 1999:67).

3.4.2 The core model

Krugman's (1991b) model of geographic concentration has been the spearhead of the economic geography revolution (Krugman and Venables, 1995; Henderson, *et al*, 2001; Kim, 1995; Petersson, 2000). Krugman (1991a:14-15) argues that the presence of increasing returns, transport costs and demand play an important role in the location decisions of industry. Thus, if economies of scale in a particular industry are strong, and transport costs low enough, firms in that industry will want to serve the market from one location. However, if economies of scale are small, and transport costs large, production will take place in each separate population area. This thinking breaks away from earlier theories where geographic concentrations of production were bound by natural resource endowments, whereas now it is the result of the complex interplay of various dynamic factors. With the scheduled reduction in transport costs (through reduced tariffs) within SADC the theory indicates that the optimal industrial distribution of industry will change, depending on the level to which industries are affected by scale economies and the amount that transport costs actually fall.

Krugman's seminal paper (1991b) explains how factor mobility between regions reduces the pressure of the concentration of production activities. This occurs through labour migration from the peripheral areas to the core, thus allowing the benefits of agglomeration to take place for longer. The higher bids for production factors, such as labour are met by an elastic supply of these factors, thus, profits remain high and more firms are attracted to the core. For an intermediate range of trade costs, where agglomeration forces are too weak to alter the symmetric equilibrium, they may still be high enough to ensure a *status quo* with one region possessing all industry (Ottaviano and Puga 1997:9). The pace of agglomeration will be increased the stronger the labour force's preference for variety and the higher the proportion of manufactures in total expenditure (Ottaviano and Puga 1997:10). Thus, labour is attracted without the necessity of offering higher wages. In Africa, this argument may be somewhat relevant as borders tend to be porous, but this is unlikely to be labours' response to an increase in variety, but rather a response to a greater availability of jobs. A high mobility of labour between sectors will lend further impetus to forces for agglomeration as additional

workers can be attracted from the agricultural sector with a minimal increase in wages. Ottaviano and Puga (1997:10) argue that this elastic mobility of labour in developing countries helps to explain the dominance of 'primate' cities in these countries. Mobility of labour ensures that interregional wage differentials are quickly removed; when opportunities of employment in the manufacturing sector are low in one region, labour will move to the region with more jobs offered (Ottaviano and Puga 1997:10).

In an attempt to broaden the Krugman (1991b) model, Krugman and Venables (1995) and Venables (1996) extend the initial model, creating a situation where agglomeration is not dependent on labour's geographical mobility but instead relies on Hirschman-type (1958) input-output linkages.

The Krugman and Venables (1995) model assumes two initially identical countries, the North and South. Both economies are self-sufficient and produce two goods: agriculture (with constant returns to scale), and manufactures (with increasing returns to scale). Manufactured goods can be further divided into final and intermediate goods, which are then used in the production process of other firms. Trade between the two countries leads to a circular process of regional differentiation in favour of the larger market for intermediate goods. The consequent fall in transport costs, as intermediate goods are produced nearby, leads to the creation of an industrialised core (assumed to be the North) and a de-industrialised periphery (the South). A further fall in transport costs decreases the importance of being near to the markets and supply. The higher the firm's price cost mark-up and the higher the share of intermediates in production, the greater the forces for agglomeration.

The backward and forward linkages work as follows; an increase in the output of a downstream industry will stimulate greater scale efficiency in upstream firms, and an increase in the output of an upstream industry will allow downstream firms to produce more efficiently. The level of agglomeration will depend on the extent to which real wages are affected. The critical factor in the model is the firms' dependence on intermediate inputs. The more intermediate inputs a downstream firm can source within

close proximity, the greater the saving on transport costs and hence lower production costs.

Thus, the higher proportion of manufactured goods produced in the core results in an increase in the North's real wages, and a decrease in the real wages of the periphery. The increase in real wage in the North occurs for two reasons. Firstly, manufacturing labour demand causes an increase in the manufacturing wage relative to agriculture. Secondly, a lower proportion of manufactures are imported and not subject to trade costs leading to a fall in the consumer price index (CPI).

However, as transport costs fall, at some point the lower wages demanded in the periphery dominate the disadvantage of being remote from markets and suppliers. Thus, an incentive is created for firms to move to the lower wage periphery, and in time this increases the South's real wages (Krugman and Venables, 1995:859). The movement of industry in this model therefore follows a *U-shaped* pattern. Industry in the periphery will first decrease with a fall in transport costs and then increase once transport costs reach a critically low level. The model is therefore one of multiple stable equilibria depending on the level of transport costs. Krugman and Venables (1995:875) conclude that due to the dynamic effects the final result of greater global integration "will normally raise the overall real income of just about every nation". However, this process takes time, shown to be over one hundred years in the spatial distribution of manufacturing in the USA (Kim, 1995). It is possible that, in the modern world, with advances in transport technology and greater capital mobility, this process could be much quicker. For SADC, the question of how long the process will take is of critical importance. The bloc is at a very early stage of economic integration, thus if it is predicted that it will be a long time before industry is pulled back from the core, countries are unlikely to proceed with the integration process. On the other hand, if it is found that SADC is already at an advanced stage of the cycle, as evidenced by the large wage differentials between countries in the region, the smaller nations will push for further integration, while the core country(s) will be reluctant.

So far, the model explains how two *a priori* identical regions can develop differently. However, it fails to say where, or what will cause the initial break from equilibrium. The determining factor, Krugman (1991a) says, is 'historical accident', where for no apparent reason an industry springs up in a region with no distinctive advantages. This 'historical' accident then snowballs as cumulative causation locks the system in place. What then develops may be a 'second best' scenario, where another location may be found to have resources that better suit the industry, but because industry has become established and 'locked in' firms are unwilling to relocate (Martin 1999:69). In order to simplify the model, transport costs are assumed to be of the von Thunen (1982) "iceberg" variety, where one merely assumes that a fraction of a good disappears in transit. This avoids the complexity of incorporating a separate transportation sector into the model.

In a theoretical spatial analysis, Krugman (1993) shows how industry will agglomerate according to different specifications. In a situation where only one core develops, this core will be near the center of the region, though not necessarily at the center, as the core itself may shift the economic center. Additionally, transportation networks may influence core cities, such as ports (Krugman 1993).

3.4.3 Further theoretical additions

There have been a number of additions to the model of Krugman and Venables (1995), but this section will focus on two particular extensions that are important for the empirical section of this study, that of a multi-region framework, and differentiated industries.

Extending the primarily local analytic result into a multi-location model, Fujita *et al* (1999) borrow from Alan Turing's mathematical work on theoretical biology (Neary, 2000:14). The link between biological theorising and economics is central to the theory, as Marshall (1961:772) stated "economics, like biology, deals with a matter, of which the inner nature and constitution, as well as the outer form, are constantly changing" thus economics "is a branch of biology broadly interpreted".

Using the above tools, Fujita *et al* (1999) extend the initial framework of two countries into a multi-region approach, where industrialisation spreads as a succession of waves from one country to another. The vital factors involved in the spread of industry are the relative expansion of production in world trade and changes in trade policy. An expansion of manufactures in the world will bid up wages in the industrial country, until such a time as the wage differences between this country and the next country are large enough to alter the equilibrium, and industry begins to 'spill over' into peripheral countries. At some stage a critical mass is reached by one member of the periphery at which they are able to offer increased forward and backward linkages and rapid industrialisation occurs (Fujita *et al* 1999). Again, the increased growth causes this industry eventually to spill over into the next peripheral country, and the process continues. The classic example is the rapid industrialisation of the East Asian countries, where the initial industrial base of Japan spread out to its neighbours, not in smooth succession as traditional theory predicts, but in waves. The 'flying geese' or 'tandem growth' patterns that emerged in East Asia involved a shift from low technology production, such as textiles, to higher technology sectors, and from one country to another. This first occurred in Japan, spreading later to the NIEs (Korea, Taiwan and Singapore) and finally into the nations of the ASEAN (Abo, 2000:640).

So far 'industry' has been assumed to be homogeneous, however, it may be the case that some industries are more prone to agglomeration forces than others, and *vice-versa*. Brülhart (1996) cited (in Ottaviano and Puga 1997:20) stresses that the increasing specialization of countries in different manufacturing pursuits is one of the strongest economic trends presently in Europe. In order to account for this, Krugman and Venables (1996) add to their previous model an extra imperfectly competitive industry in place of the perfectly competitive sector. Each sector produces goods that act as intermediates for each other and final goods for consumers. Within each sector firms utilize more intermediate goods from each other than from the other sector. Thus, the addition of one firm in Sector 1 will provide better linkages (backward and forward) for other firms in the Sector 1, while the greater labour and product market competition will negatively affect both Sector 1 and 2. Therefore, firms in Sector 2 find little benefit, but greater

losses and so move to another region. This leads to the specialization of different regions in each sector. In a later paper, Venables (1998) further extends the model to one of multiple imperfectly competitive industries as well as a perfectly competitive sector. The finding is that the share of sectors may not be equitable between regions, but there are limits to how great this difference may be. As the process of regional integration proceeds, the total share of industry that may be gained by one region first increases and then decreases.

In a small economy with few industries one needs to question whether these intra-sector benefits will be significant enough to outweigh negative inter-sector externalities. There may be a critical mass of industry that needs to be established before the negative inter-sector effects outweigh the positive externalities that arise from a mass of industry. For developing countries the influence of infrastructure, governance, stability, and confidence that arise from an established manufacturing base that yield inter-sectoral benefits may well outweigh intra-sectoral advantages and congestion costs. The fact that the large discrepancy in wages between South Africa and the rest of the SADC has persisted over time testifies to the above hypothesis.

3.4.4 Some alternative NEG models

Since the initial Krugman (1991b) and Krugman and Venables (1995) models a number of alternative NEG models have been proposed, based on the same framework, but with different specifications. This is an area of expanding research, and hence only a few of the most influential models will be presented.

Baldwin (1997) creates a model where agglomeration can occur in the absence of factor migration. This occurs due to factor accumulation, rather than migration affecting demand linkages. Here the importance and creation of research and development (R&D) benefits the location in which it occurs. Decreasing returns to patent accumulation creates a ceiling on the marginal benefits of R&D thus preventing 'black holes'. Again, the balance will be determined by the high profits of producing in the R&D area (depending on the number of firms) and the congestion costs. Further studies by Martin and

Ottaviano (1998, 1996) explain how local pecuniary externalities of production arise from an agglomeration of firms which reduces the cost and increases the level of R&D, thus attracting more firms to the region. Technological and R&D factors may have an important effect on certain industries in SADC, where a critical mass of industry is needed to provide the skilled labour and infrastructure needed.

Helpman (1997) creates an interesting model, where the dispersion force is not real wage differences, but the cost of housing. In his model, Helpman (1997) uses the standard Krugman (1991b) model with the modification of a non-tradable housing sector in the place of the freely-traded agricultural sector. The results turn out somewhat differently, with a reduction in trade costs improving the availability of manufactured goods in the peripheral areas, and thus, with the lower cost of housing in the periphery, workers migrate outwards from the centre (Helpman, 1997). However, at intermediate levels of transport costs, the Krugman (1991b) and Helpman (1997) models both predict predominantly agglomerated industry.

Kaldor (in Martin 1999:77) incorporates the standard composites of the NEG models, imperfect competition, increasing returns and cumulative causation, into a model with the addition of a number of other more qualitative factors. The model allows for limits to increasing returns, structural change and industrial decline.

Murata (2003) creates a model incorporating taste heterogeneity in residential locations into a model otherwise styled on the NEG. The results of the model shows how market-related product diversity, as proposed in the NEG, acts as an agglomeration force, while differences in local tastes acts as a dispersion force much like any other immobile factor (Murata, 2003:126). Murata (2003:136-137) establishes the inverted u-shaped pattern of agglomeration, this time based on taste heterogeneity. With a high degree of taste heterogeneity, production is dispersed for all ranges of transport costs. For intermediate ranges of taste heterogeneity, an unstable equilibrium emerges where there is a move from dispersion to agglomeration, and then back to dispersion, as transport costs fall. Finally, for low levels of taste heterogeneity the initially agglomerated industry disperses.

This creates a number of differences to the NEG models of Krugman (1991b) and Fujita *et al* (1999). Firstly, unless the 'no-black-hole' condition is satisfied in the traditional model, agglomeration forces will dominate at all levels of transport costs. The inclusion of taste heterogeneity as a dispersion force in Murata (2003:138) enables a stable equilibrium regardless of the level of transportation costs. Secondly, the core-periphery pattern is sustainable under conditions of high transport costs in Murata's (2003:138) model, whereas the possibility is excluded in Krugman (1991b). Finally, Murata (2003:143) finds that the nominal wage rate is always higher in the larger region for all levels of transport costs.

Related to the new economic geography, a second branch of research from 'geographical economists' has emerged that focuses on the issues of long-run regional growth and convergence. This body of theory has emerged out of the 'new growth theory', much in the same way that studies of spatial agglomeration were born out of the 'new trade theories' (Martin, 1999:71). The new 'endogenous growth theory' focuses on inter-regional transfers of human capital and localized technological progress as contributors to concentrations of industry. In one such study, Bertola (1993), creates a Romer-Lucas type endogenous growth model in which labour mobility and labour migration in the presence of increasing returns lead to an increasing concentration of industry in some regions, while industry declines in other locations. Bertola (1993) concludes that an increase in factor mobility in the face of regional integration will lead to an increase in agglomeration of industrial activity. Within Southern Africa, there is a significant transfer of human capital from the poorer countries to the richer, thus propelling the forces for agglomeration. In another slant, Martin and Ottaviano (1996), Baldwin (1997) and Walz (1996) emphasise how research and development can have high local benefits, and thus leads to similar industries clustering together (Martin 1999:69). Likewise, the research and development (R&D) networks are far more prevalent in South Africa than elsewhere in the rest of the region. Thus, firms within the R&D sector, or heavily reliant on R&D will face a strong pull towards South Africa.

As a whole, models of the new economic geography point to three distinct phases in the process of integration. When trade costs are high, firms locate in different sub-regions each supplying their home market. As trade costs fall to an intermediate level, cost and demand linkages become dominant and industry is pulled towards a core. At low levels of trade costs industry is pulled back towards the periphery as its location is determined by the price of immobile factors and goods (Ottaviano and Puga 1997:20). In order for the periphery to benefit in the final stage it is essential that the periphery maintains, and clearly provides those goods and factors that remain immobile through the process of regional integration (Ottaviano and Puga 1997:23).

3.5 Empirical evidence and mathematical modelling of the new economic geography model

There has been a surge of papers in recent years that have attempted to validate the foundations of the NEG. This is a critical area of research that seeks to ground the NEG in mainstream economics. This section will focus on studies that analyse the underpinnings of NEG models, namely, the importance of scale economies, input-output linkages, transport costs, the role of technology and home market effects.

3.5.1 General testing of the model

The Krugman and Venables (1995) *U-shaped* occurrence is supported by Kennes (1998:29) who concludes that, "in the long run, economic integration will tend to reduce disparities, though in the short-term (during the transition phase) the benefits may not be evenly spread". In particular, inefficient, mainly import substituting industries may disappear before more efficient (perhaps export oriented) industries can be established (Kennes, 1998:31). In line with the necessity for consistently falling transport costs, the deeper the integration (i.e. moving toward free movement of capital and labour, rights of establishment, common competition and fiscal policies), and greater the improvement in infrastructure, the greater the convergence will be between regions in a bloc (Kennes, 1998:29). However, the initial transition phase may lead to shifts in production, increased macroeconomic instability and potentially social problems, which could lead to the breakdown of the RIA involved (Kennes, 1998:31).

As the Krugman and Venables (1996) paper suggests, industries will be affected by agglomeration forces in different ways. For example, Balassa (1961:201) argues that industries prefer to locate in areas with established social and industrial infrastructure and related industries. Additionally, Balassa (1961:201) confirms that spread effects are restricted by high transport costs due to poor transport and communications infrastructure and goes even further to include sociological and psychological rigidities, factors not included in the basic theory of economic geography. Additionally, Steinle and Schiele (2002:849) note how the following characteristics may make some industries more susceptible to agglomeration forces than others. It is found that industries with the following characteristics are more likely to agglomerate:

- divisible production process
- transportable product or service
- long value chain including multiple distinct competencies
- innovation-intensity characterised by "network innovations"
- volatile markets.

Reviewing the NEG, Puga (1998), develops an eclectic framework of analysis, including interregional migration, input-output linkages and constant versus increasing returns in the labour market. Puga (in Ottaviano and Puga 1997:17) arrives at four main conclusions. Firstly, interregional migration of labour is not a critical element for agglomeration, but when present helps to fuel the agglomeration process. Secondly, if at equilibrium, wage differences persist, this acts as a dispersion force, increasing the cost of producing in the core. Thirdly, this last factor allows for all regions to maintain some level of industry, while preventing extreme conditions. Lastly, the lower the transport costs the more the difference in wages will pull industries out of the core and into the periphery. This would point to a positive scenario for the smaller countries of SADC, with the large wage differences in the region and currently high transport costs. When transport costs are zero, the price of non-tradable factors will determine location (Ottaviano and Puga 1997:17). The key factor in these models, which defines the contribution of the 'new economic geography', is that this movement of industry and

changing market size is endogenous and not reliant on *a priori* differences (Ottaviano and Puga 1997:19).

3.5.2 Scale economies

The importance of scale economies provides the rationale for use of the NEG over previous theories of regional integration. Thus, it is critical that empirical research finds evidence of the role of scale economies in the spatial distribution of industry. However, even though much emphasis is placed on scale economies within NEG models, the empirical evidence is not absolutely conclusive in the role that it plays.

Traditional NEG models, such as Krugman (1991b) incorporate two types of scale economies. Firstly, all manufacturing firms face fixed costs which lead to internal pecuniary[3] scale economies. Secondly, the nominal wage rate falls as the number of available local varieties of the good increases (pecuniary localization economies), as well as the rising population putting downward pressure on wages. These scale economies are most likely to act as an agglomeration force when the transport cost of manufactures is low in relation to the fixed costs of production, when there is high product differentiation, and finally when there is a large share of manufacturing to GDP (Kilkenny and Thisse, 1999:1389).

Kim (1995) uses the locational Gini coefficient[4] to analyse the concentration of industry in the USA from 1860 to 1987. He does this by regressing the locational Gini index on a proxy for internal scale economies (production workers per plant), a resource intensity

[3] Scale economies can be broken down into technological and pecuniary economies. Technological economies are exclusively internal to the firm, and are evident in a doubling of inputs resulting in a proportionately greater increase of output. Pecuniary economies of scale arise when average revenue increases, or average costs fall as the volume of production increases. If this fall in average costs is a result of the fixed cost being spread out, this form of pecuniary economies remains internal to the firm. However, if it is the result of the scale of an industry increasing, it is then external to the firm and internal to the industry. In so far as these industries are grouped within a specific area these effects are known as localization economies. If the economies are both external to the firm and to the industry they are known as urbanization economies, such as Marshall's effects of labour market pooling (Kilkenny and Thisse, 1999:1369).

[4] A measure of industrial concentration ranging from 0 to 1, as used by Krugman (1991a). Further detail about this measure is given in chapter 5.

variable (cost of raw materials divided by value added) and industry and year fixed effects. His findings support the NEG as scale economies are found to be a significant agglomeration force.

Holmes and Stevens (2003) compute the Ellison-Glaeser (E-G) index[5] in addition to the Gini coefficients as used by Kim (1995) for various US and Canadian manufacturing, retail and service industries. Providing support for the role of scale economies, Holmes and Stevens (2003:26) find that the average concentration index increases together with the average establishment size.

Further investigating the extent to which different industries are affected by scale economies, Black and Henderson (1999:325) measure the effect of scale economies on manufacturing in the USA. They use plant inputs of labour, materials and capital as well as various local externalities. Their results indicate no evidence of scale externalities in capital-goods industries, although amenities to the production of these goods is found to have a profound effect on location, while diversity is found to be beneficial in electronic components industries (Black and Henderson, 1999:325). On the other hand, high-tech industries are found to be subject to scale economies. Overall, industries that were found to be greatly affected by scale economies tended to be the most agglomerated as well (Black and Henderson, 1999:327).

A number of studies within Europe have emerged in response to Kim's finding of a positive relationship between spatial concentration and scale economies. Amiti (1999) finds a positive correlation between firm size (as a proxy for increasing returns) and changes in spatial concentration. Likewise, in an earlier paper, Amiti (1997) uses the ratio of establishments to number of employees in the industry as the proxy for scale economies. Her results find the effect of scale economies on agglomeration to be significant at the 5 percent level, where a 1 percent increase in scale economies leads to a 0.5 percent increase in the industry Gini coefficient.

[5] E-G index measures the extent to which the distribution of industry differs from a random distribution. Again, this index is further explained in chapter 5.

Brülhart and Torstensson (1996) find a 0.69 rank correlation between locational Gini coefficients and returns to scale. They also find a strong correlation between increasing returns and a 'core-periphery bias'. This was investigated by relating the geographic distribution of industry employment to the likely market potential within the area. Likewise, Brülhart (1996, in Ottaviano and Puga 1997:24) finds that those industries prone to large economies of scale showed a greater movement towards concentration than the rest. Brülhart and Torstensson (1996) find that industries with large scale economies became increasingly agglomerated in the geographical core and a positive correlation with the concentration index, with examples including the chemical and motor vehicle industries. However, since the 1980s, this process has reversed. Industries with increasing returns were more agglomerated based on a measure noting the importance of scale economies in spreading out development and production costs. These industries were found to be located near to the core.

However, a few of the studies surveyed have claimed that the degree to which scale economies affects location is not as significant as made out in the NEG. For example, Brülhart (2001) in a study using longer time-series than his earlier work, and Haaland *et al* (1998:22) find that their proxy for scale economies has a negative impact on concentration. Haaland *et al* (1998:22) do say that this finding goes against intuitive expectations and provide a few possible explanations for their different result. Firstly, they fault their own measure of scale intensity on the basis that new technology and different production techniques mean that their measure (elasticity of average costs to output), developed in the 1980s may not be as relevant now. Differences in scale elasticities could also be the result of different underlying cost functions, or even if the cost functions are identical, firms may be producing at various stages along the curve. Thus, their measure may more accurately reflect the degree of "unexploited scale economies" (Haaland *et al*, 1998:23).

3.5.3 Transport costs

Martin (1999) takes the issue of transport costs within the theory a step further and investigates the effects of improving infrastructure both within and between regions. His model finds that development of infrastructure within the poorest region or country will lead to a decrease in the spatial concentration of industry, reducing the growth rate and thereby increasing the income gap (Martin, 1999:85). However, an improvement in infrastructure between regions will result in the reverse effect. Martin (1999:85) thus points to a trade-off between regional growth and the spatial distribution of industry.

This may be explained as follows. An improvement in the domestic infrastructure of the South would lead to a reduction in transaction costs in the South thereby increasing effective demand, as prices are lower. This would mean that firms in the differentiated goods sector would, in his model, relocate to the South. The cost to the region as a whole would be a decrease in innovation and fall in overall growth. This is because the firm now faces a higher cost of innovation as they would now be further away from the innovative hub of the North (Martin, 1999:98). However, if these firms produce products that are at an advanced stage of their product cycle, innovation would not be critical.

Brakman, *et al* (2002) conduct a series of estimations pertaining to the role of factors underpinning the new economic geography, such as the role of transport costs, non-tradable commodities (in this case housing, as used by Helpman), and the elasticity of substitution for manufactured goods. All the above variables were found to be significant lending support to the core theory. However, in one variation of the model, where land value was used as a proxy for the price of housing, it was found that transport costs played no role in determining industrial structure. This distribution of manufacturing was purely reliant on the fixed distribution of housing stock (Brakman *et al,* 2000:14).

Ades and Glaeser (1995) use the log of the size of the dominant city as evidence for agglomeration. Transport costs are captured in three ways. The first method is geographical distance. A larger area leads to increased transport costs as buyers and sellers have to travel further to trade. Secondly, relative expenditure on transport and

communication and, thirdly, road density are used as measures of the transport infrastructure. These all lead to a positive relationship between trade costs and agglomeration. This would be consistent with the mid stages of the NEG theory, but inconsistent with the beginning and end result.

Combes and Lafourcade (2000) find that transport costs can play a significant role in determining specialization patterns when intermediate inputs are introduced to the model. This is found to be the case for almost all manufacturing and service sectors.

In southern Africa, an important component of transport costs are non-tariff barriers (NTBs). In relating the Gini index to non-tariff barriers (NTBs), Brülhart (2001) finds that the concentration of industry increases with the level of NTBs. However, Head and Mayer (2003:33) fault the way in which NTBs were quantified in this paper (through the Brigues *et al,* 1999 classification), which consequently casts doubt on the validity of the results.

On the other hand, the impact of NTBs was found to be significant by Haaland *et al* (1998:24), where industries subject to high NTBs were absolutely more concentrated (near larger markets) than those facing less significant NTBs. Where NTBs were low, production was generally found in peripheral locations (Haaland *et al*, 1998:24). This highlights a problem often found in RIAs, when tariff barriers are reduced, there are often alternate NTBs put in place. There will be a challenge for the SADC countries to ensure that the reduction in tariffs under the FTA ensure a real fall in trade costs and are not counterbalanced with NTBs. Particularly in southern Africa, it may be the case that the role of NTBs, ranging from inadequate infrastructure to border delays, may even be a more important protection mechanism than the use of tariffs.

Venables and Gasiorek (1997) stress the importance of domestic and regional infrastructure and a country's positioning in the integration area, both in geographical and infrastructural terms. Infrastructure is likely to play a highly important role in SADC. The transport infrastructure within the region is largely undeveloped as compared to the

available transport infrastructure leading out of the continent. This could be an important factor for the location of export oriented firms, and as the internal infrastructure improves, this will increase the locational importance of firms producing for the local SADC market.

3.5.4 Input-output linkages

The importance of input-output linkages as a force for agglomeration was first brought into the NEG literature by Venables (1996). As firms locate near other firms, inputs into the production process can be sourced at a lower cost due to the reduced transport costs. This provides an incentive for the concentration of firms, both within the same industry and between different industries, that may contribute parts to each others' production process.

Ellison and Glaeser (1997) create a model connecting input-output linkages between pairs of industries and their tendency to concentrate close to each other. Industries are categorized according to 100 downstream industries that receive the largest per dollar value of inputs from a single upstream industry, and 100 upstream industries that contribute the largest proportion of output to a single industry. The results show that 77 of the downstream pairs and 68 of the upstream pairs displayed a tendency to agglomerate. Amiti (1999), using a different measure (manufactured inputs per euro of shipments) likewise finds a strong positive relationship between linkages and agglomeration in Europe, as with Haaland *et al* (1999) who find significant input-output effects in a study of the EU. Additionally, Gola and Mori (1998:15) find evidence of increased efficiency of clustered firms in Italy. However, Rosenthal and Strange (2001) merely find weak empirical evidence at a wide level of aggregation, as with Haaland *et al* (1999) who find very weak input-output linkages.

Redding and Venables (2000) use a model of intermediate goods (as the agglomerating factor) together with income and the number of establishments to analyse cross-sectional data on 103 countries. Demand and cost linkages are measured through the use of estimated coefficients drawn from a gravity equation for trade flows. The results suggest

that demand and cost linkages account for up to 70 percent of cross-country variations in incomes and 50 percent of manufacturing wage variation, thus providing support for the agglomeration effect of inter-firm linkages.

Amiti (1997) uses the ratio of intermediate inputs to final production and found that a one percent increase in the ratio leads to an equivalent 1 percent increase in the industrial Gini coefficient. However, Amiti (1998:51) acknowledges weaknesses in this analysis in that the measure of intermediate inputs also includes raw materials, does not distinguish between domestically and imported inputs, and purely focuses on downstream firms.

A point of great discussion in the literature is whether it is more beneficial for firms to locate near other firms in the same industry, or whether it is better to have a large 'core' of different firms producing in the same area. The difference between the two could have a profound impact on the distribution of industry in SADC. If intra-industry linkages are more important than inter-industry linkages, this would provide more hope for the peripheral countries who may be particularly specialized in a particular industry. However, if the benefits are more profound with inter-industry linkages then the larger markets in the region will have an overwhelming dominance and attraction.

In a study of industrial employment in the US from 1956 to 1987, Glaeser *et al*. (1992) find that it is beneficial for firms to locate in regions where there is a substantial and diverse base of industry. However, no evidence was found that the existence of firms in the same industry provided a basis for the location decision of firms. However, Henderson *et al* (1995) in a similar study over the period 1970 to 1987 found that, in addition to industrial diversity for mature industries, employment growth was linked to initial own-industry employment. Thus, Henderson *et al* (1995) show that over the life cycle of a product, firms find greater benefits from locating in a diverse environment with exposure to different ideas, while established industries benefit by locating near other firms with similar activities (Henderson, 2000:23).

Henderson (1999, in Henderson, 2000:23), again looking at US industry over 1963 to 1992, finds that plant output is

i. positively correlated with the contemporaneous number of own-industry plants in the same country, with this effect being stronger for high-tech industries than for machinery;
ii. positively correlated with the lagged number of own-industry plants in the same country, with this effect holding for high-tech industry only; and
iii. uncorrelated with city industrial diversity or total city manufacturing employment.

In contrast to the findings of the earlier study by Henderson *et al* (1995), Henderson's (2000:23) later results suggest that mature industries benefit from locations with diversity of industry, while new industries grow faster with greater own-industry agglomeration. This would be in line with the findings of Jaffe *et al* (1993) where it is suggested that there are significant location-specific spillovers in innovation. Likewise, Audretsch and Feldman (1996) show how new innovations locate in areas which display a greater tendency for research, such as R&D expenditure, university research and greater employment of skilled labour.

Dumais *et al* (1998), investigating the causes of agglomeration in US cities from 1972 to 1992, find that the growth in industry employment is higher in regions where there are similar labour skills (occupations) required, and where there are significant input-output linkages to be found, that is, where there are other firms that produce inputs required by the firm, or provide an outlet for the industry. The external scale economies of input-output linkages are also found in the studies of Bartelsman *et al* (1994), and Paul and Siegel (1999).

Haaland *et al* (1998:22) find the role of intra-industry linkages to be increasingly significant over time in the EU. Holmes (1999:314) finds that firms located near other similar firms tend to have a higher ratio of purchased inputs as a percentage of their total output. Additionally, industries with high materials ratios (purchased inputs as a

proportion of total sales) are generally found to be first-stage processors of raw materials that produce near the source of their raw materials. Carlton (1983) and Rosenthal and Strange (1999) also find that firms are more likely to locate in regions where there is a core of firms in the same industry (Hanson, 2000:18).

Thus, the role of input-output linkages is generally found to be positive. However, the degree to which this is intra- or inter-industry is not clear-cut, and is likely to depend on each individual industry.

3.5.5 Technology

Theories of new economic geography are closely linked to developments in new growth theory. In particular they both have a common focus on the non-diminishing returns to capital of the early endogenous growth theory. Of more recent interest is the idea of endogenous innovation, which provides the rationale for self-enhancing growth in the long run. Much research has been focused on the effect of knowledge bases on promoting new knowledge and the methods of diffusion of knowledge, promotion of research and development, and global innovation competition (Hendrickson *et al*, 1997:1540-1541). This is a disputed point in the literature of the NEG as the role of technology as an agglomeration force is generally underplayed. However, a number of authors have stressed the importance of this factor, hence it is worth investigating.

Keller (2002:120) finds that technological diffusion is mostly local, and tends to decline with distance with the effect halving every 1,200 kilometres. These findings are verified by the numerous other studies, such as Jaffe *et al* (1993), Eton and Kartum (1996, 1999) and Hanson (2000).

Audretsch and Feldman (1996) computed Gini coefficients for the geographic concentration of innovative activity. It was found that there was "a greater propensity for innovative activity to cluster spatially in industries in which industry R&D, university research, and skilled labour are important inputs" (Feldman 2000:379). Feldman (2000:380) additionally surveys a number of studies by Jaffe (1989), Jaffe and

Trajtenberg (1996) and Almeida and Kogut (1997) that show how innovation is geographically localised, particularly at the early stages of a product's life. However, the geographic importance of being close falls over time (Feldman 2000:380). Within a particular field of research, the location of production is often bound by proximity to 'key' innovators or knowledge bases (Feldman 2000:381).

Knarvik *et al* (1999) find that high-tech and scale intensive industries concentrate in locations which are central and typically have high relative wages. Industries that rely less on technology and whose returns are lower tend to be more dispersed with a tendency towards peripheral regions. However, Devereux *et al* (2002:11) find that high-tech industries tend to be among the most dispersed industries.

Further studies by Martin and Ottaviano (1996, 1998) explain how local pecuniary externalities of production arise from an agglomeration of firms, which reduces the cost and increases the level of R&D, thus attracting more firms to the region.

The empirical results of studies testing the importance of technology as an agglomeration force vary widely, and there is no absolute consensus within the literature. However, within SADC, where a critical mass of industry is needed to provide the skilled labour and infrastructure needed, it is likely that technological and R&D factors may have an important effect on certain industries in SADC. However, the number of industries that will be affected significantly by technological factors is not likely to be large. This is because the majority of SADC countries have emerging manufacturing sectors, and the industry they are likely to attract will probably rely on established production methods and not on cutting edge technology. Thus, for one or two manufacturing sectors technology may play an important role in industrial location, but for the majority it is not likely to act as a primary force for agglomeration.

3.5.6 The home market effect

The role of the home market effect is critical within the NEG, and has thus been the focus of a significant number of studies, particularly within the EU and North America. The home market effect refers to the centripetal force of the larger markets attracting industry.

Hanson (1997) finds that integration between Mexico and the USA has resulted in much of Mexico's industry moving from Mexico City to Mexican states closer to the larger market of the USA. This shows evidence of the declining importance of proximity to the hub of Mexico City and perhaps the negative externalities emerging between sectors. Hanson (1996, 1998) also finds evidence of US industry moving closer towards the border with Mexico. With the process of integration in this region, Hanson (1997) argues that the importance of demand and cost linkages, particularly within individual industries, has grown in importance in the determination of industrial location. In a similar situation, Resimini (2003) finds that industries in European accession countries are locating near the border of EU nations, thus signifying a shift in the importance of home demand to that of the larger EU demand.

Davis and Weinstein (1998) compare the home-market effect of the new economic geography, with the effect of traditional comparative advantage on the location of industry. Their results indicate that the home-market effect accounts for over half of the distribution of manufacturing in the 13 OECD countries studied. The remainder is determined by trade based on comparative advantage. The elasticity of production with respect to demand was 1.6, thus providing strong evidence of home market effects. This finding was backed up in a similar study conduced on Japan (Davis and Weinstein, 1999), where home market effects were found to be statistically significant in 8 out of 19 manufacturing sectors. These sectors included transportation equipment, iron and steel, electrical machinery, and chemicals (Davis and Weinstein, 1999). In an earlier paper, Davis and Weinstein (1997) found that 50 percent of all industries at the 3-digit level of analysis were found to have home market-effects, with the proportion increasing as the analysis became more disaggregated up to 64 percent at the 4-digit level.

Feenstra *et al* (2001) estimate separate gravity models for differentiated products, reference priced exports, and homogeneous goods. It is found that differentiated products are subject to home market effects in that the coefficient on income in the exporting country is greater than unity and significantly higher than that of the coefficient on the importing country's income.

Haaland *et al* (1998:22) find the role of home market effects in the EU to be not only significant, but the most important factor in the location of industry. In terms of relative concentration, Haaland (1998:25) find that traditional Heckscher-Ohlin and Ricardo variables explain around 50 percent of the cross-sectional variation in industry concentration. However, when home market effects are included, the model was able to explain between 80 to 90 percent of the cross-sectoral variation.

The weakest support for home market effects was found in Head and Ries (2001), who conduct an analysis of US-Canada trade at the three-digit level from 1990 to 1995. Results provide a weak, but still positive home market effect, with an elasticity of production to local demand of 1.12.

With the evidence of strong home market effects in other blocs, it might initially appear to be a foregone conclusion within SADC that the home market effect of South Africa, (which contributes 77 percent of the regions GDP) will be an exceedingly strong agglomeration force. However, due to the structure of trade of almost all SADC countries focused outside of the continent (primarily to the EU and the USA), the home market effect may not be as critically focused towards South Africa, but would perhaps be somewhat divorced from the domestic production system and externally oriented.

3.5.7 Wages

The effect of wages is very clear within the NEG, with wages providing one of the strongest forces for dispersion. This appears to be an empirically observed phenomenon as well. However, the question is, how large do wage differences have to be in order to attract industry away from core centres?

Overman *et al* (2001:18) from a survey of the available literature, conclude that "*ceteris paribus*, locations that are remote from markets and sources of supply of intermediate inputs are characterized by lower nominal wages"; however, these findings are subject to identification and simultaneity problems. Likewise, Hanson (1996) finds that as industry has relocated from the hub of Mexico City towards the border with the USA, as trade has been liberalized, the difference in relative wages across the country has fallen. Additionally, in a later paper, Hanson (1997) finds that nominal wages fall as the distance from both Mexico City and the new industrial belts along the USA border increase. Hanson (1998, 1999 in Hanson, 2000:15) finds a positive correlation between the degree of market access and the level of wages.

However, the effect on labour may not be uniform. In order to establish how low and high-skilled labour would be affected in a NEG model, Peeters and Garresten (2000) extend the Fujita *et al* (1999) model of economic geography. They build in a two factor approach (low and high skilled labour); this in turn allows for modeling wage rigidities and unemployment outcomes. Additionally, transport costs are broken down to allow for separate transport costs for goods and services. The results show that the impact on relative wages and unemployment can be ambiguous, but depend critically on the level and type of transportation costs that fall, as well as the flexibility of the labour market (particularly wages) and the initial distribution of low and high-skilled labour between countries. The impact on labour markets is particularly profound in the initial stages of integration, but over the long term, with mobility of labour between countries, the result is less clear. It is also found that both skilled and unskilled wages tend to move in the same direction within individual countries, although this is highly dependent on the type of transport cost being reduced. This is because the impact of home market versus the competition effects are likely to affect industry as a whole.

The situation within SADC reflects the predictions of the theory, with the more industrialised countries possessing the highest wages. However, it is not clear whether this is the result of demand for labour bidding up the price, or the presence of strict labour

laws. This has led to the situation where South Africa has a significant level of unemployment as well as high relative wages compared to the rest of the region. The role of wages as a dispersion force within SADC will be critical, and it is likely that with a fall in transport costs labour intensive industries will take advantage of the lower wages in the periphery.

The results of all the above studies are crucial in determining an empirical model of the NEG. Although a few studies have cast doubt over the role of these factors, the majority of the literature appears to support their use in such a model.

3.6 Criticism of the theory

The NEG theory has been criticized both by economists who dismiss the theory as a 'flash in the pan', as well as from economic geographers who claim that the NEG is nothing new and is overly reductionist, thus ignoring other important factors.

Ottaviano and Puga (1997:25), both well-respected theorists in the field question the theory in the following ways. Firstly, they tackle the rigidity of the model and ask what the effect would be of different specifications of the functional forms used, especially of transportation technology and market structure. In particular, Ottaviano and Puga (1997:25) suggest that the effect of strategic interactions between firms should be investigated. This could be a highly important factor in the developing nations of SADC, where many investment decisions do not follow traditional economic analysis, but may be political or based on 'animal spirits'; additionally, many industries have been run as monopolies and as such the firms may have an aversion to working with other firms nearby in the same industry. Related to this is the need to incorporate the activities of multinational corporations (MNCs) into the model. Again, in SADC many of the large (and dominant) firms are MNCs. This aspect has however, been introduced into the NEG literature in the work of Markusen and Venables (1995) and Baldwin and Ottaviano (1998). Additionally, Ottaviano and Thisse (1998) break the initial Krugman model of research in the NEG by introducing new forms of imperfect competition that allow more detailed analysis and a greater connection to the industrial organization literature. In their

new model, the number of competitors and their respective geographical locations affect the pricing decision of a firm. The element of transportation loses its simplistic 'iceberg' assumption including a cost of other resources than the good itself. Ottaviano and Thisse (1998) also investigate the effect of different pricing methods and agglomeration tendencies on the back of research by Smith and Venables (1998), with the change from segmented to integrated economies.

The issue of unemployment has perhaps been one of the greatest issues not only in SADC, but also in the EU. With these models based on the assumption of full employment, how relevant will they be, and how does unemployment fit in? (Ottaviano and Puga 1997:26). Theoretically the presence of unemployment in the core would allow the agglomeration forces to operate for a longer time, as the price of labour would not be bid up as quickly. However, the rigid labour markets in South Africa may negate this issue to some degree helping to maintain relatively high regional wages in the presence of significant unemployment.

In the NEG, regional differences in factor prices and incomes are usually ascribed to be the result of centripetal forces. Thus, Hanson (2000) questions the role of wages in determining the outcome of the NEG models. Rosen (1979) and Roback (1982) (in Hanson, 2000:8-10) explain regional differences in wages through regional variation in exogenous amenities that influence consumer utility or labour productivity. For example, people may have a preference for living in warm climates, and hence will have to be paid a premium to work in colder regions. This hypothesis is confirmed through numerous studies in the USA, however, as Hanson (2000:10) notes, there is still considerable variation in factor prices, even within regions that are geographically similar to each other. Hence there must be alternative explanations.

As a geographer, Martin (1999) criticizes the NEG in three particular areas; the originality of the model, the inherent mathematical reductionism, and the omission of real geographical issues and places. Martin argues that the NEG ultimately boils down to an attempt to take the early location-theory models and bolster them with mathematical

advances such as new maximization-equilibrium solutions (Martin 1999:74). He claims that geographers see the NEG theory merely as a rehash of tools previously used in geography, regional science and urban economics, which have since been discarded (Martin 1999:67). In particular, Martin (1999:79) argues that regional science is beginning to acknowledge the limits of theoretical 'imaginary places' in order to "escape the strait-jacket of mainstream equilibrium economics, and to widen its conceptual base to engage with social theory" – precisely the opposite of the direction of the NEG.

This brings up Martin's (1999) second major criticism, that of the mathematical reductionism of the NEG. Martin (1999) acknowledges that the mathematics behind the new economic geography may be more impressive and comprehensive than the previous models, but he claims that the results are remarkably similar and are thus open to the same criticisms that regional science previously faced (Martin 1999:67). However, as any body of theory reliant on proof through mathematics, the theory has to be somewhat reduced, which means that "messy social, cultural and institutional factors involved in spatial economic development are neglected" (Martin 1999:75). Martin (1999:75) criticizes the pioneers of NEG for putting these crucial issues 'on the back seat', and quoting Krugman, in saying that they are "best left to sociologists". This is a valid criticism especially in the context of the developing world where the spatial distribution and composition of institutions (from formal to informal) contribute to the organization of economic activity (Amin and Thrift, 1994; Martin, 1999). Within Africa, these institutional effects may be substantial and perhaps outweigh the basic centripetal and centrifugal forces of the NEG.

Rather than using a highly reduced model, such as the NEG, Martin (1999:77) advocates the new evolutionary economics that arises from a contextual approach includes more qualitative factors usually treated as 'exogenous' factors such as "history, institutions, technological change, and human agency". Martin (1999:80) specifically highlights the way in which these new models incorporate the issue of sunk costs. In Africa, where many industries have been government funded and are often large monopolies, there are

likely to have been significant sunk costs. Due to these costs likely being high, countries are unlikely to be willing to give them up.

In addition to Martin (1999), Kilkenny and Thisse (1999:1390) criticize the weak manner in which real geography issues are incorporated into NEG models. In particular, Kilkenny and Thisse (1999:1391) compare the NEG to the urban systems literature which documents at length the decay of scale economies with distance. The majority of NEG models do not specify limits to the regional analysis, in terms of the size of the locality, city or country. Hence, they largely ignore the extent that agglomeration forces affect different sized regions. However, NEG models do acknowledge that specific types of externalities may be more localized than others (pecuniary less so than technological or informational), but tend not discuss the relative importance and interaction of these externalities (Martin, 1999:78).

These latter criticisms highlight the present divide between 'new' economic geographers and those practicing economic geography. However, as with all different theories there is room for "cross-fertilisation of ideas between geographers and economists" (Martin, 1999:83). Within each paradigm there are benefits and failures. An important question that needs to be asked is whether, in the study of developing countries, one gains enough insight from a reduced form, abstracted model, or whether there are other 'developing country specific' factors that may have been omitted in the model that may influence the choice of industrial location to a greater degree. Thus, the purpose of this study is to analyse the SADC experience in terms of the NEG, to see how applicable this theory is to southern Africa.

3.7 Conclusion

Traditional methods of analysing RIAs through static trade analysis have been found to be insufficient, particularly in a developing country context. Out of the shortfalls of this body of theory emerged a focus on the dynamic effects of regional integration. These dynamic effects have the potential to be large and vastly outweigh the static effects of trade creation and trade diversion. One particular dynamic effect is the evolving structure

of industrial distribution across countries as they liberalise trade with each other. From this standard trade background, the new economic geography has arisen, incorporating additional factors that are used by geographers while being largely ignored by the pure trade economists. The new economic geography incorporates factors such as increasing returns to scale, monopolistic competition and transport costs. The standard premise of the theory is that, at high levels of transport costs, industry will be dispersed. As transport costs fall to an intermediate level, industry tends to agglomerate, but once some critically low level of transport costs is reached industry once again disperses. Criticism of the theory has come from both economists and geographers. From an economic standpoint, the core model is based on a number of highly rigid assumptions that could make the end result susceptible to change. To date, there has not been a large enough base of empirical research to fully accept or reject the theory, although the evidence is leaning towards support for the NEG and consequently this body of research is growing and becoming increasingly popular. Geographers on the other hand have based their criticism on the name being a misnomer. They claim that the majority of 'findings' of the new economic geography are not 'new', but have been present at various stages in the literature of geography, regional science and urban economics. Additionally geographers argue that real geographical space is largely ignored in place of a focus on abstract, hypothetical space. However, despite these criticisms, the new economic geography has provided a framework in which aspects of mainstream economics are used to create a "choice-theoretic basis for a propensity to agglomerate" in spatial analysis (Neary 2000:1).

Despite vocal concerns of polarisation of industry from the smaller countries in SADC, empirical studies of this 'dynamic' nature are exceedingly scarce. The next chapter will survey empirical research of regional integration that has been done within this framework of analysis.

Chapter 4: The Experience of Regional Integration from a New Economic Geography Perspective

4.1 Introduction

Although the nature of research emanating from the new economic geography could have serious policy implications, little research has been done. Part of the reason is that it is an emerging theory and consequently most of the research completed has been theoretical (Ottaviano and Puga 1997:2). Martin (1999:70) sums it up well when saying the new economic geography "has been long on mathematical modelling and exceedingly short on empirical application". This could also be because the nature of the models make empirical estimation difficult, as they are often abstract, highly simplistic and idealised (Martin 1999:70). Thus, evidence has largely relied on the existence of illustrative examples, such as the industrial clusters of Silicon Valley and the Detroit motor industry. More applied analysis uses measures, such as the locational Gini coefficient, to map patterns of industrial location and compare this to what would be expected in the theory (Martin 1999:70). Even so, the research that has been done so far has focused almost purely on the 'important' economies and economic blocs, particularly the EU and NAFTA. Conclusions from these studies will be useful, but the need remains to test their relevance in the developing country context, and particularly in Africa. This section begins with an overview of the literature on regional integration that has been based in the new economic geography concerning SADC and will then proceed to empirical research conducted in various other regional groupings, namely the EU, studies in North America, India and Mercosur.

4.2 The Southern African Development Community (SADC)

There is surprisingly little literature investigating polarisation of industry within SADC, despite the sensitivity of the issue. There are particularly few "dynamic" studies, and even fewer of the economic geography of SADC. Thus the findings of seminal studies on SADC, some of which are not necessarily specifically 'dynamic' in nature will be considered in this section.

McCarthy (1999), in a dynamic analysis, presents an interesting paper outlining the possibility of polarisation within SADC. Several characteristics of SADC economies that may affect the level of polarisation are considered (McCarthy, 1999:388-395). Firstly, McCarthy notes that the peripheral countries presently have a significant wage advantage over South Africa, a result of the high level of labour market regulation in South Africa. This is a particularly important factor for labour intensive industries. Secondly, between countries there are substantial constraints on the mobility of labour, but not of capital. This has particular implications for the possibility of direct investment from South Africa to the region. Between 1995 and 1999 at least R2 500 million was invested by South African firms in SADC (McCarthy, 1999:389). This value is almost double the GDP of both Lesotho and Swaziland. Thirdly, McCarthy highlights the spatial disparities in South Africa as a country, arguing that many regions face levels of poverty similar to those found in the poorer SADC countries. McCarthy's fourth point is that the marginal cost of industrial production in developed South African areas is generally lower than in the smaller SADC countries, despite the wage advantages of the smaller countries. His fifth point is that there are already a significant number of RIAs between the members of SADC, which poses problems for rules of origin. In addition, the absence of a common external tariff excludes the possibility of a common revenue pool to be used for re-distributive purposes. He argues that this also reduces the possibility of an effective regional industrialisation policy. Separate trade agreements with other countries outside the bloc may influence decisions to invest in particular countries. McCarthy (1999:394) provides the example of the Pepkor Group, a clothing manufacturer which transferred production from the Eastern Cape in South Africa to Malawi to take advantage of cheaper labour and duty-free inputs from Asia. The resulting products are then exported duty-free to South Africa. His sixth point is that most SADC countries do not have an established business sector compared to South Africa's sophisticated and diversified private business sector. The above agglomeration and dispersion forces already present in SADC lead McCarthy (1999:394) to argue that the Krugman and Venables (1995) *U-shaped* trend of industrial production will occur. McCarthy emphasises the need to improve transport and communications infrastructure to facilitate cross-border investment from South Africa.

Additionally, McCarthy (1999:382), acknowledges the importance that external economies of scale play in the agglomeration of industry, and notes that an increase in specialisation leads to an increased division of labour, which in turn promotes inter-firm transactions (such as found in the 'just in time' (JIT) method of production), and therefore agglomeration. Agglomeration stimulates innovative leadership and expertise, as an OECD report argues that the core "grows by the cumulative effects of learning, scale and sector cross-fertilisation" in a geographically concentrated area " contrary to the assumptions of the orthodox theory of comparative advantage" (quoted in the National Economic and Social Council, 1989:318).

McCarthy (1999:395-397) concludes that polarisation of industry is likely to occur towards South Africa. However, hope is provided for the less developed SADC countries through the interplay of various factors, namely, the institutionally determined comparative advantage in labour cost, presently high South African import tariffs that will be significantly lowered through the FTA, greater functional cooperation between members and the demonstrated willingness of South African firms to invest in SADC.

Confirming McCarthy's (1999:396) prediction of greater investment flows from South Africa, Thomas (1998:52) shows how the formation of the SADC FTA is likely to lead to an increase in investment from South Africa into the rest of the region. From 1998 to 1999, the South African Ministry of Finance increased the amount private investors could invest in SADC from R50 million to R250 million. The Development Bank of Southern Africa (DBSA) and the Industrial Development Corporation (IDC) mandates have been extended from South Africa to the rest of the region to promote 'normal' investment. The DBSA committed R1.8 billion in funds to SADC in 1998 alone (Thomas, 1998:52).

Petersson (2002) conducts an analysis of SADC using locational coefficients in conjunction with other related measures. For example, he includes the centrality index, which factors in access to a country's own market, the size of this market, and access to other markets in the region. It thus quantifies 'road' transport costs and the importance of size. Petersson includes eleven SADC members, and treats South African provinces as

separate regions within SADC. He (Petersson, 2002:1239) finds that non-ferrous metals, machinery, electrical machinery, plastic products, motor vehicles and other transport equipment, fabricated metal products and basic iron and steel have definite locational biases towards the centre. Petersson (2002:1242) also notes that SACU members rank lowest in terms of industrial diversification, and considers whether this is the path the rest of SADC will follow with closer integration. Petersson (2002:1242) finds that industries prone to scale economies and external economies are geographically concentrated in regions with close access to large markets.

Petersson (2002:1237) defines three broad types of industries in order to classify the importance of scale and external economies arising from the core:

1. Those with a strong correlation between an industry's potential for scale economies and locating in central regions or large markets. This category includes machinery and other chemicals, metals and metal products and transport equipment. These are mainly differentiated goods.
2. Those less affected by these economies. These industries have a higher share of total manufacturing employment in peripheral countries, and thus would have a locational bias towards the periphery. Included here are the resource-based or labour intensive industries of food products, beverages and textiles, and less so, wood products and footwear.
3. Industries not presently clustered in the centre or the periphery, such as the highly concentrated leather industry, and the more dispersed non-metallic mineral products.

Mutambara (2001) finds, in a static analysis, that the less developed countries of SADC are likely to experience net trade losses. However, she also notes that the FTA may lead to increased cross-border investment from South Africa, which would "facilitate the transfer of skills, capital and technology necessary to improve production capacities of less developed countries" (Mutambara, 2001:240). These benefits would be dependent on active policies of infrastructural and industrial development (Mutambara, 2001:240).

Cattaneo (1998:230), in evaluating various static analyses of the potential effect of the FTA, indicates that it cannot be concluded that smaller countries will lose disproportionately, and that they may even gain. Cattaneo (1998:235) calls for more research to be conducted on both the static and dynamic effects of the FTA within SADC, and concludes based on the existing literature, that it cannot be said "*a priori*, that the formation of a SADC free trade area could not be beneficial to South Africa and its smaller partners".

Holden (1996:viii) too concludes that the assumption of polarisation towards South Africa is not a foregone conclusion and recommends further research into the industrial structures of the region. The possible aversion of polarisation is based on lower wages in the periphery, and is dependent upon the significant reduction of transport costs in addition to the removal of tariffs (Holden 1996:56). Holden (1996:55) also recognises that non-tariff transport costs (or NTBs) are high in Africa, and consequently need to be reduced in conjunction with the fall in tariffs. In addition to the problem of incorporating NTBs there is the difficulty of determining the point at which the *U-shaped* pattern inverts (Holden, 1996:56). Holden (1996:62), however, points out that studies by the African Development Bank show evidence of South African firms looking to relocate to peripheral countries, but little evidence of companies in peripheral countries wanting to relocate back to South Africa. This could indicate that the trend would be on the upswing.

In two other static studies, compiled by the IDC (1995) and Evans (1996), the IDC report finds a positive impact of the FTA on South Africa (SACU), but a negative impact of de-industrialisation through increased competition on four of the remaining six non-SACU SADC members (Thomas, 1998:53). Evans (1996) finds the FTA to be beneficial for all members.

Thus, there have been a few studies that have addressed the issue of polarisation of industry within SADC. The results of these studies are generally tentative, leaving the door open for further polarisation of industry towards South Africa. However, the

general trend appears to acknowledge that there are likely to be gains and losses in both the core and the periphery. It is likely that some industries will tend to concentrate in the core, while others, particularly labour intensive industries, will relocate in the periphery. There is a need for further, specific research in this field in order to quantify and validate the largely qualitative findings.

4.3 The European Union (EU)

This section will investigate research that has been conducted on economic geography matters within Europe. The majority of studies of regional integration within the new economic geography framework have focused on the EU. Thus, it is critical body of research that should be considered when applying a similar form of analysis to SADC. Additionally, there may be much that could be learnt from the experience of the EU that could be extended to other regional groupings. The EU forms part of the multi-region analysis in chapter five, and this section allows a comparison to be made between the results of the analysis in the next chapter, and the rest of the literature.

Ciccone (2002) uses spatial data analysing value added, employment and education in Germany, Italy, France, Spain and the United Kingdom in order to estimate agglomeration effects. Ciccone (2002:214) bases his estimations on two models that provide similar results, firstly, by using the extent of spatial externalities and secondly by analyzing non-tradable inputs with increasing returns to scale. Both result in a similar reduced-form relationship pairing employment density and productivity at the local geographic level (Ciccone, 2002:214). Ciccone (2002:214) highlights the problem arising between the paradox of agglomeration and productivity. As agglomeration increases, so does productivity, but conversely, agglomeration is the result of productivity, therefore, which comes first? This problem is compounded by the difficulty in defining and determining the correct influence of all variables that contribute to total factor productivity. Ciccone (2002) overcomes this problem by using a large sample of disaggregated regions, thus being able to include detailed regional fixed effects in the estimation.

Ciccone's (2002) results indicate that there are significant agglomeration effects in all five countries of the study of a roughly similar magnitude. Using the least squares regression method, it is estimated that doubling employment density increases average labour productivity by approximately 5 percent. Using an instrumental-variables approach with total land area as an instrument for employment density, the effect is roughly similar at 4.5 percent. However, the estimate is reduced to 3.4 percent when including the share of value added from agriculture (Ciccone, 2002:214). It is also found that an increase of 1 percent in the share of agriculture in total value added leads to a reduction in average labour productivity in the manufacturing and services sectors by 0.9 percent (Ciccone, 2002:224). Taking into account the density of production of neighbouring regions is not found to have any significant effect on regional productivity (Ciccone, 2002:225). By using the detail of the Nuts 3 regions, Ciccone's (2002) paper provides a useful indication of the agglomeration effects of industry as a whole; however, at this level of analysis it becomes increasingly difficult to distinguish vital differences that sub-groups of industries might face.

Molle (1997:437) finds that inequality between all European regions has decreased with deeper integration. Molle (1997:437) attributes this occurrence to the movement of direct capital investment from central to peripheral regions, the aid spurred growth and access to large economic markets. Molle (1997:440) further estimates that the 1993 GDP of the 'lower' income countries of Spain, Portugal, Greece and Ireland was 10 percent higher than if one modelled pre-1987 growth rates. Molle (1997:440) also found that labour initially migrated towards the centre, but then later returned to the periphery. This was amplified by the rich members being net exporters of direct investment, and the poorer members being net importers.

Forslid *et al* (1999a) conduct a comprehensive computable general equilibrium modeling process to determine the locational effects of European integration. Forslid *et al* (1999a) utilize the EURORA model, including fourteen industries and ten regions using 1992 data. With the exception of Greece, Spain and Ireland, the remaining countries in the study are of a roughly similar high income level. The model includes both intra- and inter-industry linkages. Sectors are linked with regard to their demand for intermediate inputs. Two of the 14 sectors are assumed to be perfectly competitive (agriculture and energy), while the rest are assumed to be imperfectly competitive. Of these, only two sectors are non-traded manufacturing sectors (private and public services). Trade costs are assumed to be of three kinds, transport costs of the iceberg variety, tariffs and export taxes (Forlsid *et al*, 1999a:4). Forslid *et al* (1999a:8) model four factors that affect the strength of backward and forward linkages, trade costs, scale elasticities, the input-output structure, and the size of regions (home market effect). It is also assumed that location can be affected by comparative advantage, through differences in endowments or technology (Forslid *et al*, 1999a:8).

The results of the study indicate that agglomeration effects are highly regional and sector specific, with some industries being more affected by comparative advantage, and others by scale economies (Forslid *et al*, 1999a:2). However, as a whole the manufacturing sector displayed the inverse U-shaped relationship between trade liberalization and agglomeration as predicted by Krugman (1991). It is also found that nominal factor prices co-vary (Forslid *et al*, 1999a:3).

The most dramatic locational changes are found to be in textiles, leather, wood products and food products. At low trade costs production is seen to disappear from the Central Europe region and agglomerates in both Western Europe and Southern Europe regions. This relocation occurs abruptly partially because of the strong intra-industry linkages in this industry. Textiles are attracted via the comparative advantage of Southern Europe which has a comparative advantage in the production of labour intensive goods, as textiles is one of the most unskilled labour-intensive industries. The reason why the

Western Europe region attracts the industry is that is has a larger initial production of textiles than Central Europe (Forslid *et al*, 1999a:13).

The leather industry displays a clear movement towards Southern Europe. This is because of Southern Europe's labour-intensive comparative advantage and the fact that initial leather production in Southern Europe was more than twice as large as any other region. However, the movement of industry is more gradual and continuous as there is a relatively low own input share in production (Forslid *et al*, 1999a:14).

Wood products move out of Northern Europe and into all other regions, primarily due to the removal of a 15 percent export subsidy in Northern Europe. The large changes in the location of food production are attributed to the initially high trade costs of the industry. An interesting result emerges where the industry begins to agglomerate in Northern Europe at low trade costs, even though Northern Europe's initial share of the industry is significantly less than that of the others. This is because food production is relatively capital-intensive and this is Northern Europe's comparative advantage. Additionally, the increasing returns to scale, and the own input share are both relatively insignificant thus reducing the dependence on a large market (Forslid *et al*, 1999a:14).

Of the remaining industries, metals, chemicals, transport equipment and machinery are singled out as possessing the most significant increasing returns to scale technology. This fact combined with strong intra-industry linkages mean that the initial status quo of production in the largest markets remains (Forslid *et al*, 1999a:15). Concentration follows a u-shaped process where initial reductions in trade costs increases concentration, but at low trade costs the situation is reversed and other forces such as comparative advantage start to dominate. This is particularly the case with metals, which show a later decline in industrial concentration of 19 percent (Forslid *et al*, 1999a:17).

Overall, the small Northern European region displays a distinct U-shaped pattern, where loss of industry is at a maximum for intermediate trade costs. The share of industry increases in the large Central European region as trade costs decline. This again is most

apparent at intermediate levels of trade costs, and may begin to decline at lower trade costs. Western Europe displays a similar pattern to Central Europe, while Southern Europe's industrial movements are slightly bell-shaped (Forslid *et al*, 1999a:15).

Forslid *et al* (1999a:17) speculate on where Europe could be on Krugman's U-shaped curve. The results of the model indicate that manufacturing industries with high degrees of economies of scale are close to the peak of concentration, while those industries more affected by comparative advantage may continue to concentrate (Forslid *et al*, 1999a:18).

Forslid *et al* (1999b) conduct a similar CGE study, this time incorporating the effect of closer Western European integration with Eastern Europe, and greater global integration. Again the model incorporates elements of traditional trade theory in the use of comparative advantage and new economic geography in agglomeration and clustering effects of structural or policy change (Forslid *et al*, 1999b). The results of the study are somewhat more positive for the less developed, smaller Eastern European countries than for the established members of the EU with whom closer integration is modeled. The effects of integration are seen to be large for the smaller Eastern European countries and marginal for most Western countries, and perhaps slightly negative for those with currently strong trade links with the East. However, the results are based on a number of rigid assumptions, such as the assertion that liberalization will lead to a productivity improvement of five percent, a better investment climate will likewise increase investment with a five percent reduced risk premium, which in turn will lead onto a growth in employment of another five percent (Forslid *et al*, 1999b:10). The multiplier effects of these changes are necessarily massive. However, Forslid *et al* (1999b:14) make a critical point in saying that even though the less developed countries of the East may attract some industry, these effects "are too small to matter very much for the overall production and welfare elsewhere". Thus, it appears as though the peripheral countries of Eastern Europe will benefit from integration, but this will not affect the established industrial core to any great degree.

The results of the model indicate that Eastern Europe is likely to attract labour-intensive sectors such as textiles and leather, as well as a few skill-intensive industries like transport equipment and machinery.

Amiti (1999) conducted an empirical investigation of specialisation patterns in Europe, and compared the results to leading trade theories. Amiti (1999) settled on using locational Gini coefficients as a measure of industrial dispersion. Although other methods could and have been used, Amiti (1999:576) argues that the Gini coefficient provides the best analysis[6]. Amiti (1999) calculates her Gini coefficients with production and employment data, using two different data sets. Firstly, the highly disaggregated EUROSTAT data, consisting of 65 manufacturing sectors of the NACE3 classification for five countries, Belgium, France, Germany, Italy and the UK. This covers the period 1976 – 1989 (Amiti, 1999:577). Secondly, Amiti (1999:578) used UNIDO data with 27 industries classified according to ISIC3 categories, for ten countries and for a longer time period of 1968 – 1990. These two data sets were used to try and pick up specialisation that may be taking place within an industry but that would not be picked up by the more aggregated UNIDO data.

Using the EUROSTAT data, Amiti (1999:578) found an increase in specialisation in all countries from 1976-1989; however, the increase in Italy's Gini coefficient was not significant at the five percent level. A similar pattern was noted using production and employment data. With the UNIDO data set, an average annual increase in specialisation of around one percent was found for Denmark, Germany, Greece, Italy and the Netherlands over 1968-1990, while Belgium, France, Portugal, Spain and the UK showed a significant increase in specialisation only after 1980 (Amiti, 1999:578). The fall or lack of specialisation prior to 1980 for Portugal, Spain and the UK may have been due to their late membership of the union and have been part of their structural adjustment (Amiti, 1999:579).

[6] This issue is explored further in chapter 5

Using the disaggregated EUROSTAT data, in 1976, the following industries were found to have the highest level of geographical concentration: toys and sports goods, carpets and other floor coverings, miscellaneous industries, bread and flour confectionary, wool industry, brewing and malting manufacture of paint, mass produced footwear, other wooden manufactures and jewellery (Amiti, 1999:587). Industries with the lowest level of geographic concentration in 1976 were processing of plastics; cocoa, chocolate and sugar confection; iron and steel; furs and fur goods; ready made clothing and manufacture of agricultural machinery (Amiti, 1999:588). However, there were substantial changes in order in 1989, with 30 of the 65 industries recording an increase in geographical concentration (from 1-12 percent annual growth in concentration).

In an earlier study, Amiti (1997) also found that there was a general increase in specialization of production in the EU over the period 1960 – 1990. However, this did not occur in all countries, but Amiti in her (1998) paper argues that this is a result of using more disaggregated data sets for some countries. As one would expect, the level of aggregation by industry was also found to have increased as industries became located in fewer specialized regions. This was also found in Brülhart (1998) and Brülhart and Torstensson (1996). However, the ordering of agglomerated industries changed over the period of analysis, with those most agglomerated in 1968 not being the most agglomerated in 1990. 17 of 27 industries analyzed agglomerated further over the period, with the largest changes being in leather products, transport equipment and textiles. Of the industries that dispersed, paper and paper products and other chemicals spread the most.

Devereux *et al* (2002) measure the levels of industrial concentration in the UK using an index of industrial dispersion developed by Maurel and Sedillot (MS) (1999). This index measures the extent to which the geographic concentration of an industry exceeds that due to industrial concentration. The measure utilizes plant level data on employment, inputs and output. Devereux *et al* (2002:18) compare their results to those of Maurel and Sedillot's (1999) study of France, and Ellison and Glaeser's (1997) study of the USA and find that the pattern of industrial dispersion is similar across all three countries, with a

high positive correlation of the EG index. In particular, flax, hosiery, jewellery and spirit distilling were found to be amongst the most agglomerated industries in both the UK and the USA, while cutlery, periodicals and woolen products were found to be highly agglomerated in France and the UK.

The MS index shows textiles to be the most concentrated manufacturing industry, and Devereux *et al* (2002:11) put this down to strong labour market externalities. This finding is concurrent with Ellison and Glaeser (1999) who find that the location determinants of textile and apparel industries in the USA are largely driven by access to unskilled labour. An interesting result from this study that backs up Krugman's (1991) decision not to incorporate technological factors into the NEG is that high-tech industries are generally less agglomerated than the average. Devereux *et al* (2002:11-12) provide a number of reasons for this finding. Firstly, high-tech industries are usually new and have not yet been significantly affected by the dynamic forces for agglomeration. Secondly, the issue of geography may not be as important as knowledge spillovers have become easier with developments in communications and transportation, and thirdly, the externalities found in these industries may be high and consequently firms have internalized them which then distorts the index.

Brülhart (2001), using the locational Gini coefficient based on employment, finds that the index increases by 18 percent between 1972 and 1996 in Europe, a period of high integration. However, since 1986 the growth rate of the coefficient is around one third that of the previous period. Brülhart and Torstensson (1996), in a similar study, again using the Gini coefficient with employment data on 18 manufacturing industries in the European Union, find that in the 11 countries studied, geographical concentration increased during the 1980s. Likewise, in an earlier paper, Brülhart (1995) finds that 14 of 18 industries studied in Europe increased in agglomeration over the period 1980 and 1990. This was particularly noticeable in labour intensive industries (such as textiles, clothing, footwear and leather) and some industries prone to increasing returns to scale (motor vehicles, other vehicles and chemicals). High-tech industries were generally

concentrated over the period of analysis, while the labour intensive industries were relatively more dispersed at the start.

Like Brülhart (1995), Haaland *et al* (1999) find that the textile and apparel industries are highly concentrated in relatively small countries, while cars, electrical apparatus, communications equipment and machinery are concentrated in large countries in the EU. Overall, Haaland *et al* (1999) find that there was an increase in concentration over the period of analysis 1985 to 1992 of 11.4 percent. In an earlier study, Haaland *et al* (1998:14) analyse manufacturing industries by ISIC four-digit level for thirteen EU member countries in order to estimate the relative impact of the components of new economic geography and traditional neoclassical trade analysis. The study ranges from 1985 to 1992. Results indicate that the relative concentration index increased by 11.4 percent over the period (Haaland *et al*, 1998:15). Haaland *et al* (1998:16) stress the need to distinguish between relative and absolute dispersion. Relative dispersion takes into account the relative sizes of countries where as absolute measures merely look at the actual distribution. Thus, in SADC, the absolute measure would be extremely large as South Africa dominates the vast majority of manufacturing, while the relative measure is likely to be significantly smaller. This poses an interesting question in the light of the theory and the nature of this study. The scale economies and demand effects existing in South Africa are incomparable with the size of industry and demand in the remaining countries of SADC. Thus, would a relative measure bias the actual result towards the smaller countries assuming that the countries are of a somewhat similar, though not equal size? Haaland *et al* (1998:16) find significant differences in the distribution of industry in the EU when compared on a relative and an absolute basis. In particular, industries in which scale economies and imperfect competition are important are concentrated in absolute, but not relative terms. This would indicate that they are generally based in larger countries. On the other hand, industries such as apparel are concentrated in relative but not absolute terms, indicating a specialization of smaller countries in the production of these goods. Intra-industry linkages are found to play a particularly important role in the agglomeration of industry in absolute terms (Haaland, *et al*, 1998:25).

Using the EG index, Resmini (2003:213) maps the dispersion of industries over the 1990s in various Central and Eastern European countries seeking accession to the EU. The most concentrated sectors are found to be:

- textiles and clothing
- fuels and chemicals
- metallurgy
- transport equipment and motor vehicles
- food, beverages and tobacco, and
- wood and paper products.

In Bulgaria, textiles and clothing, metallurgy, transport equipment and motor vehicles increased in concentration in regions bordering existing nations of the EU, while fuels and chemicals dispersed. In Romania it was found that regions bordering the EU began to specialize in textiles and clothing, food and beverages, wood and paper products, machinery, equipment and motor vehicles. Resmini (2003:215) creates a model including relative wages, regional distance from the country capital, distance from the nearest EU border, foreign direct investment (FDI), region accessibility and the level of development of the service sector. Results show that the relative wage is unrelated to relative employment. However, relative employment is lower where distance variables to EU markets are higher, while relative employment is positively related to levels of FDI, road density and the development of the service sector (Resmini, 2003:217). From her regional analysis, Resmini (2003:217) concludes that integration with the EU has had different effects on the regional structures of accession countries, particularly with regard to regions bordering the EU, and those in the centre of the country. Resmini (2003:218) predicts that those regions bordering the EU will achieve the highest growth rates. She finds that regional employment growth depends negatively on the original level of employment and the relative wage, while it depends positively on FDI and infrastructure (Resmini, 2003:219). An important conclusion from this paper, and one that has been found in studies of the USA and Mexico, is that previously peripheral regions in an

autarkical sense, are now the most likely regions to benefit if they border the larger market of the EU.

Leitner (2001) compares the concentration ratios of production in the EU and the US from 1887 to 1996 through the use of Gini coefficients and the coefficient of variation. In line with theoretical predictions, industries traditionally subject to increasing returns to scale (such as transport equipment and electronics and electrical equipment) were found to be the most spatially agglomerated in both the EU and the USA (Leitner, 2001:10). In the EU, minerals, food and beverages, and textiles and clothing were found to agglomerate over the entire period. Food and beverages tended to agglomerate towards the core due to the high trade costs and relative capital intensity of the industry. However, textiles tended to relocate towards more peripheral regions in Europe (Leitner, 2001:11). Industries less affected by increasing returns to scale were found to be more affected by the prices of immobile factors.

It is commonly accepted in the literature that US industry is more concentrated than in Europe (Leitner, 2001:1; Krugman, 1991). A question often posed is whether Europe will approximate the distribution of industry evident in the US. Although agglomeration is likely with integration, Europe appears to have reached the critical stage of integration where agglomeration appears to have peaked. The fact that Europe has not seen the levels of concentration of the early years of the 20th century in the US is caused by the significant immobility of labour. This labour immobility reduces the extent to which centripetal forces may extend, and in turn equalizes wages and production structures in the bloc (Leitner, 2001:18; Puga, 1998a).

In another study comparing the EU and the USA, Aiginger and Rossi-Hansberg (2003) investigate how the specialization of regions and concentration of industry changes with a reduction in transport costs in both the EU and the USA. They base their model on Rossi-Hansberg (2003) which has two industries, a continuum of regions, iceberg transport costs and production externalities resulting in agglomeration effects. Additionally, transport costs are modeled both between and within regions. This differs

from the Fujita *et al* (1999:338) model in the source of congestion costs and agglomeration effects and additionally in the inclusion of intra-regional transport costs (Aiginger and Rossi-Hansberg, 2003:4). Specialisation and concentration is measured through the use of the Gini coefficient. Results show that as transport costs fall the specialization of regions increases and the level of industrial concentration falls. The average specialization of the USA increased by 2.3 percent from 0.1075 in 1987 to 0.1100 in 1996, and likewise for the EU, increasing by a larger amount of 5.7 percent from 0.2001 to 0.2115. On the other hand, regional concentration of industry decreased from 0.2966 to 0.2892 (-2.5 percent) in the USA, and from 0.2994 to 0.2962 (-1.0%) in the EU (Aiginger and Rossi-Hansberg, 2003:4). This signifies the distinction between the specialization of regions and industrial concentration which is often treated in the same way in the empirical literature. In terms of the NEG, Aiginger and Rossi-Hansberg (2003:6) claim that the results are generally in line with the theory, but cannot be used as direct proof.

Through the studies surveyed, it is generally found that there was significant agglomeration of industry within the EU in the second half of the 20th century, and particularly since the 1980. However, this trend of concentration appears to be reversing with studies showing that since 1992, industry has generally shown a dispersing trend (Forslid *et al*, 1999; Aiginger *et al*, 2000). Although there has been an increase in the overall concentration of industry within the last few decades this has not necessarily been biased away from the peripheral countries, with the textile industry in particular concentrating away from the core. SADC should take particular note of the extent to which industry has concentrated in the EU as their degree of integration has increased. SADC still has some way to go before they reach the level of integration in Europe in the last 20 years. This evidence appears to validate the NEG prediction that industry would be likely to concentrate until an extremely high level of integration (and consequently low internal transport costs, and higher factor mobility) has been reached.

4.4 North America

The seeds for the present NAFTA were sown with the signing of the Canada-US Automotive Products Trade Agreement in the mid-1960s. Under this agreement most automotive products were traded freely between the two countries. After a period of twenty years or so, in 1989 the Canada-US Free Trade Agreement (CUSTA) was signed, and five years later Mexico was included to form the North American Free Trade Agreement (NAFTA) (Holmes, 2000:652). Although the USA is the key player in the bloc, the drive for a free trade area largely came from the smaller nations of Canada and Mexico who wished to gain preferential access to the US market (Holmes, 2000:652). For the USA, the trading bloc increased its power both in the region, and in the world trading system as part of a larger 'bloc' of countries. The US represents 68 percent of the population of NAFTA, 84 percent of GDP, 73 percent of the labour force, and 49 percent of the trade in goods (Cremeans in Holmes, 2000:654). The degree of trade dependence is split between Canada and Mexico on the one hand and the USA on the other. Both Canada and Mexico are highly reliant on the US for both exports (80 percent and 84 percent respectively), and imports (77 percent each). In proportion to their overall economies, total world exports represent 40 percent of GDP in Canada and 30 percent in Mexico (Holmes, 2000:656). In contrast, total exports in the US contribute a mere 12 percent to GDP, and of these exports NAFTA only claims 30 percent, and likewise with imports (Holmes, 2000:656). Trade within the bloc has been increasing exponentially, with the balance moving in favour of the smaller countries. For example, Mexican exports to the USA have grown at an average annual rate of 18.9 percent since NAFTA began, and have doubled in value to Canada (Holmes, 2000:658). An interesting feature of the trade is that a substantial proportion is intra-industry, and particularly inter-firm, amongst large MNCs (almost 50 percent of Mexican exports) (Holmes, 2000:659).

Barkley *et al* (2001) investigate the propensity for manufacturing firms to cluster in non-metropolitan areas in order to ascertain whether the natural advantages of locations override the inter-industry spillovers present in metropolitan regions. The results indicate that 119 of the 120 3-digit manufacturing industries analysed showed some degree of non-random concentration, of which around 20 percent were heavily clustered, 45

percent moderately and 36 percent only slightly. Comparing the index from 1981 to 1992 an overall trend of dispersion was found. However, a number of particularly high-tech industries were found to have agglomerated further, as shown in table 4.1 below,

Table 4.1: Industries showing an increase in concentration

High-tech	**Other**
Electrical industrial appliances	Fat and oils
Communications equipment	Beverages
Aircraft and parts	Paper mills
Measuring and controlling devices	Paperboard mills
	Plastics materials

(Barkley *et al*, 2001:21-22).

Overall, textiles and apparel industries were found to be the most concentrated, with the six most concentrated industries (US SIC 3-digit level) all falling into these two categories. Related to textiles, the leather industry was also found to be significantly agglomerated in non-metropolitan areas. This is likely to be the result of the presence of natural advantages in the form of low wages (Enright, 1993 in Barkley *et al*, 2001:23) in combination with spillover economies of "labour pooling, service providers and accommodating industries" (Rosenfeld, 1995 in Barkley *et al*, 2001:23). As would be expected, a large number of resource-intensive industries were also concentrated in non-metropolitan areas, such as paper mills, petroleum products and refining, primary metal products, structural clay products and dairy products (Barkley *et al*, 2001:24). The last group of industries that was found to be agglomerated in these areas were skill or technology reliant, including, jewelery, glass and glasswear, communications equipment, and computer and office equipment (Barkley *et al*, 2001:24).

On the other hand, those industries that were most dispersed were diverse, but generally market-oriented, such as printing, bakery products, newspapers and periodicals and

beverages, or they faced high transport costs in relation to the value of the products (Barkley *et al*, 2001:25).

Hanson (1998) investigates the distribution of industry within the three members of NAFTA and the effect on skilled versus unskilled labour. Although the distribution of industry in the USA is substantially more dispersed than 50 years ago, there is still a strong tendency for firms to agglomerate in certain regions. For example, in 1990, 41.2 percent of total manufacturing employment in the USA was found in 100 counties, which represented 1.5 percent of the USA's land area (Hanson, 1998:32). Mexico's relatively successful import substitution programme led to a concentration of manufacturing in and around Mexico City. However, in response to the liberalization of trade, the focus on Mexico City has diminished and the importance of border towns has increased. In contrast to the dispersion seen in the USA and Mexico, the level of concentration of industry in Canada has remained somewhat steady over the course of the last century, primarily centered in Ontario (Hanson, 1998:33).

Hanson's (1998) study provides an important area for further research in determining the types of areas in SADC that are likely to benefit from greater access to the South African market. These are likely to be regions which can minimize transport costs to central South African cities, or achieve preferential access (with adequate infrastructure and low transport costs) to global markets that South Africa is ineligible for.

Kim (1995) investigates whether regional specialization in the long term in the USA has been driven by the traditional theories of comparative advantage or external economies and increasing returns to scale.

Between the nineteenth and twentieth centuries the U.S.A. was transformed from a set of regional economies to an integrated national economy (Kim, 1995:885). In particular, the integration of American regions progressed quickly after the development of a comprehensive railroad network. The degree of regional specialisation increased between 1860 and 1914, after a slight dip between 1860 and 1890, reached a peak

between the two world wars, but then fell progressively until 1987. The scale of regional specialisation was around 35 percent in 1860, increasing to 43 percent in 1927 and 1939, but continually fell to 23 percent by 1987 thus adding credence to the idea of a U-shaped pattern of localisation (Kim, 1995:887). Kim's (1995:894) findings echo the intuitive result that industries became increasingly agglomerated as regions became more specialised.

According to the Gini coefficient, the following industries displayed an (inverted) *U*-shaped rising and then falling trend in agglomeration: lumber and wood, rubber and plastic, fabricated metal, nonelectrical machinery, electrical machinery, transportation equipment, instruments, and miscellaneous industries (Kim, 1995:894). However, tobacco, textiles and apparel became more regionally localised throughout the entire period, whereas food, paper, printing and publishing, and chemicals became more regionally dispersed until 1947, and then remained stagnant until the end of the period in 1987 (Kim, 1995:894). Furniture and fixtures and primary metal showed virtually no change in localisation at any stage in the period studied (Kim, 1995:894).

Kim (1995:902) analyses his results as follows. The fall in transport costs until the end of the 19th century coincided with Fordian production techniques where large-scale production techniques were used that had a heavy reliance on immobile resources and energy sources. Increased mobility of factors, the increasing likeness of regional factor endowments and reduced scale economies then led to a fall in regional specialization from the mid-1900s.

Table 4.2: US most and least agglomerated industries

	Most localised Industries	Least localised Industries
1860	Tobacco Lumber and wood Chemicals	Fabricated metal Transportation Non-electrical machinery Furniture and fixtures Stone, clay and glass
1927	Lumber and wood Textiles Tobacco Petroleum and coal Rubber and plastic	Clay and glass Printing and publishing
1987	Tobacco and textiles	Electrical machinery Paper Printing and publishing Rubber and plastic Stone, clay and glass Fabricated metal Nonelectrical machinery Chemicals Food

Source: Kim (1995:894-895)

In a more recent analysis, Holmes and Stevens (2003) comment on a well documented occurrence in the USA, that of the shifting manufacturing belt. Up until the 1960s manufacturing in the USA was predominantly located in the manufacturing belt of the Northeast and Upper Midwest regions. However, much of this manufacturing has now relocated to Southern regions, forming a 'new manufacturing belt' resulting in the 'old' manufacturing belt no longer specializing in manufacturing (Holmes and Stevens, 2003:2). Another interesting phenomenon has been observed in the USA in that with the change in the geographical location of manufacturing, there has been a shift in firms' preference from producing in urban areas to locating in rural areas at the end of the century. Rural areas have become net exporters of manufactured goods, while urban areas have become net importers (Holmes and Stevens, 2003:22).

2.4 The Southern Cone Common Market (Mercosur)

There is scant literature applying the NEG to Mercosur, and the majority of the available literature is inaccecable due to language barriers. In one of the studies found, Diao and Somwaru (2000) investigate the trade and welfare effects within Mercosur and its external trading partners. Using a dynamic global equilibrium model they find that there is a general increase in welfare within Mercosur due to increased investment, production and consumption in the region. Using a gravity model, Becker and Suarez (2001) attempt to determine the extent of trade creation and diversion in Mercosur. The results indicate that both trade creation and diversion will occur in all members with the exception of Argentina for which neither occur.

In order to determine agglomeration tendencies in Mercosur, Shams (2003) measures the difference in income levels as a result of manufacturing concentration. If Paraguay is excluded as an outlier, the results indicate that there has been convergence among the countries. In a more comprehensive analysis, Darrigues and Montaud (2001) (in Shams, 2003:9) compute a NEG model to predict changes in the industrial structure of Mercosur[7]. The results show that industry moves from Brazil to Argentina, while industry in Paraguay and Uruguay remains unaffected. Shams (2003:9) in his brief overview of Mercosur concludes that there is no proof of agglomeration occurring in Mercosur, nor is there any proof that agglomeration is likely to occur in the future.

Although India does not directly form part of this study, and is not necessarily a case of regional integration *per se*, NEG analyses within a developing country context are exceedingly scarce. Thus, this study by Lall and Chakravorty (2003) may yield valuable insights for a similar study between developing countries. Over the standard components of the NEG, Lall and Chakravorty (2003:3,23) emphasise the political and economic factors evident in the location decisions of Indian manufacturing, such as local wages, taxes, subsidies and incentives, nationalism (textiles), war, bureaucratization and the spread of literacy.

[7] This paper could only be accessed in French

In terms of inter-industry linkages, Lall and Chakravorty (2003:22) find high levels of industry co-location to be present in industrial clusters in India; however, they find no evidence of co-location of industries that would be expected to locate near one another. In fact, they find evidence of many counterintuitive co-locations, thus indicating that own industry concentration does not play a significant role in agglomeration, while industrial diversity may. This is because industrial diversity may reduce production costs, but Lall and Chakravorty (2003:25) say that this factor alone is not sufficient for explaining the industrial distribution. Other factors, such as the decision-maker's ethnicity, hometown bias, personal political connections and the lack of location choices may play a more significant role. "In the absence of location choices, firms are willing to put up with the higher costs of locating in existing industrial clusters and metropolitan regions… [that is] cumulative causation processes may be driven by the absence of alternatives rather than productivity advantages" (Lall and Chakravorty, 2003:25).

Table 4.3: Spatial concentration by industry in India

Industry	**Concentration (E-G index)**
Food processing	0.031
Textiles	0.025
Leather	0.186
Paper products & printing	0.013
Chemicals	0.011
Metals	0.088
Mechanical machinery	0.024
Computing and electronics	0.030

Source: Lall and Chakravorty, (2003:28)

The leather industry is found to be highly clustered, and located in urban fringes. This is attributed not to the importance of locating near markets, but due to state regulations on pollution requiring that firms have had to produce outside of residential areas. The only industry found to co-locate with leather is the chemical industry. Printing and publishing

likewise is highly concentrated, this time near the urban core. The textile industry is located in separate clusters, but all relatively nearer the city centre than printing and publishing (Lall and Chakravorty, 2003:22-23).

4.6 Conclusion

The use of the NEG as a framework for empirical studies of regional integration is still relatively new and has largely been focused on the EU and North America. There have been very few studies conducted with regard to developing countries, and those that have been done have tended to be fairly qualitative. Studies of SADC have been rather open-ended, but generally lean towards the suggestion of increased polarisation of industry within the region. However, this is not a foregone conclusion and many authors leave the door open for the peripheral countries to gain at the expense of the dominant country, South Africa. The rapid progress towards regional integration in the EU, and recent debate over the accession of new less developed members into the bloc, has stimulated much research in terms of the industrial location effects. The results of these studies are also somewhat mixed, although most have shown that regional concentration has increased over the last few decades, but that this process may be coming to a head, and particularly with the accession of lower-wage countries, the EU may be entering a dispersion phase. The textile and leather industries in particular appear to be concentrating in the smaller, lower wage regions. These industries were also found to be concentrated in low wage regions in the USA, while textiles and leather were concentrated in India, but closer to market centres. Evidence also points to large dynamic effects of integration and a general convergence of income levels between all members, with the less developed regions catching up with the rest.

There has also been significant research on the effect of regional integration in the NAFTA and the internal distribution of industry in the USA. Studies of NAFTA have focused on the importance of the US market for Mexican manufacturing, and how integration has seen a relocation of these firms from Mexico City to the US border. Internal studies of the USA have provided useful guidelines on how specific industries are affected by agglomeration and dispersion forces, and how this has changed over time.

The USA is perhaps the most useful region for analysing long-term distributional effects as the process of regional integration has been operational for many years. There has been significant relocation of industry in the USA, with the breakdown of traditional manufacturing centres and the emergence of new manufacturing 'belts'.

Of the few studies that investigate the distribution of industry in developing countries, Lall and Chakravorty (2003) emphasise the role of political and other factors not included in the rigid models of the NEG. Their study also provides a useful comparison for the overall distribution of industry in a developing country context. Studies of Mercosur show that regional integration has had a positive effect on intra-regional trade, but not necessarily any effect on the location of industrial activity.

Chapter 5: An empirical investigation of the dispersion of industry in SADC: 1970 - 1999

5.1 Introduction

As the issue of reducing trade costs within the SADC region becomes more important, so too does the impact of these reductions on the location of industry. There is a critical need for a greater understanding of the forces that affect the location of different industries. As shown in chapters 3 and 4, the new economic geography provides an alternative method for analysing the effects of regional integration. However, empirical studies within the developing country context are exceedingly scarce, particularly within Africa. This chapter will begin by outlining the method of analysis used for the present study's empirical investigation into the movement of industry within SADC over a period of three decades. It will then proceed to analyse the movement of industry as a whole in SADC, explore the changing concentration of individual industries and finally compare the experience of SADC to the EU and Mercosur.

The framework of the new economic geography is used to analyze the evolving distribution of industry in the SADC region because it provides a dynamic approach and investigates factors not traditionally used in static trade analysis. The empirical investigation will consist of two parts. The first part will describe and analyse the distributional pattern of industry as a whole and individual industries within SADC from 1970 to 1999. The second part of the analysis compares the experience of SADC with that of Mercosur and the EU over the period 1980 to 1999. This cross-regional analysis will investigate whether similar industries are affected in the same manner across blocs, as well as attempting to identify trends, similarities or differences across these three groups which are each at a different stage of liberalisation. As both the regions used for comparative purposes are at a further stage of liberalisation than SADC, the analysis enables possible inferences to be drawn for the region.

5.2 Method and problems of analysis

5.2.1 Regions chosen for analysis

The primary aim of the study is to investigate how the distribution of industry has changed in the SADC group with falling transport costs over time, and to highlight specific trends of industry, both individually and as a whole, as transport costs fall even further[8]. Therefore, the 11 member states that have currently ratified the SADC protocol on trade will be analysed, and will be assumed to be a proxy for the entire SADC. These countries are Botswana, Lesotho, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. The remaining three member countries, Angola, the DRC and the Seychelles were omitted for two reasons, firstly all three countries have not solidified a commitment to the FTA, and Seychelles has given notice of withdrawal from SADC. Secondly, data availability for these countries is very poor. As mentioned in chapter 2, the membership of the bloc has grown from 1980 with South Africa in particular being one of the more recent members. However, in order to ensure an accurate comparison over time, all eleven countries are included in the analysis even though they may not have been members of SADC for the entire period.

The two blocs chosen for the cross-regional analysis, Mercosur and the EU, were selected for the following reasons. Mercosur represents a group of developing countries of radically different size, with one particularly dominant member, Brazil. Additionally, the region initiated their FTA just over a decade before SADC's free trade area is scheduled to be implemented. Thus, it is possible to observe the effects of a recently formed FTA, on the regional distribution of industry. The EU was chosen as it is currently the most progressive RIA, and over the period of analysis has initiated high levels of integration amongst member states. Although not a developing country grouping, there are wide differences in income and productive capacity in the bloc.

[8] This does not presume that falling transport costs is the only factor that has affected the location of industry over this period. However, it is assumed that transport costs have fallen to some extent through cooperation, trade agreements and a general movement towards economic liberalisation within the region. Trends that are observed within individual industries are likely to be amplified as transport costs fall further and the choice of industrial location becomes more important.

5.2.2 Time period

The time period chosen to analyze the distribution of industry in the SADC region ranges from 1970 to the year for which the most recent reliable data was available, 1999. However, the focus of the study will be between 1980 and 1999 – the period during which there has been a formal cooperation agreement in the region, from the initial SADCC cooperation agreement to the planning of the FTA currently being implemented. This period ties in well with the end of protectionist regimes in Mercosur and significant progress towards an economic union in the EU. Locational Gini coefficients, as discussed in section 5.2.3.4 below are calculated at 5 year intervals from 1980 to 1995, and then for 1999.

5.2.3 Measures of industrial concentration

A number of indices have been developed to measure geographic concentration. This section will discuss various measures that could be used for analysis, and provide the rationale for the use of the locational Gini coefficient. There are four indices that are used predominantly in the literature, the concentration index, the Herfindahl index, the Ellison-Glaeser concentration index, and the locational Gini coefficient. However, which index to use is a hotly debated issue in the literature (Spieza, 2002:1).

5.2.3.1 The concentration index

The concentration index shows the share of the largest regions (usually four to eight – depending on the total number of regions) in total production. It typically shows the proportion of plants in an industry in the top few regions. The disadvantages of this method are as follows. Firstly, it only incorporates information from the largest units and does not say how this is broken down within this group, thus it is highly sensitive to the number of regions selected (Barkley *et al*, 2001:5). Secondly, the number of regions constituting the 'top few' is not specified and is likely to need to increase as the unit of disaggregation increases (Aiginger, 1999:16). This poses a particular problem for studies requiring international comparison (Spiezia, 2002:1). Thirdly, the distribution of employment outside the selected industries is not considered (Barkley *et al*, 2001:5).

5.2.3.2 The Herfindahl index

The Herfindahl index is somewhat more comprehensive than the concentration index as it includes data from all regions. The total of all regions' squared weight (being the number of employees in the region *i* divided by the number of employees in all regions z_i). Thus the index is notated as follows:

$$H = \sum_i z_i^2$$

With *n* regions indexed by *i*, the index is equal to 1 if there is absolute concentration of industry. However, if industry is equally dispersed the index will equal 1/*n*.

The major advantage of this measure is that it is simple to calculate. However, with simplicity come problems. Firstly, the index does not account for the industry in terms of all economic activity as all regions are assumed to have the same area (Macon and Puech, 2002:4; Spiezia, 2002:2). Secondly, it is sensitive to the number of establishments in an industry (Barkley *et al*, 2001:6). If the number of firms in the industry exceeds the number of regions a high concentration ratio will result, thus becoming problematic for cross-industry comparison. Thirdly, it is biased towards the largest country's share (Macon and Puech, 2002:4; Aiginger, 1999:16), and lastly, it does not distinguish between random and non-random distributions of firms (Barkley *et al*, 2001:6).

5.2.3.3 Ellison-Glaeser Index

The Ellison-Glaeser (E-G) index measures how industrial concentration patterns differ from a situation where firms locate in a purely random manner. The E-G index is relatively new, but is gaining in popularity for studies of regional concentration. The index is defined as follows:

$y = (G-(1- \sum_i x_i^2))H / (1-\sum_i x_i^2)(1-H)$

where *G* (gross geographic concentration) is calculated as follows,

$G = \sum_i (s_i-x_i)^2$

and,

s_i = share of region's employment in the sector
x_i = share of employment in region of total country's employment

The expected value of *G, E(G)* is equal to $E(G) = (1- \sum_i x_i^2)H$, where $(1-\sum_i x_i^2)$ measures the economic activity across locations, and *H* is the Herfindahl index (see section 5.2.3.2). Thus, the estimated Herfindahl index for each industry is compared with a 'dartboard' or random distribution. A value above 0.05 indicates a highly concentrated industry, 0.02-0.05 shows moderate concentration, and values less than 0.02 indicate dispersion (Lall and Chakravorty, 2003:6).

However, as it is based on the Herfindahl index, the E-G index is also likely to give a high value for an industry with a few number of firms or employees as compared to the number of regions studied (Barkley *et al*, 2001:9). Spiezia likewise (2002:2) criticises the E-G index for international comparisons of regions within countries due to the sensitivity to the level at which regional data is aggregated.

5.2.3.4 The locational Gini coefficient

The locational Gini coefficient overcomes a number of the shortcomings of the above measures, and is the most widely used measure of industrial concentration in the literature of the new economic geography. The standard form of calculation was popularised by Hoover (1936) and is used as the basis for Krugman's (1991) coefficient. This index measures the extent to which individual industries are concentrated within a regional bloc. In order to calculate the Gini, it is first necessary to work out and order the

location quotient. The explanation below will take regions to be subsections of a country. The location quotient shows the ratio of a region's share of a particular industry to that of its share of aggregate employment, and can be calculated as follows.

For each industry i, the ratio of the industry's share of total national manufacturing employment (Ej/Ec) and the share of national employment in industry for each locational unit (Eij/Eic) is calculated, where:

E_{ij} = employment in industry 'i' for region 'j'
E_j = total employment in region 'j'
E_{ic} = employment in industry 'i' for country 'c'
E_c = total employment in country 'c'

This will calculate the 'locational quotient' (L_{ij}) defined as follows

$$L_{ij} = \frac{E_{ij} / E_{ic}}{E_c / E_j}$$

If the quotient is greater than one, then region 'j' has a higher percentage of industry 'i' compared to its proportion of total industry employment relative to other regions. This provides a simple measure for revealed comparative advantage (RCA) (Petersson, 2002).

The regions are then ranked by their locational quotients in descending order, and the cumulative percentage of employment in industry 'i' ($\sum Eij/Eic$), and the cumulative percentage of employment in total manufacturing ($\sum Ej/Ec$) are calculated. The Lorenz curve for industry i is then formed with ($\sum Ej/Ec$) on the X-axis and ($\sum Eij/Eic$) on the Y-axis. If the location quotient is equal to one for all regions, the industry will be evenly spread across all regions and the curve will be a 45-degree line. If the location quotient is greater than one the localisation curve will be concave.

Using the Lorenz curve, it is then possible to calculate the coefficient of localisation (Gini coefficient) by taking the area between the 45-degree line and the localisation curve, and dividing this figure by the entire triangular area beneath the 45-degree line. If the coefficient is equal to zero the industry is completely dispersed across regions, and if equal to one, industry is completely localised (Kim, 1995:883).

To provide a theoretical example of a highly concentrated industry we assume three regions with the following characteristics. Region A represents 40 percent of total manufacturing employment (Ej/Ec), and 10 percent of employment in industry 'i' (Eij/Eic), Region B, 50 percent and 50 percent, and Region C, 10 percent and 40 percent respectively.

Thus, the locational quotient for Region A $L_{ij} = \frac{E_{ij} / E_j}{E_{ic} / E_c}$

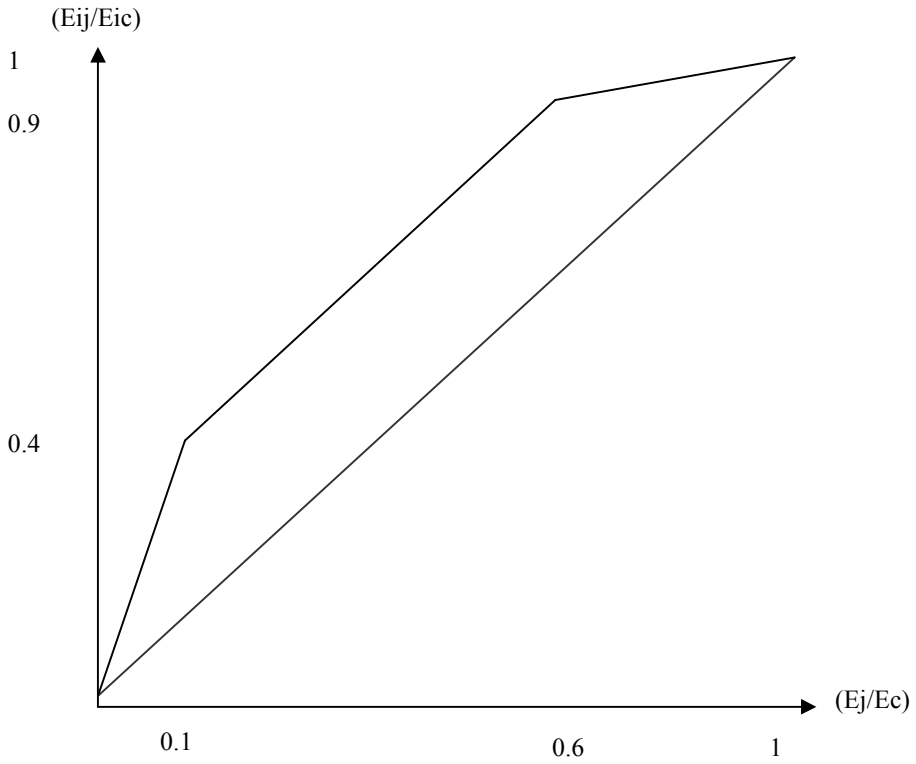
$= 0.1/0.4$
$= 0.25$

The locational quotients are 1 for Region B and 4 for Region C. The resulting Lorenz curve is depicted in Figure 5.1, with the regions ranked C, B, A.

Table 5.1: Example of cumulated location quotients

Region	(∑Eij/Eic)	(∑Ej/Ec)
C	0.4	0.1
B	0.9	0.6
A	1	1

Figure 5.1: Hypothetical Lorenz curve



The locational Gini coefficient is then equal to 0.450, the area between the Lorenz curve and the 45-degree line, divided by the entire triangular area.

Employment is usually preferred to other measures of manufacturing, such as manufactured value added (MVA) for cross-regional and country analysis. This is because it is more stable and easily measured. An additional problem in Africa is the conversion to a common currency unit as exchange rates are highly volatile and / or artificially fixed.

However, a common criticism of the Gini coefficient is that it does not factor in the size of firms; hence the index may be biased upwards if there are a few large firms in one small area (Macon and Puech, 2002:5). Additionally, it is argued that the Gini gives additional emphasis to the middle parts of the distribution, thus reducing the impact of

changes on the edge of the distribution (Stirboeck, 2002:5). Other criticisms have revolved around the potential for the Gini coefficient to 'confuse' the distinct concepts of inequality and concentration (Arbia, 1989, and Wolfson, 1997, in Spiezia, 2002:2). Devereux *et al* (2002:10) find a strong negative correlation between the locational Gini coefficient and the number of firms, a factor exacerbated by the use of the concentration index.

However, none of the above indices are perfect, and as the Gini coefficient is the "most widely used concentration index in the analysis of regional patterns" (Stirboeck, 2002:5), it will be used for this analysis.

5.2.3.5 Other indices

Macon and Puech (2002) introduce a distance-based method of determining industrial structure (dispersion) simultaneously across different geographical areas, similar to Duranton and Overman (2002). The rationale is that traditional measures of agglomeration, such as the Herfindahl, Gini and Ellison-Glaeser indexes measure of industrial dispersion at a single geographical level. However, the distribution is likely to change as the area of analyses changes, hence Macon and Puech (2002) investigate the simultaneous distribution of industry at different geographic levels. As with Krugman's (1995) use of scientific methods, such as Turin's racetrack economy, Macon and Puech (2002:3) use a method often used in forestry and ecology.

Devereux *et al* (2002) measure the levels of industrial concentration in the UK using an index of industrial dispersion developed by Maurel and Sedillot (MS), as discussed in chapter four. This index measures the extent to which geographic concentration of an industry exceeds that due to industrial concentration. The measure utilizes plant level data on employment, inputs and output. The results show a strong positive correlation with the E-G index (Devereux *et al*, 2002:9).

In search of a relative measure, Amiti (1999:575) considers the Finger-Kreinin (F-K) index. This is used by Hine (1990) and Greenaway and Hine (1991) to measure country

specialisation with production and export data of various industries by comparing one country's distribution of shares in production with another. However, using the mean of the index does not provide a satisfactory summary measure of specialisation. This is because large variations in small countries' production shares have a more than proportional effect on the value of the index as the bilateral comparisons of one country with every other in the sample move in different directions (Amiti, 1999:575).

Spiezia (2002), as part of a study for the OECD, arrives at an alternate measure of dispersion, based on the Herfindahl index, which also takes into account within-and-between-country differences in the size of regions. Other indices that have been used include the standard deviation of the shares and the sum of absolute differences (Aiginger, 1999:16-17).

Thus, there are a variety of measures that could be used for a study of this nature. However, use of the Gini coefficient is the most likely to provide meaningful results in the case of SADC. This measure also allows greater comparability with the existing literature in which the Gini is extensively used.

5.2.4 Problems with the analysis

Unsurprisingly, the major problem faced by the study was obtaining accurate data. The most comprehensive standardised database available is provided by the United Nations Industrial Development Organisation (UNIDO). However, data was missing for a number countries and industries over the years 1980 to 1999. Although some more recent data could have been sought, it would have been for a select few countries only. The last year for which comparable data could be obtained was 1999. Due to these data constraints, it was decided to use 5 year intervals and, where data for a particular year was not available, the closest year for which data could be found was used. The countries that posed the biggest problem in terms of data collection were Namibia, due to its union with South Africa until 1994, and Paraguay, for which only highly suspect data was available for 1991 and 1995. A list of the countries and the years used is presented in the appendix.

The quality of the data is also of concern, with data missing for some industries for certain years, or extremely large changes which appear suspect, such as the disappearance of Malawi's tobacco industry. Thus, the reliability of the results is heavily affected by the quality of the data. It is indicated in the analysis where there is data missing. In most cases it was unclear whether this was due to data not being recorded, or to no employment in the industry. As an attempt to check for missing data, data for other variables such as MVA, establishments and wages were checked in order to ascertain whether it was just employment data missing. In every case, where no employment data was recorded, there was no data for any of the other variables.

Employment data is most commonly used in the literature, as well as being the most readily available and accurate data. Data for MVA is less readily available, subject to more calculation problems, and have to be converted to a common exchange rate. For many countries in SADC exchange rates tend to be either fixed or highly volatile making a common measure of MVA meaningless. Additionally, MVA data availability and quality was so poor that this was not possible.

Although there are significant advantages in using the Gini coefficient as a measure of industrial concentration, there is a problem in that the distinction between concentration and specialisation is blurred. This is because the measure is relative, and takes into account the overall shares of each country's manufacturing employment sector. This means that the Gini will be higher for a small country with a high degree of concentration of a particular industry, even though a larger country may possess an overwhelming majority of the industry. This is evident in the tobacco industry having the highest Gini at 0.61, even though there are four major producers in the region. As a means of comparison the pottery industry, where South Africa contributed 98.8 percent of total employment, had a Gini of 0.29, and the miscellaneous petroleum industry, where almost all industry was concentrated in South Africa, had a Gini of 0.31. Thus, the way in which these Ginis are interpreted must be handled with care. An additional problem with the Gini is the question of whether to include countries with zero production levels in

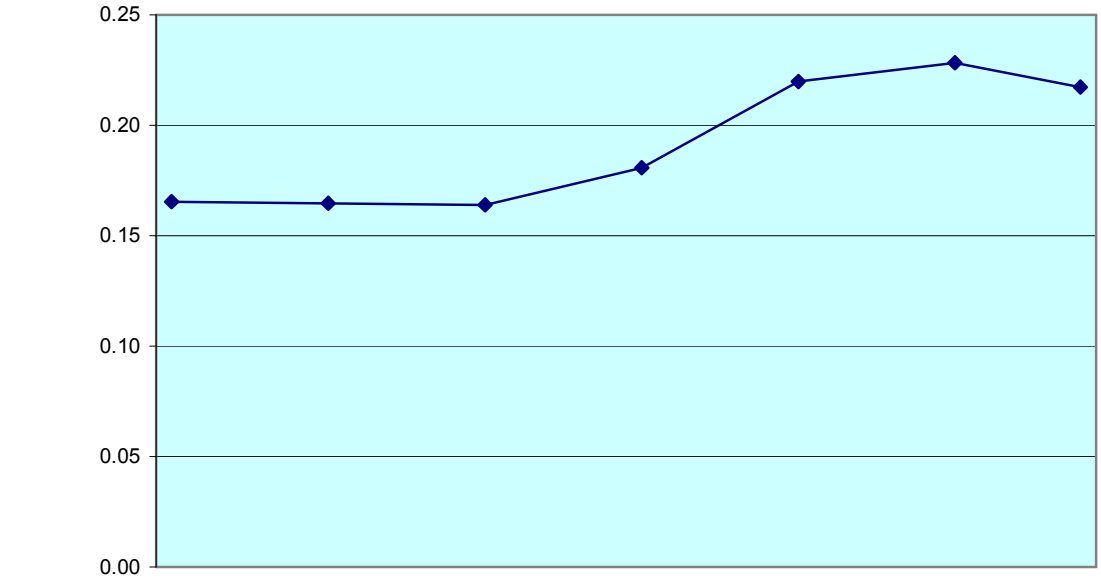
particular industries in the calculation. As this is a common occurrence within SADC countries, it was decided to include all countries for all industries.

5.3 SADC time series analysis: 1980 - 1999

5.3.1 The overall change in SADC industry

The study computed locational Gini coefficients for SADC over the time period 1970 to 1999. This allows for a comparison of the situation before and after liberalization efforts began in the region, and to see how the structure of industry has changed since the inception of SADC.

Figure 5.2: The average SADC locational Gini coefficient



	1970	1975	1980	1985	1990	1995	1999
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.[9]

Taking the simple average of the Gini coefficient we can map the overall distribution of industry in the region[10]. The period 1970 to 1980 shows the situation prior to the

[9] For the purpose of plotting the Gini graph above, and those that follow, the locational Gini for 1975 is taken to be to be the mean of 1980 and 1970.

formation of SADCC, the precursor of SADC (see chapter 2). With the new-found independence of the majority of African countries from the 1960s to 1980, the Unilateral Declaration of Independence in Rhodesia (Zimbabwe) and the apartheid regime in South Africa there was a strong focus on inward-oriented industrialisation. Countries attempted to alter economic ties with former colonial powers and become increasingly self sufficient, particularly via the development of the underdeveloped industrial sector. What we see from 1970 to 1980 is that the distribution of industry in employment terms remains stagnant, with only a slight increase in industrial dispersion. The average Gini coefficient fell by 0.01, from 0.17 in 1970 to 0.16 in 1980.

The formation of the SADCC in 1980, a cooperation agreement more than an attempt at liberalization, aimed to reduce reliance on apartheid South Africa, which was excluded from the group. During this time, the Gini coefficient showed an increase in industrial concentration, perhaps reflecting the large share that new government initiated industry had in each country's overall production, particularly in the smaller countries. From 1980 to 1985 the coefficient increased marginally by 0.02 from 0.16 to 0.18, but then rose rapidly in the latter part of the 1980s, increasing to 0.22 in 1990. Overall, this represented an absolute increase of 0.06 in the coefficient over the decade, a relative increase of 37.5 percent.

The reformation of the SADCC into the SADC showed a marked commitment to economic reform and trade liberalization. The majority of members also underwent IMF backed domestic macroeconomic reform at this time. A highly influential factor was the inclusion of the now democratic and comparatively more industrialised South Africa into the group, as well as the rapidly progressing Mauritius. However, contrary to the expressed fears of initial members of SADC, the inclusion of South Africa did not lead to the mass re-location of industry. From 1990 to 1995, the Gini coefficient increased marginally by 0.0085 and appeared to peak at this level. This could potentially have been a turning point for the region as, by 1999, the Gini fell by 0.011 indicating that on

[10] The simple average is used to show the average distribution of all industry, regardless of its share of the SADC total. This allows an equal representation of each industry, not biased by weights, and additionally is a useful measure with which to compare the Gini of individual industries.

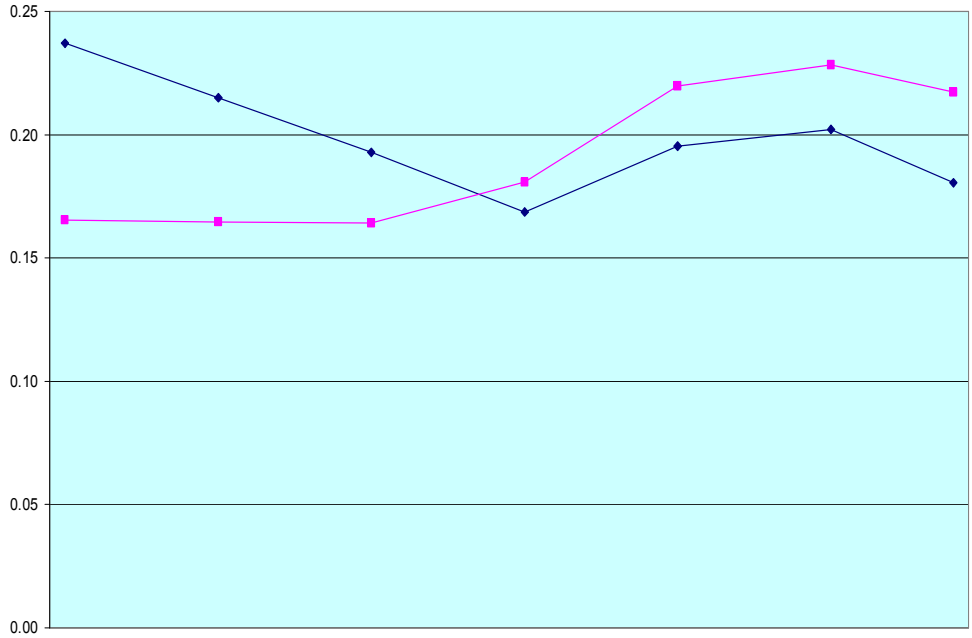
average industry was beginning to disperse. The final value of the index at 0.217 reveals that industry in 1999 was more dispersed than in 1990.

5.3.2 Individual sector analysis

5.3.2.1 Food products (311)[11]

The Gini coefficient for food products decreased substantially from 1970 to 1985. However, between 1985 and 1999, the Gini kept trend with the average, increasing at a decreasing rate until 1995, and then falling to levels just above that of 1985.

Figure 5.3: Food products



	1970	1975	1980	1985	1990	1995	1999
311: Food products	0.2371	0.2150	0.1928	0.1688	0.1953	0.2021	0.1806
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

South Africa contributes just over half of the total SADC employment in food products, significantly less than its average contribution. The Gini appears to have been driven by South Africa's falling share of SADC employment in the 1980s, and then increased share in the 1990s. Other countries that are likely to have increased the Gini in the 1990s are

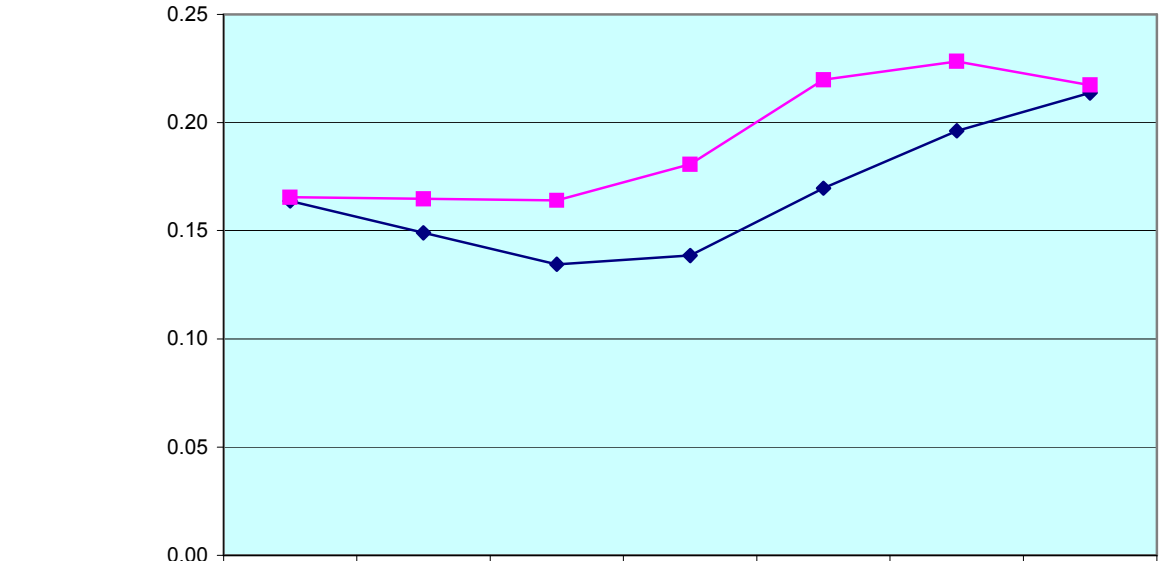
[11] 314 – The number in brackets after the category represents the ISIC revision 3 code assigned to that industry.

Tanzania, Botswana and Lesotho. Tanzania's contribution increased significantly over the two decades from 6.8 percent of the SADC total to 12 percent, and so doing, overtaking Zimbabwe, whose share remained fairly stable at just over 7 percent. This would have been compounded by falls in the shares of Malawi, Mozambique, Namibia, Swaziland and Zambia, which also displayed significant falls in actual employment.

5.3.2.2 Beverages (313)

After falling between 1970 and 1980, the Gini for beverages has steadily increased with particularly great increases in concentration between 1985 and 1995. Although it still increased in the latter part of the 1990s it did so at a slightly slower rate. From an initial level of 0.1345 in 1980, the Gini has climbed to approximate the average industry Gini 0.2137 in 1999.

Figure 5.4: Beverages



	1970	1975	1980	1985	1990	1995	1999
313: Beverages	0.1637	0.1491	0.1345	0.1386	0.1696	0.1961	0.2137
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

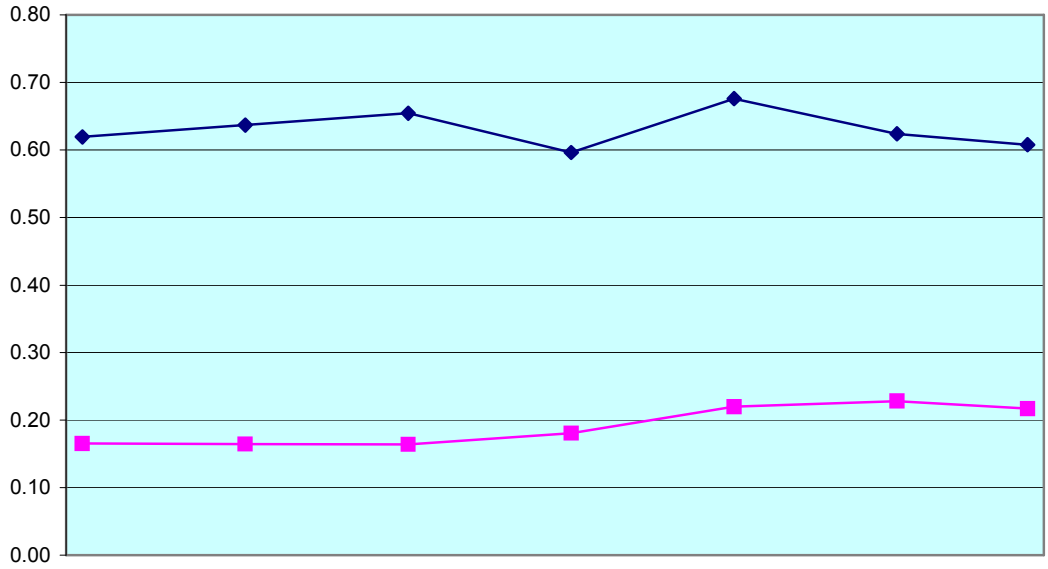
This rise in the Gini has been spurred on by rapid increases both in actual employment in the beverage industry as well as their share of SADC employment in Botswana, Malawi,

Tanzania and Zimbabwe. At the same time, South Africa's share of employment fell substantially from 61.3 percent in 1980 to 54.8 percent in 1999, thus amplifying the concentration in the above countries. Thus the increase in the Gini does not represent a pull towards the core, but rather could reflect a relocation of production to a few of the smaller countries.

5.3.2.3 Tobacco (314)

Tobacco was by far the most concentrated industry in SADC throughout the period of analysis, remaining almost three times higher than the average. Concentration has remained fairly stable, with a slight fall in concentration from 0.6542 in 1980 to 0.6076 in 1999.

Figure 5.5: Tobacco



	1970	1975	1980	1985	1990	1995	1999
314: Tobacco	0.6194	0.6368	0.6542	0.5962	0.6758	0.6240	0.6076
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

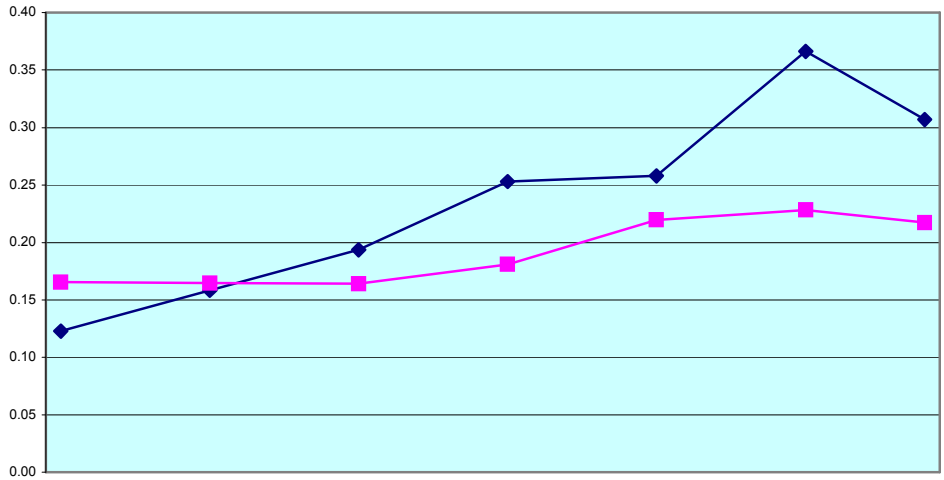
The extremely high level of concentration is partially a result of the four BLNS countries possessing no tobacco processing employment whatsoever. Three of the remaining SADC countries contribute the majority of the manufacturing employment, that is South

Africa with 23 percent, Tanzania with 38 percent and Zimbabwe with 32 percent in 1999. Tanzania in particular showed rapid growth, with their contribution doubling from 16 percent in 1980 to the 38 percent indicated in 1999. On the other hand, data shows that Malawi's share fell from 29 percent in 1980 to less than one percent in 1999 with the apparent closure of 5 of the 6 firms that were operating in 1980. This appears highly suspicious and, upon further direct investigation, there appear to be 4 tobacco firms currently operating in Malawi. However, the ratio of labour to value added varies substantially, which points to a different result in the concentration of manufacturing using MVA. For example, Mauritius, which only contributes 2 percent of SADC employment, contributed 21 percent of the SADC MVA in 1999, compared to Tanzania's 6 percent MVA contribution and 38 percent employment contribution. Part of this discrepancy could be due to the problems highlighted earlier on the use of MVA data, but the differences between the two measures are still overwhelming. The increasing share of this industry contributed by South Africa (despite no real increase over the period) appears to be driving the current trend of dispersion – as the industry becomes less concentrated in the small countries.

5.3.2.4 Textiles (321)

The textile industry has shown one of the most notable concentration tendencies, with the Gini increasing from 0.1937 in 1980 to a peak of 0.3664 in 1995. However, since 1995 textiles have dispersed to a level of 0.3071.

Figure 5.6: Textiles



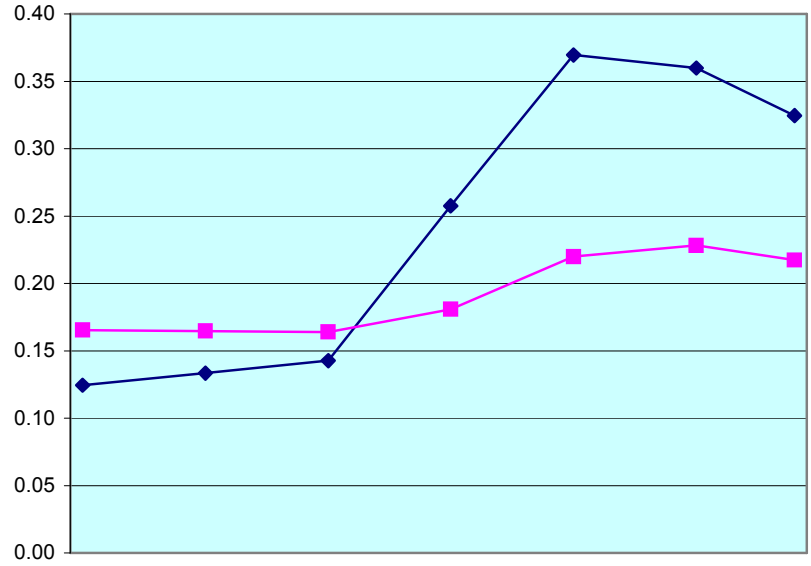
	1970	1975	1980	1985	1990	1995	1999
321: Textiles	0.1228	0.1583	0.1937	0.2531	0.2580	0.3664	0.3071
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

The increase in concentration of the industry is likely to have been the result of a 41 percent fall in employment in the South African textile sector while there has been strong growth in a number of the smaller countries. This has seen South Africa's share of the SADC total fall from almost 60 percent in 1980 to 46 percent in 1999. Conversely, textile employment levels in Botswana increased by 487 percent, in Lesotho by 191 percent (after extraordinarily strong growth in the 1980s of 830 percent) and in Mauritius by 121 percent. Tanzania and Zimbabwe, the two largest producers after South Africa both increased their share of total SADC employment in textiles, although employment levels remained fairly steady in the face of South Africa's falling employment levels in this sector. The increased concentration relates to an increased share of employment now occurring in the periphery.

5.3.2.5 Wearing apparel, except footwear (322)

Figure 5.7: Wearing apparel, except footwear



	1970	1975	1980	1985	1990	1995	1999
322: Wearing apparel, except footwear	0.1244	0.1336	0.1428	0.2576	0.3696	0.3599	0.3244
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

This industry has mirrored the experience of textiles with the exception that concentration peaked earlier, in 1990 with a Gini of 0.3696. After this point, industry levelled off and then began to disperse significantly in the later half of the 1990s. The Gini coefficient in 1999 was equal to 0.3244, thus indicating that the industry is still agglomerated relative to other industries.

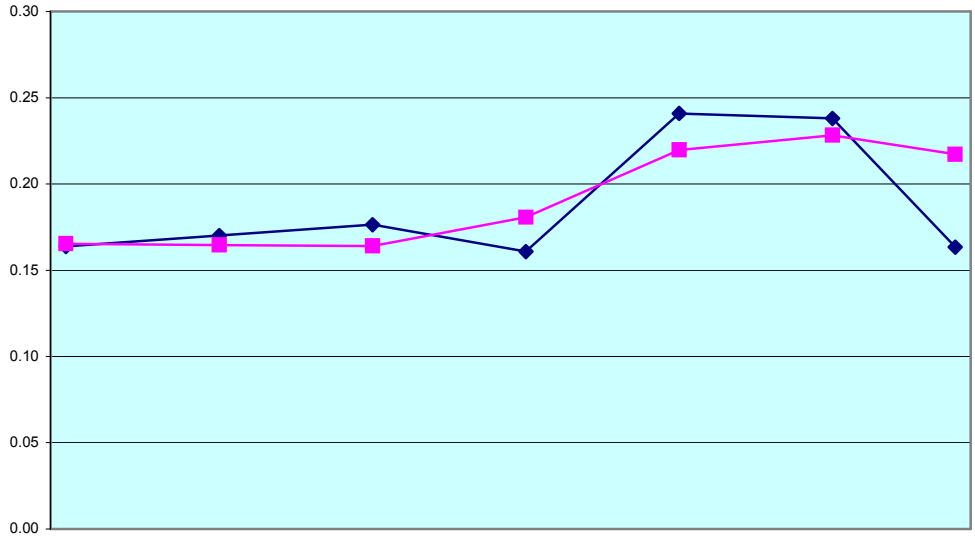
The sharp rise in the Gini during the 1980s can be attributed to strong growth in Mauritian employment where the apparel industry grew by 368 percent, and increased Mauritius's share of SADC employment dramatically from 10 to 27 percent. The fall in the Gini at the end of the period could be due to the establishment of the apparel industry in Lesotho and Swaziland in the mid 1990s, as well as declining employment levels and shares in South Africa, Zimbabwe and Mauritius. Nonetheless, Mauritius has established

itself as SADC's second largest apparel producer after South Africa. The other notable country, Lesotho, gained 4 percent of SADC's total employment, after apparently zero production levels in the 1980s. It thus appears that the Gini was at first driven by strong growth in employment in the dominant countries in the 1980s. The status quo changed in the 1990s with the decline of the industry in the dominant countries and the establishment of wearing apparel production in two of the smaller countries. Both the textile and wearing apparel industries changed from being two of the least concentrated industries in 1980 to the being the most concentrated in 1999.

5.3.2.6 Leather (323)

The leather industry displayed a sharp increase in concentration from 1985 to 1990 at which time it levelled off until it fell drastically in the second half of the 1990s, becoming more dispersed in 1999 than 1980 levels. At the peak of concentration in 1990 the Gini coefficient was 0.2409, which then fell to 0.1633 in 1999.

Figure 5.8: Leather



	1970	1975	1980	1985	1990	1995	1999
323: Leather products	0.1638	0.1701	0.1764	0.1608	0.2409	0.2380	0.1633
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

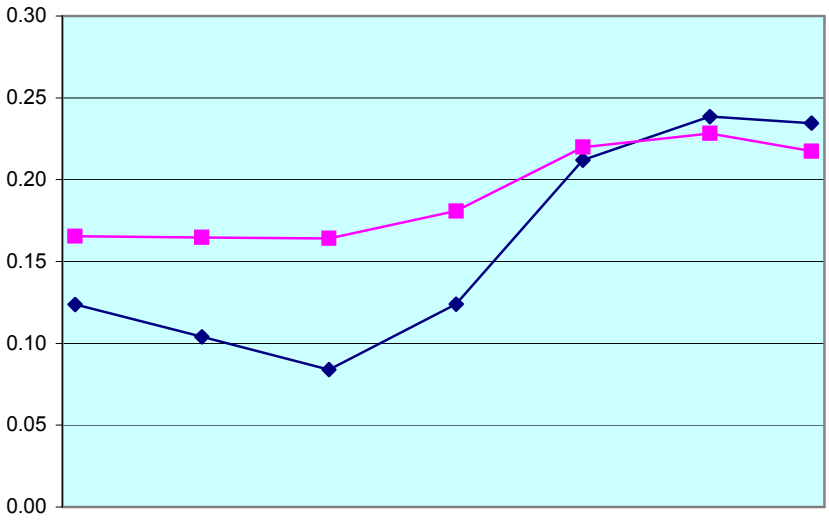
Source: Own calculations based on Unido (2003) data.

The rapid increase in concentration in the late 1980s appears to have been driven by large increases in the employment share of Botswana, Lesotho, Mauritius and Zimbabwe, while South Africa's share fell substantially from 73 percent to 61 percent, thus increasing the importance of the four initial countries. The dispersion in the late 1990s appears to be the result of a slight reversal of this process, with South Africa increasing its share while Lesotho's share fell substantially (from 13 percent to less than one percent). Again, this could be due to bad data for Lesotho for 1999.

5.3.2.7 Footwear (324)

After a slight fall between 1970 and 1980 the footwear industry became increasingly concentrated until 1995, when, following the general trend of industry, the Gini began to fall slightly. In 1980, footwear was one of the most dispersed industries in SADC with a Gini of 0.084, however, by 1995 it was no longer so, with a Gini above the average at 0.2386. From 1995 to 1999, there was a slight dispersion of the industry.

Figure 5.9: Footwear



	1970	1975	1980	1985	1990	1995	1999
324: Footwear, except rubber or plastic	0.1237	0.1039	0.0840	0.1239	0.2118	0.2386	0.2345
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

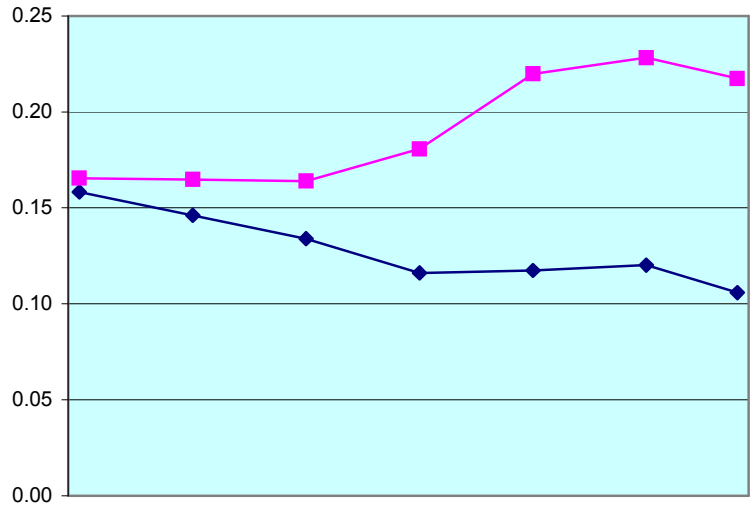
Source: Own calculations based on Unido (2003) data

South Africa's proportion of SADC employment fluctuated over the period of analysis, contributing 60.2 percent of total SADC employment in 1999, down from a high of 79 percent in 1990. Increased shares of employment in this sector in both South Africa and Zimbabwe during the 1980s appear to have driven the Gini upwards. However, a fall in South Africa's employment share in the 1990s and the apparent establishment of the industry in Lesotho resulted in a levelling off of the Gini. Data for Lesotho indicates that the country gained 6.8 percent of the SADC share in 1999, up from apparent zero employment levels in 1980 and 1990.

5.3.2.8 Wood Products, except furniture (311)

There has been a general trend of dispersion in the wood products industry, although during the decade 1985 to 1995 concentration levels were fairly stable with a slight trend upwards. The Gini fell from an initial level of 0.134 in 1980 to 0.1059 in 1999, indicating that the wood products industry is the most dispersed in the SADC region.

Figure 5.10: Wood Products, except furniture



	1970	1975	1980	1985	1990	1995	1999
331: Wood products, except furniture	0.1583	0.1462	0.1340	0.1161	0.1174	0.1202	0.1059
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

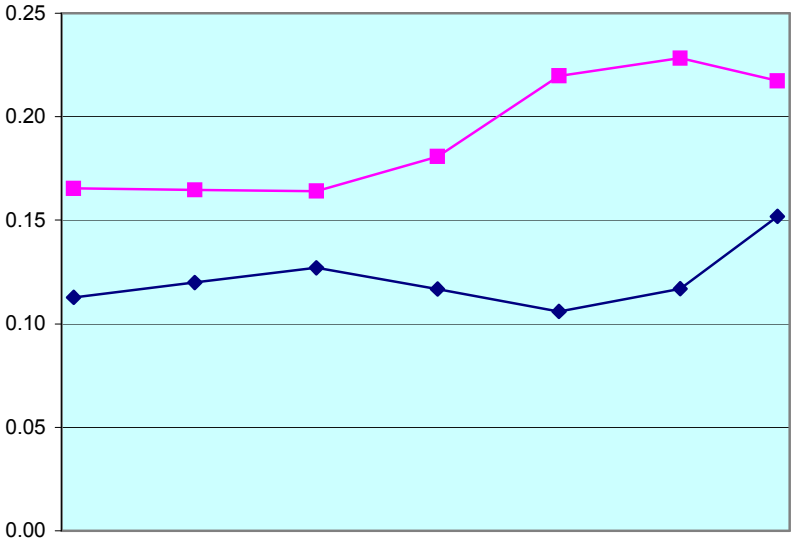
Source: Own calculations based on Unido (2003) data.

The most notable growth was found in Mozambique, where employment shot up from 20 employees in 1980 to 3074 in 1990. However, by 1999, employment had fallen to 1715 jobs. The industry also saw strong growth in Namibia during the 1990s where employment grew over sevenfold. Overall, there was strong growth in all countries with the exception of Swaziland and Zimbabwe, which has lead to a more equal share of the industry.

5.3.2.9 Furniture, except metal (332)

Like wood products, the Gini for the furniture industry remained one of the lowest, despite the industry concentrating in the 1990s. This particular industry appears follow an inverse path to the general trend of all industries, and is almost as a mirror image of the average on the chart below.

Figure 5.11: Furniture, except metal



	1970	1975	1980	1985	1990	1995	1999
332: Furniture, except metal	0.1128	0.1200	0.1271	0.1168	0.1059	0.1169	0.1519
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

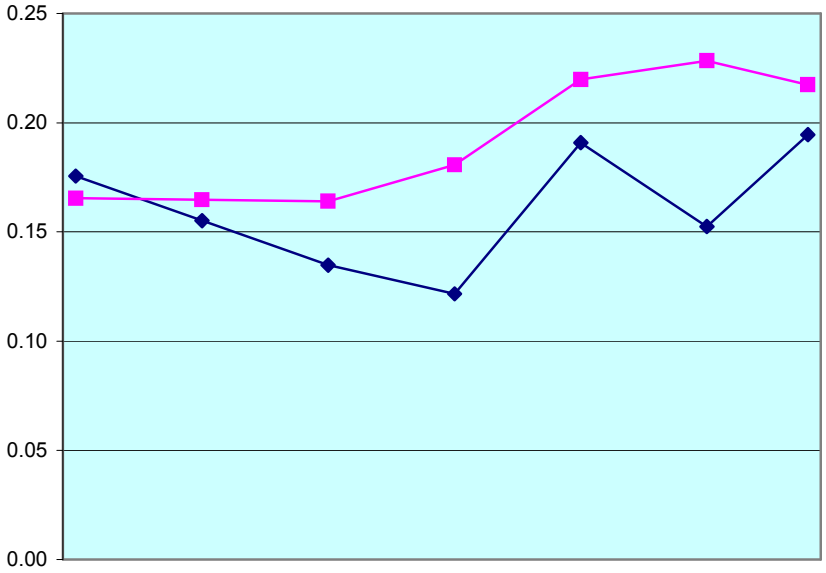
Source: Own calculations based on Unido (2003) data.

The increase in the Gini up to 1980 shows the large degree of relative concentration of the industry in Lesotho, with the country's contribution to SADC in the furniture industry being six times its average contribution of manufacturing employment. However, by 1990, this ratio had dropped significantly, and no country had an overwhelming concentration ratio as measured by the location quotient. By 1999 the location quotient for Namibia in particular had increased dramatically, which, in conjunction with declining shares in all other countries except Zimbabwe, has driven the rising Gini coefficient.

5.3.2.10 Paper and products (341)

The Gini for paper and products has fluctuated around an increasing trend, with the Gini increasing from 0.1348 in 1980 to 0.1945 in 1999. The industry has, however, remained below the average concentration levels for all industry.

Figure 5.12: Paper and products



	1970	1975	1980	1985	1990	1995	1999
341: Paper and products	0.1756	0.1552	0.1348	0.1216	0.1908	0.1524	0.1945
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

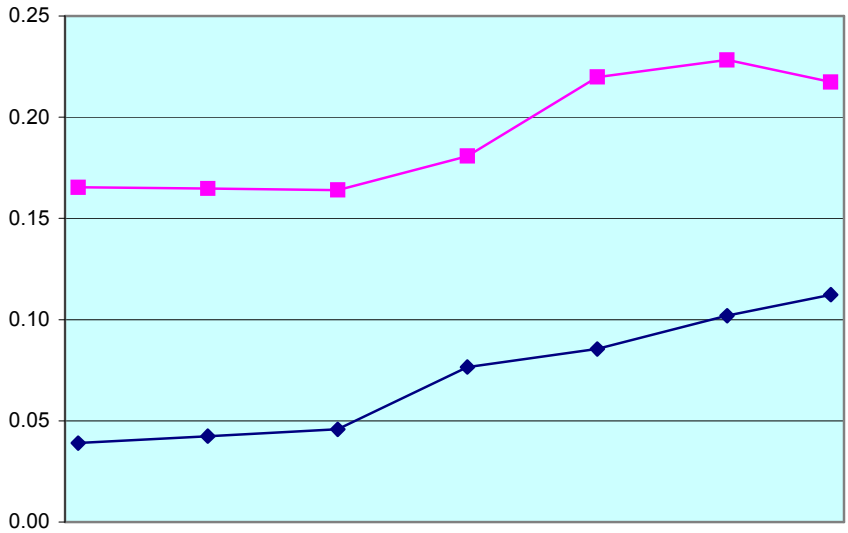
Source: Own calculations based on Unido (2003) data.

The general increase in the Gini appears to be the result of increases in the share of employment of Botswana, Malawi, Swaziland and Tanzania over the two decades. This has resulted in these countries (with the exception of Tanzania) showing relative specialisation in this industry as indicated by their location quotients. The fall in South Africa's share of employment from 82 percent in 1980 to 70 percent in 1999 is likely to have amplified the concentration in the above countries and the consequent rise in the Gini.

5.3.2.11 Printing and publishing (342)

This industry has maintained its position as the most dispersed industry in the region for the majority of the period, despite showing a consistent increase in the Gini. From an extremely low Gini of 0.0459 in 1980, the Gini grew significantly to 0.1123 in 1999. However, due to the increase in the overall average Gini the industry has remained relatively dispersed.

Figure 5.13: Printing and publishing



	1970	1975	1980	1985	1990	1995	1999
342: Printing and publishing	0.0391	0.0425	0.0459	0.0766	0.0856	0.1020	0.1123
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

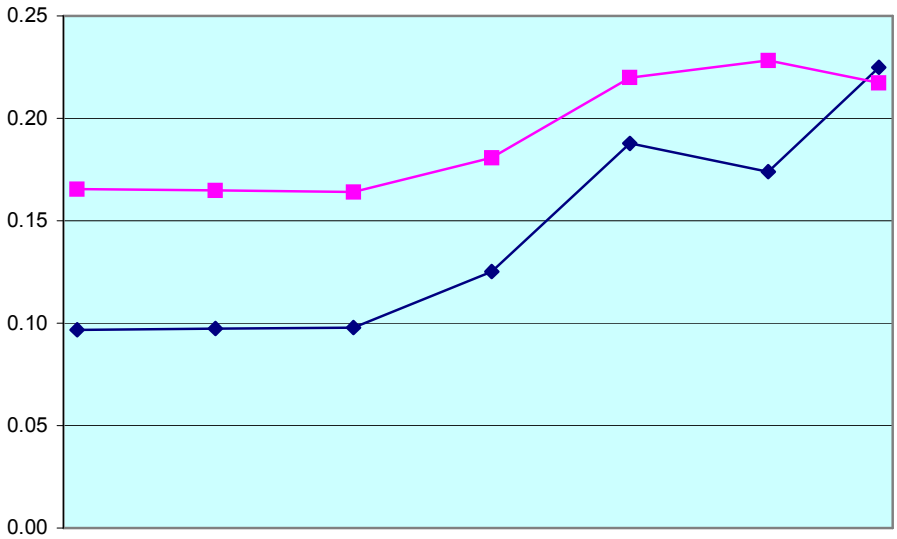
Source: Own calculations based on Unido (2003) data.

The location quotients are broadly similar across countries, with Lesotho being the only country to stand out with a quotient of slightly over 2 in 1980. However, by 1999, Lesotho had lost this advantage, and growth in the industry in South Africa and Zambia meant that these two countries became relatively specialised, but not to any great degree. South Africa showed the greatest increase in market share, from 72 percent of SADC employment to 78 percent over the 20 years. Thus, the slight, but steady increase in the Gini is likely to be the result of the increased specialisation of South Africa and Zambia.

5.3.2.12 Industrial chemicals (351)

The Gini for industrial chemicals has increased rapidly, from 0.097 in 1980 to 0.2249 in 1999, after a slight dip in 1995. This has meant that the industry went from being the 5th most dispersed industry in 1980, being well below the average to the 10th most agglomerated industry in 1999, and lying above the average.

Figure 5.14: Industrial chemicals



	1970	1975	1980	1985	1990	1995	1999
351: Industrial chemicals	0.0968	0.0974	0.0979	0.1253	0.1878	0.1739	0.2249
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

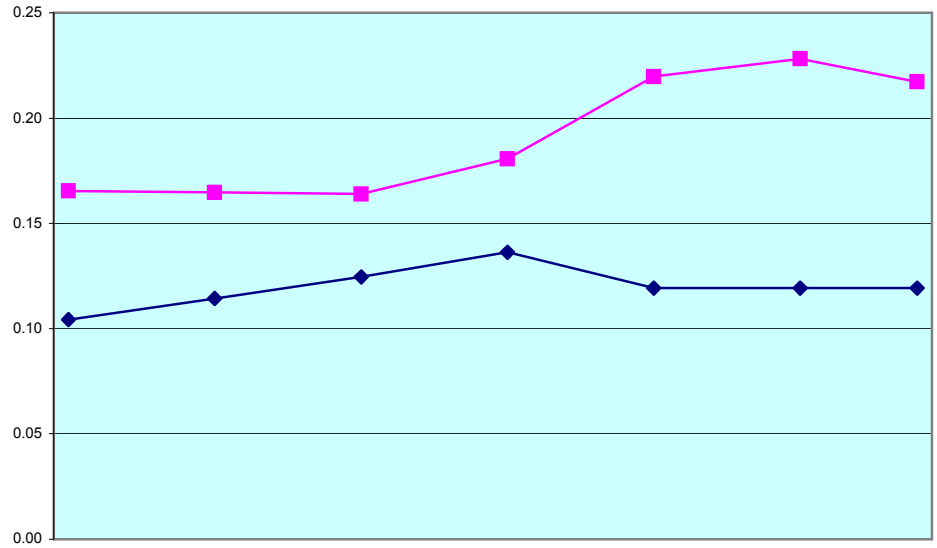
Source: Own calculations based on Unido (2003) data

The rapid increase in the Gini is likely to be the result of extremely strong growth in South Africa and Botswana. Botswana increased their share of SADC production from 0.2 percent in 1980 to 1.9 percent in 1999. Likewise, and perhaps more importantly, South Africa's share of production increased from 76 percent in 1980 to 91 percent in 1999. However, missing data for South Africa in particular for 1999 in the next industry 'other chemicals (352)' may indicate that employment figures for 'other chemicals' had been included in this category. This would help explain South Africa's sharp increase in their share of SADC employment for industrial chemicals.

5.3.2.13 Other Chemicals (352)

Due to changes in data recording systems, and bad data, this sector could not be analysed properly. Data, in particular for South Africa, was not recorded for the 1990s which distorted the results significantly, and may have somewhat distorted the most recent Ginis for industrial chemicals. However, it is possible to analyse the Gini up to 1990. After increasing slightly from 1970 to 1985, the Gini fell in 1990 to levels similar to 1980. Thus there was not much change overall, and the industry remained one of the most dispersed industries in the region.

Figure 5.15: Other chemicals



	1970	1975	1980	1985	1990	1995	1999
352: Other chemicals	0.1043	0.1144	0.1245	0.1363	0.1192	0.1192	0.1192
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

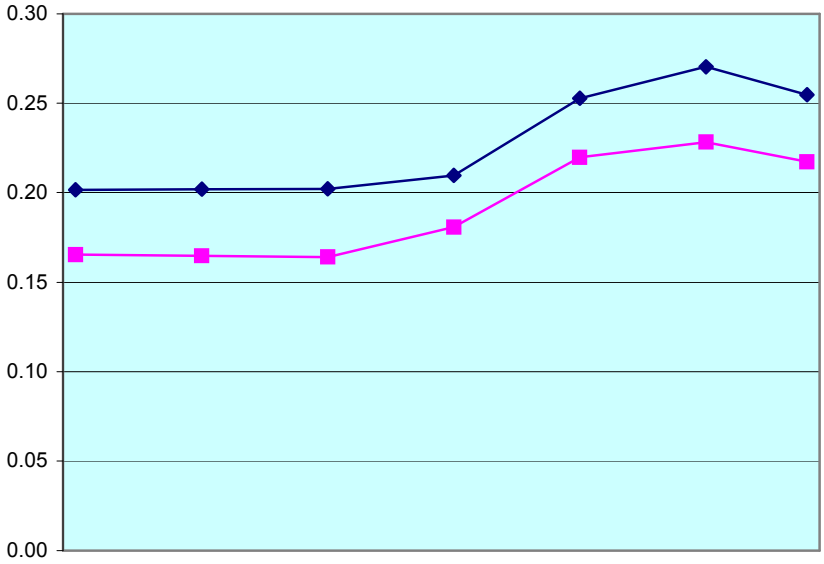
Source: Own calculations based on Unido (2003) data.

There was growth in all countries in the region except for Botswana, Namibia and Swaziland, for which no data was recorded for any year, and Zambia, where employment fell by 23 percent. During the 1990s, although we cannot use the Gini coefficient, the growth of the 1980s was reversed for all countries with the exception of Malawi and Mauritius.

5.3.2.14 Petroleum refineries (353)

The Gini for petroleum refineries closely follows the average for all industries, although it remained less concentrated for the entire period.

Figure 5.16: Petroleum refineries



	1970	1975	1980	1985	1990	1995	1999
353: Petroleum refineries	0.2016	0.2019	0.2022	0.2097	0.2529	0.2704	0.2547
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

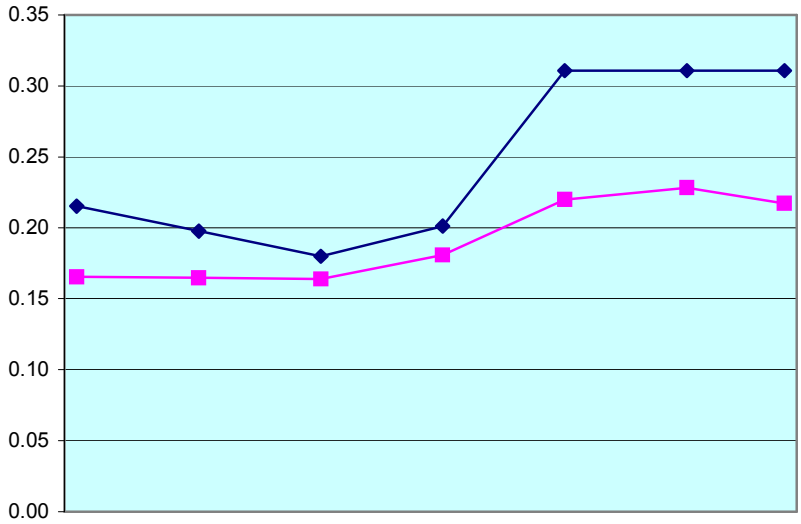
Source: Own calculations based on Unido (2003) data

There is no data recorded for five of the eleven countries for this industry. For those that the data indicates did have refineries, South Africa was heavily and increasingly dominant, with 94 percent of employment in 1999. Zambia was the only other country to maintain its share in the industry, while the data suggests that Namibia established a refinery in the 1990s. This could have contributed to the slight fall in the Gini in 1999, after a persistent rise, particularly from 1985. The petroleum industry has remained agglomerated above the average for the duration of the analysis.

5.3.2.15 Miscellaneous petroleum and coal products (354)

This industry was also subject to data problems thus only allowing the computation of the Gini until 1990. During the 1980s, only three countries recorded employment in this sector, South Africa (with 90 percent of the employment), Zambia and Zimbabwe. In 1990, South Africa was the only country to register employment (of 6000 people), while in 1999 no data was recorded for any country. This could be due to the changing classification systems used. In the ISIC revision 3 this category does not exist and is presumed to be assimilated into petroleum products, which could account for South Africa's increased employment in that industry. Although the miscellaneous petroleum industry was entirely located in South Africa, the Gini of 0.3108 reflects that South Africa is not particularly specialised in this sector. Analysis of the Gini up to 1990 shows this industry to be slightly more concentrated than the average, although this difference increased in 1990. The large increase in 1990 could also indicate that data problems were already beginning to set in.

Figure 5.17: Miscellaneous petroleum and coal products



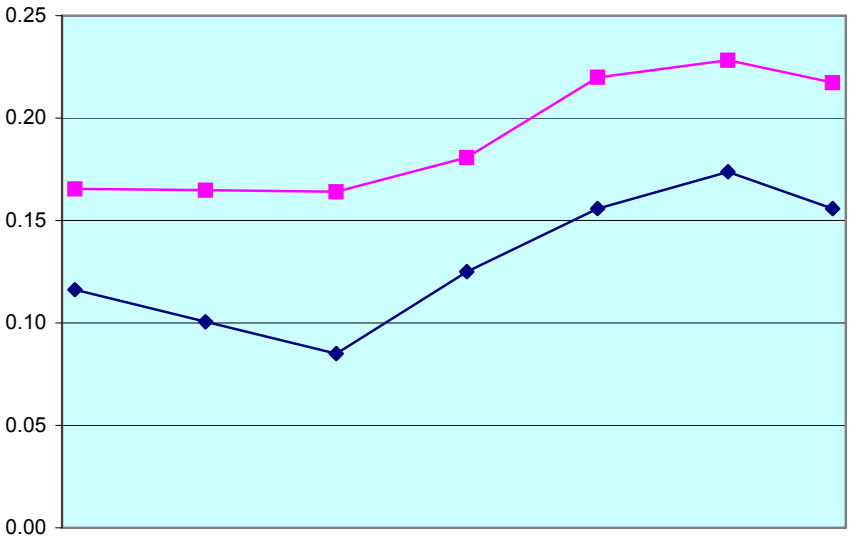
	1970	1975	1980	1985	1990	1995	1999
354: Misc. petroleum and coal products	0.2153	0.1977	0.1800	0.2012	0.3108	0.3108	0.3108
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

5.3.2.16 Rubber products (355)

Rubber products have remained one of the most dispersed industries, with the Gini following the overall SADC trend. In 1980, the Gini was equal to 0.085 which had increased to 0.1737 in 1995, and then following the trend, fell to 0.1558 in 1999, still well below the average.

Figure 5.18: Rubber products



	1970	1975	1980	1985	1990	1995	1999
355: Rubber products	0.1162	0.1006	0.0850	0.1251	0.1558	0.1737	0.1558
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

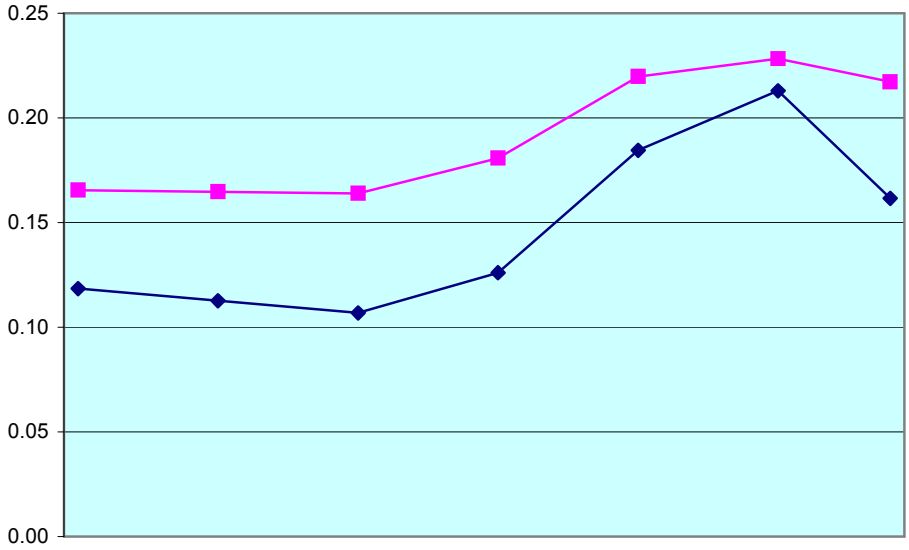
Source: Own calculations based on Unido (2003) data.

Zimbabwe and Malawi were the only countries to record positive growth levels over the two decades, with Zimbabwe's share of SADC increasing from 7 percent in 1980 to 13 percent in 1999. Thus the increase in concentration shown by the Gini displays a bias towards Zimbabwe and Malawi. Employment in South Africa fell, together with its overall share of SADC industry.

5.3.2.17 Plastic products (356)

As with rubber products, this industry followed the average trend for SADC, although the fall in concentration in 1999 was one of the largest. After peaking in 1995, the Gini fell from 0.213 to 0.1616 at the end of the decade. The industry remained less concentrated than the average level for every year.

Figure 5.19: Plastic products



	1970	1975	1980	1985	1990	1995	1999
356: Plastic products	0.1184	0.1127	0.1069	0.1260	0.1845	0.2130	0.1616
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

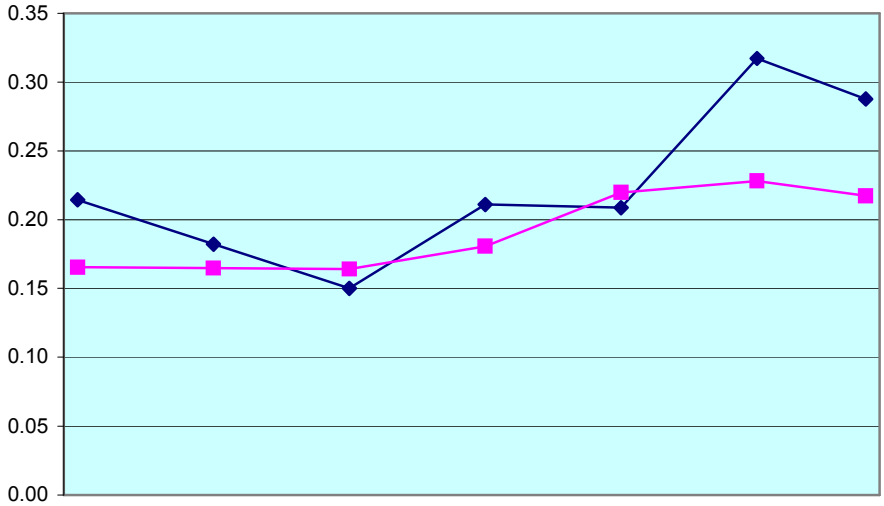
Source: Own calculations based on Unido (2003) data.

South Africa showed a particular tendency for specialisation in this industry as no other country had a location quotient over 1, with the exception of Malawi in 1990. However, the industry has grown most rapidly in Mauritius, increasing by almost 2 ½ times over the two decades. In line with the Gini, South Africa's share of SADC increased from 83 percent in 1980 to 86 percent in 1990 and then fell to 85 percent in 1999, thus indicating that the country could be a key driver of the Gini. Employment growth in Zambia and Zimbabwe merely maintained their share of total SADC employment in the industry.

5.3.2.18 Pottery, china and earthenware (361)

The Gini for pottery followed the general SADC trend increasing substantially from 0.15 in 1980 to 0.317 in 1995 and then falling slightly to 0.287 in 1999. However, this relative measure does not fully reflect the extent to which this industry has agglomerated in South Africa. From a share of 84 percent in 1980, South Africa dominated the entire industry with a share of 99 percent in 1999. Zimbabwe, which previously had a share of 11 percent in 1980, was left with 0.6 percent in 1999. The data records no employment over the entire period in Botswana, Lesotho, Malawi, Namibia and Swaziland.

Figure 5.20: Pottery, china and earthenware



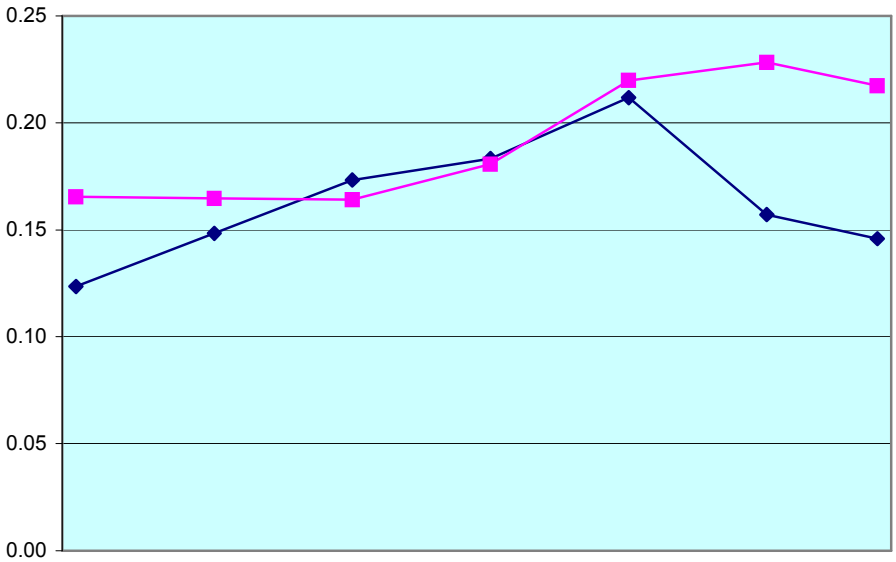
	1970	1975	1980	1985	1990	1995	1999
361: Pottery, china earthenware	0.2143	0.1822	0.1501	0.2109	0.2088	0.3171	0.2877
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

5.3.2.19 Glass and products (362)

Glass and products remains one of the most dispersed industries in SADC. The Gini shows a slight increase from 1980 to 1990, but then a greater decrease until 1999, where the Gini at 0.1458 was lower than 1980 levels.

Figure 5.21: Glass and products



	1970	1975	1980	1985	1990	1995	1999
362: Glass and products	0.1235	0.1484	0.1733	0.1834	0.2118	0.1571	0.1458
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

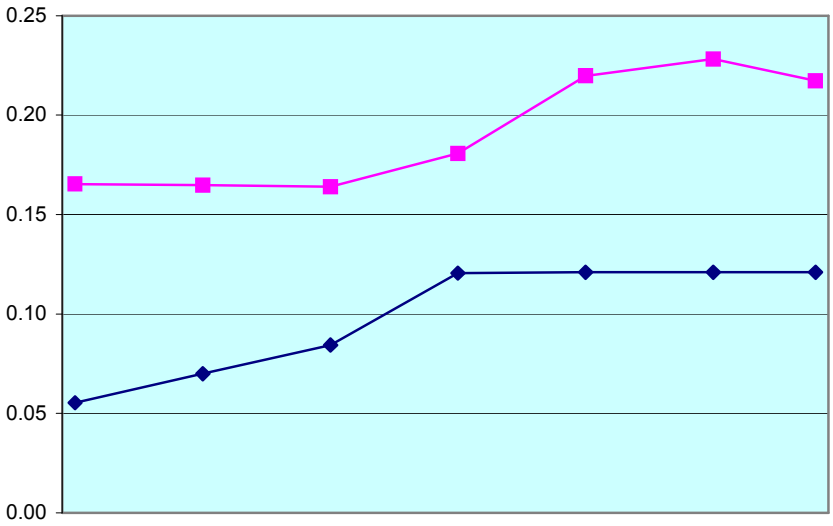
Source: Own calculations based on Unido (2003) data.

As with a number of the earlier industries, there is no data recorded for Botswana, Lesotho, Malawi and Namibia. The increase in dispersion could be the result of the decreasing specialisation of Swaziland. When the Gini was highest, Swaziland's locational quotient was 4.7, which dropped rapidly and significantly to 0.6 at the end of the period. The share of South Africa decreased during the 1980s, which complemented the upward pressure exerted by Swaziland on the rising Gini, but then increased during the 1990s to pull the Gini down.

5.3.2.20 Other non-metallic mineral products (369)

Data from 1990 for South Africa was again a problem for this industry, hence the Ginis for the later 1990s become meaningless. It is interesting however, that the Gini increased rapidly from 1970 through to 1985 at which point the level of concentration levelled off and only rose very marginally in 1990. The industry remained in the 5 most dispersed industries throughout the analysis (using the 1990 Gini for later comparisons).

Figure 5.22: Other non-metallic mineral products



	1970	1975	1980	1985	1990	1995	1999
369: Other non-metallic mineral products	0.0553	0.0699	0.0844	0.1206	0.1210	0.1210	0.1210
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

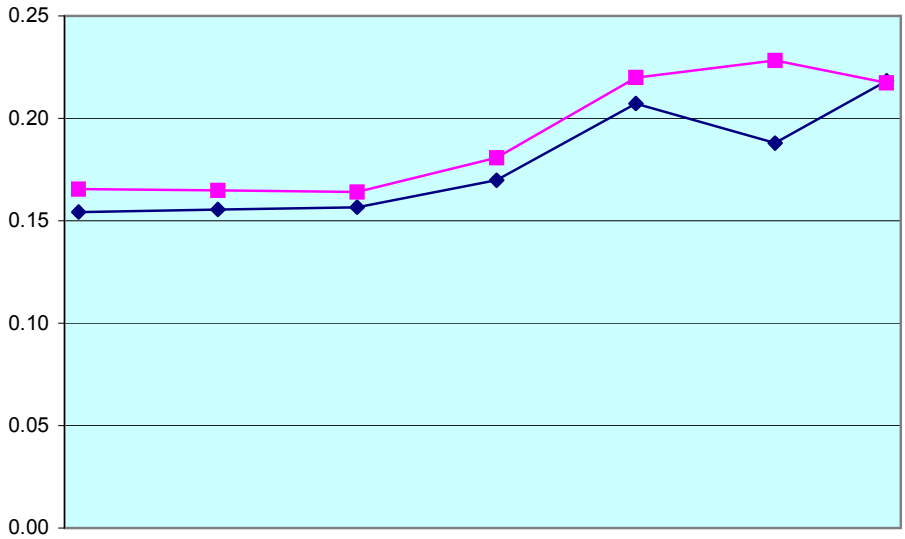
Source: Own calculations based on Unido (2003) data

The only countries which had increases in employment in this industry during the 1990s were Tanzania and Zimbabwe. Falls in employment in Lesotho and Mozambique during this time reduced the impact of the large increases the countries had in the 1980s.

5.3.2.21 Iron and steel (371)

The iron and steel industry has become increasingly concentrated during every period with the exception of 1995, where there was a slight decrease in concentration. This industry followed the average closely, with iron and steel approximating the average in 1999.

Figure 5.23: Iron and steel



	1970	1975	1980	1985	1990	1995	1999
371: Iron and steel	0.1543	0.1555	0.1566	0.1698	0.2072	0.1879	0.2183
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

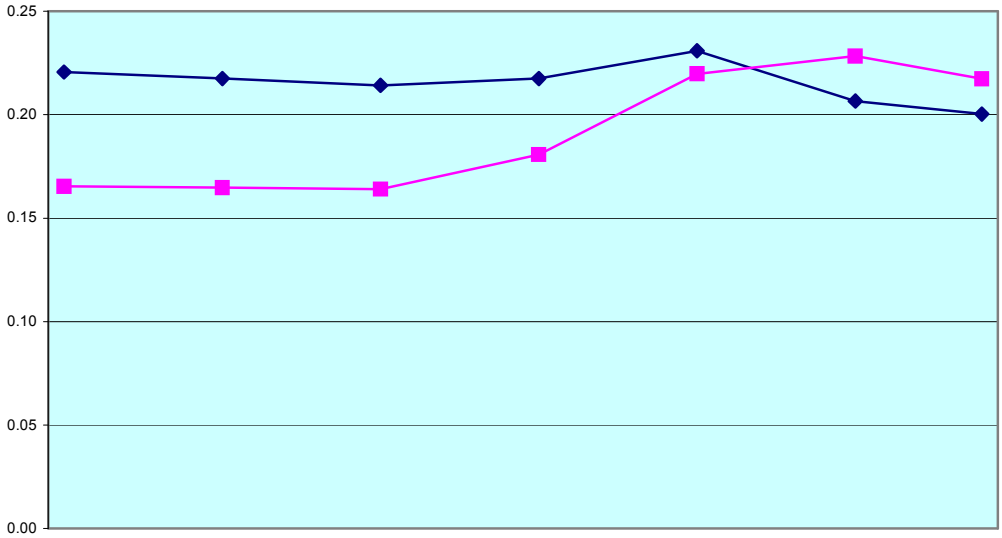
Source: Own calculations based on Unido (2003) data.

In absolute terms, however, the industry is heavily dominated by two countries, South Africa (with 80 percent of SADC employment) and Zimbabwe (with 15 percent). Five countries recorded no iron and steel manufacturing (and of those that did, all had falls in employment over the period).

5.3.2.22 Non-ferrous metals (372)

The Gini for non-ferrous metals appears to be among the most stable, although there was a slight increase in concentration in the 1980s, followed by a slightly greater fall in the 1990s. The industry does not appear to be particularly affected by agglomeration forces over this time and, from being one of the most concentrated industries in 1980, it is now less concentrated than the average.

Figure 5.24: Non-ferrous metals



	1970	1975	1980	1985	1990	1995	1999
372: Non-ferrous metals	0.2207	0.2174	0.2141	0.2174	0.2309	0.2067	0.2003
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

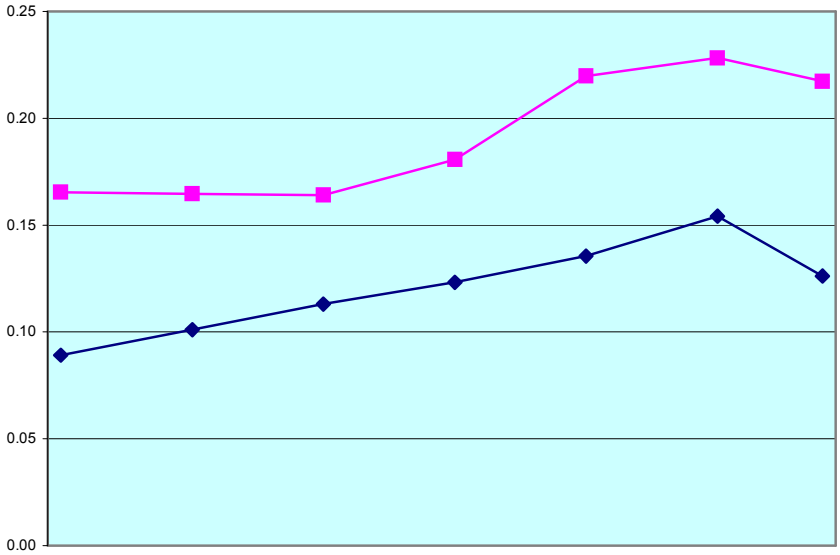
Source: Own calculations based on Unido (2003) data.

Like the iron and steel industry, the data indicates that a number of countries did not record any employment in the non-ferrous metals industry, in this case over half the countries in the bloc. South Africa and Zimbabwe dominate (with 89 and 5 percent of SADC respectively). However, South Africa's share has been falling over time, the majority of which has gone to Tanzania whose contribution grew to 4 percent in 1999, and some to Botswana which contributed 1 percent up from nil in 1980. Thus, the redistribution from South Africa to Tanzania and Botswana appear to be the driving forces of the slight fall in the Gini from 1990. In 1999, the Gini was 0.2003, down from 0.2141 in 1980.

5.3.2.23 Fabricated metal products (381)

Fabricated metals follow the general path of SADC, with the Gini increasing until 1995 and then falling in 1999. In 1999, the Gini was at 0.1262 indicating that this is one of the most dispersed industries.

Figure 5.25: Fabricated metal products



	1970	1975	1980	1985	1990	1995	1999
381: Fabricated metal products	0.0891	0.1011	0.1131	0.1233	0.1355	0.1542	0.1262
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

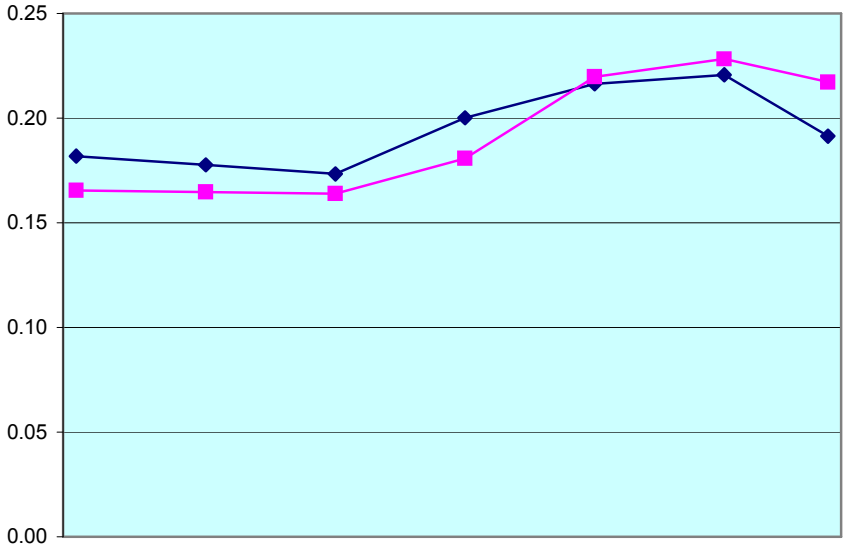
Source: Own calculations based on Unido (2003) data.

The increase in the Gini has been driven by extremely strong growth in industry employment in Botswana to the degree of 800 percent in the 1980s. This led to a location quotient of 2.3 for Botswana, significantly above that of any other country. Lesotho and Mozambique also had very large increases in the 1980s. Unlike the other metals industries, all countries in the group possessed some fabricated metals production.

5.3.2.24 Machinery, except electrical (382)

The Gini coefficient for machinery closely follows the average trend of increasing to 1995 and then falling to 1999, although the fall in concentration in the 1990s was greater than the average.

Figure 5.26: Machinery, except electrical



	1970	1975	1980	1985	1990	1995	1999
382: Machinery, except electrical	0.1819	0.1777	0.1734	0.2001	0.2164	0.2207	0.1913
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

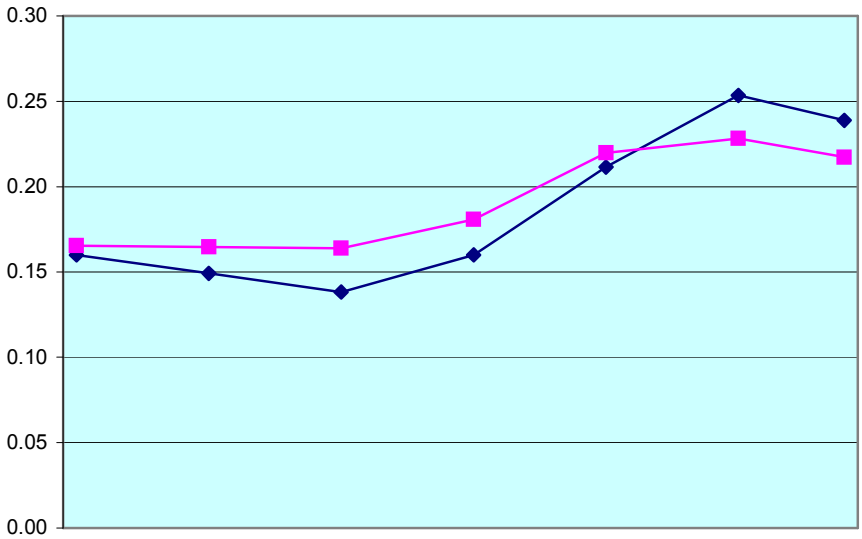
Source: Own calculations based on Unido (2003) data.

The industry trend appears positively related to the level of industry in South Africa. South Africa was the only country in which the share of employment in the machinery industry is greater than its share of overall industry, except in 1980 when Swaziland also had a location quotient over one. As the South African locational quotient increased so did the Gini, and then when it fell in the late 1990s the Gini began to fall.

5.3.2.25 Machinery, electric (383)

As with non-electrical machinery, the Gini coefficient for electrical machinery followed the SADC trend of first increasing and then decreasing from 1995 to 1999. With a Gini coefficient of 0.2388 the industry has become one of the most concentrated industries in SADC.

Figure 5.27: Machinery, electric



	1970	1975	1980	1985	1990	1995	1999
383: Machinery electric	0.1600	0.1491	0.1382	0.1599	0.2114	0.2535	0.2388
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

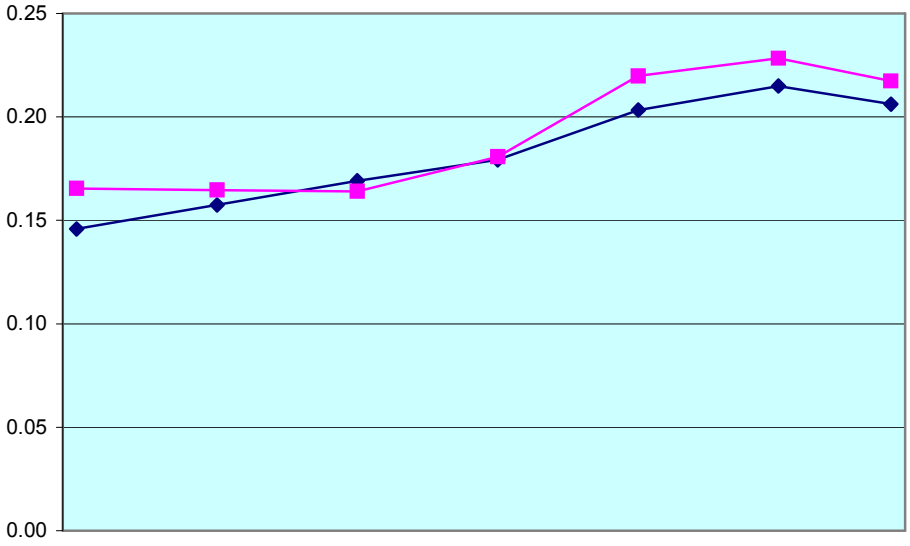
Source: Own calculations based on Unido (2003) data.

The dominance of South Africa has become more evident over time, with South Africa contributing 86 percent of SADC employment in 1980 and 93 percent in 1999. Likewise, South Africa is the only country with a revealed comparative advantage indicated by the location quotient. Of the seven countries with employment recorded in this industry, the pace of growth in South Africa far outstripped the rest with an increase of 70 percent over the period. Tanzania and Zimbabwe also had increases, while the industry shrank in the remaining countries.

5.3.2.26 Transport equipment (384)

The Gini coefficient increased from 0.1691 in 1980 to 0.2149 when it reached its peak in 1995. Then following the SADC trend, the Gini fell to 0.2062 in 1999.

Figure 5.28: Transport equipment



	1970	1975	1980	1985	1990	1995	1999
384: Transport equipment	0.1459	0.1575	0.1691	0.1793	0.2034	0.2149	0.2062
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

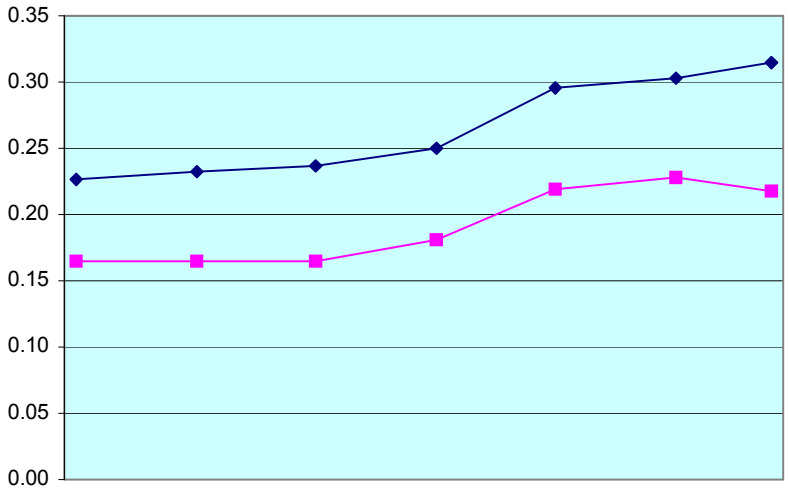
Source: Own calculations based on Unido (2003) data.

South Africa contributed 90 percent of employment in transport equipment, while Zimbabwe contributed 5 percent and Tanzania 3 percent in 1999. None of the remaining countries had shares above 0.6 percent. As with the previous three industries, South Africa is the only country with a revealed comparative advantage in the industry, as measured by the location quotient. However, Zimbabwe is the only country which has had positive growth over the period.

5.3.2.27 Professional and scientific equipment (385)

Professional and scientific equipment has maintained its place as one of the most agglomerated industries in SADC with increasing concentration levels. In 1999, the Gini coefficient was 0.3141 showing this to be the third most agglomerated industry in SADC. The industry has generally followed the average trend, while continuing to be relatively agglomerated.

Figure 5.29: Professional and scientific equipment



	1970	1975	1980	1985	1990	1995	1999
385: Professional & scientific equipment	0.2268	0.2320	0.2371	0.2501	0.2958	0.3025	0.3141
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

While South Africa dominates as usual and has had increasing levels of employment, its share of total employment at 74 percent in 1999, was significantly lower than its share in 1980 and 1990. This is mainly the result of rapid growth in Mauritius (which gained 8 percent of the market share) and Namibia (which gained 6 percent). Mauritius has possessed the greatest revealed comparative advantage of around 3 for 1980 and 1990. However, with growth in Namibia, Mauritius lost this advantage as Namibia's location quotient was 5.3 in 1999. South Africa was the only other country with a location quotient over 1.

5.3.2.28 Other manufactured products (390)

The Gini for other manufactured products increased particularly rapidly from 1985 to 1990 where it broke its close affiliation with the trend of the average Gini. However, by 1999, other manufactured products had dispersed significantly, resulting in the Gini once again approximating the average.

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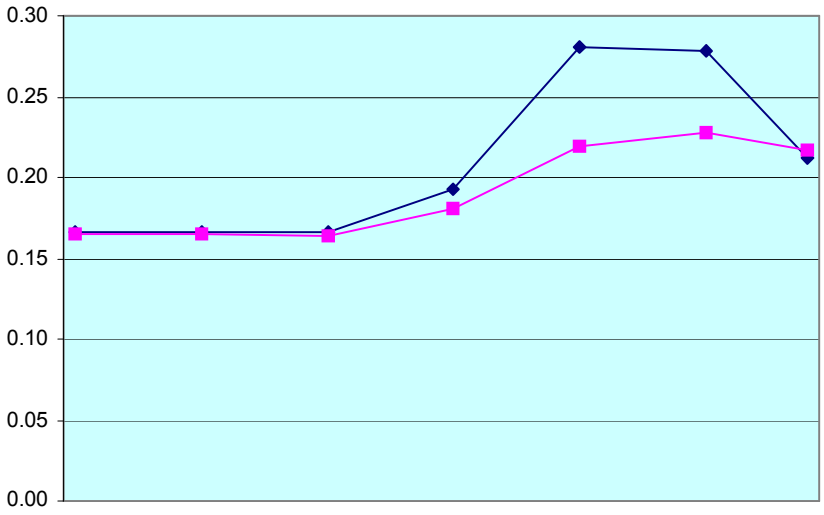
Figure 5.30: Other manufactured products



	1970	1975	1980	1985	1990	1995	1999
390: Other manufactured products	0.1662	0.1664	0.1666	0.1928	0.2804	0.2782	0.2124
Average	0.1654	0.1647	0.1640	0.1808	0.2198	0.2283	0.2173

Source: Own calculations based on Unido (2003) data.

Of all countries, Botswana stands out the most. It appears that Botswana has recorded more industries in this sector than other country as their location quotient is extremely high. In 1980 the quotient was equal to 13.6. However, over time the quotient has decreased to 11.1 in 1990 and 6 in 1999. Lesotho and Mauritius were other countries that had high location quotients for this sector.

5.3.2.29 Conclusion

Through the individual analysis of the different industries it is clear that not all industries have conformed to the average SADC trend. Even those industries that did were found to be affected in different ways. The next section analyses how the change in the Gini coefficient relates to the share of South Africa's employment in each industry, and categorises the industries according to whether they are being pulled towards or away from South Africa.

5.4 Cross industry analysis within SADC

From the above individual industry analysis, it is apparent that the increased Gini coefficient has not necessarily meant polarisation towards South Africa. However, due to the vast differences in size of the manufacturing sectors of South Africa and the rest of the region it is necessary to investigate more fully the absolute levels of manufacturing that South Africa possesses in comparison with the rest of the bloc. To do this, we analyse how the percentage contribution of South Africa to employment in each manufacturing sector has changed over the period of analysis, and link this to the changes in the Gini. This information is summarised in table 5.2 below according to each individual industry, which is then categorised according to how the Gini has been affected. The industry is said to show concentration towards South Africa (concentration towards SA) if the increased share of South Africa's employment is likely to have led to an increase in the Gini. On the other hand, if the rise in the Gini is accompanied by a fall in South Africa's share of the industry, the industry is classified as concentrating in the periphery (concentration away from SA). A third classification is where there has been a fall in the Gini, which indicates dispersion. This can either be dispersion towards South Africa, if increased shares of South Africa mean that the industry's degree of concentration in the periphery is falling, or the other way around, with growth in the periphery reducing concentration in South Africa.

Table 5.2: South Africa's share of SADC employment (percent)

Industry	1980	1990	1999	Gini shows
Total	73.2	68.9	70.1	
311: Food products	56.8	54.8	58.2	concentration towards SA
313: Beverages	61.3	56.7	54.8	concentration away from SA
314: Tobacco	19.3	19.2	23.0	dispersion towards SA
321: Textiles	59.7	49.6	45.6	concentration away from SA
322: Wearing apparel, except footwear	70.8	54.2	55.3	concentration away from SA
323: Leather products	73.8	61.0	65.5	concentration away from SA, then dispersion towards
324: Footwear, except rubber or plastic	72.7	79.0	60.2	concentration towards SA, then dispersion away
331: Wood products, except furniture	74.0	72.2	75.2	No significant change
332: Furniture, except metal	66.9	76.5	75.3	dispersion towards sa, then concentration to SA
341: Paper and products	82.2	73.0	69.7	concentration away from SA
342: Printing and publishing	72.3	74.2	78.1	concentration towards SA
351: Industrial chemicals	76.3	71.4	91.0	concentration towards SA
352: Other chemicals	79.6	78.5	-	dispersion away from SA
353: Petroleum refineries	82.8	92.7	94.1	concentration towards SA
354: Misc. petroleum and coal products	89.7	100.0	-	concentration towards
355: Rubber products	76.0	72.9	71.7	concentration away from SA
356: Plastic products	82.9	85.7	84.9	increase towards SA, then dispersion away
361: Pottery, china earthenware	84.3	79.7	98.8	concentration away from SA then increase towards
362: Glass and products	81.3	75.8	82.7	concentration away from SA then increase towards
369: Other non-metallic mineral products	79.5	78.5	-	concentration away from SA
371: Iron and steel	84.2	77.5	80.2	concentration away from SA then increase towards
372: Non-ferrous metals	93.8	90.4	88.8	concentration away from SA then increase towards
381: Fabricated metal products	82.9	78.2	80.9	concentration away from SA, then dispersion towards
382: Machinery, except electrical	89.8	89.8	86.9	same, dispersion away
383: Machinery electric	86.1	88.5	93.1	concentration towards SA
384: Transport equipment	89.4	87.8	89.6	concentration away from SA
385: Professional & scientific equipment	87.7	80.9	74.4	concentration away from SA
390: Other manufactured products	76.4	66.6	70.1	concentration away from SA, then dispersion towards
Simple average of all industries	76.2	73.8	66.0	concentration away from SA

- No data recorded for South Africa

Source: Own calculations based on UNIDO (2003) data.

Industries that have been pulled towards South Africa throughout the duration of the analysis are food products, printing and publishing, industrial chemicals, petroleum refineries, miscellaneous petroleum and coal products, and electrical machinery. There are, however, some other countries that have also attracted these industries over this time, but their contributions have largely been overshadowed by South Africa. These countries are listed in the table below. The first column shows the countries which are still relatively specialised in the relevant industries, the second column shows the countries which have had an overall increase in employment in the industry and the third column shows the countries that have managed to increase their share of SADC employment in the industry.

Table 5.3: Increase in Gini due to concentration primarily in South Africa

	Countries with revealed comparative advantage (location quotient ≥ 1) in 1999	**Increase in employment (80-99)**	**Increased share of SADC employment (80-99)**
311: Food products	B (1.5), Mw (2.2), Mz (2.4), N (2.6), T (1.9), Za (1.7)	B, L, Mu, SA, T	B, L, SA, T
342: Printing and publishing	Mz (1.2), SA (1.1), Za (1.3)	L, Mu, SA, T	Mu, SA, Za
351: Industrial chemicals	B (1.6), SA (1.2), T (1.1)	B, Mu, SA, Za	B, SA
353: Petroleum refineries	Mz (1.3), N (1.4), SA (1.3)	SA, Za	N, SA, Za
354: Misc. petroleum and coal products	SA (1.5)	-	SA
383: Machinery electric	SA (1.3)	SA, T, Zw	L, SA

Key: B=Botswana, L=Lesotho, Mw=Malawi, Mu=Mauritius, Mz=Mozambique, N=Namibia, SA=South Africa, Sw=Swaziland, T=Tanzania, Za=Zambia, Zw=Zimbabwe
Source: Own calculations based on Unido (2003) data.

The footwear and plastic products industries became more concentrated, as shown by the Gini in the 1980s, but became more dispersed in the 1990s. This was because of an increased share by South Africa at first, which reversed in the 1990s as a number of peripheral countries gained an increasing share of the industry.

Table 5.4: Increase in Gini due to concentration in South Africa in the 1980s, but fall in Gini due to dispersion to the periphery in the 1990s

	Countries with revealed comparative advantage (location quotient ≥ 1) in 1999	Increase in employment (80-99)	Increased share of SADC employment (80-99)
324: Footwear, except rubber or plastic	L (7.4), Za (1.2), Zw (2.3)	Mu, T, Zw, Mw*	L, Mu, Sw, T, Za, Zw
356: Plastic products	SA (1.2)	Mw, Mu, SA, Za, Zw	Mw, Mu, SA, Sw

* Increase in 1990s but overall decrease in employment 1980-1999

Source: Own calculations based on Unido (2003) data.

A large and varied number of industries became increasingly concentrated in the periphery over the last 20 years. These were beverages, textiles, wearing apparel, paper and products, rubber products, other non-metallic mineral products, transport equipment, and professional and scientific equipment. The increase in the Gini for transport equipment was largely driven by Zimbabwe being the only country with employment growth in this sector over the period.

Table 5.5: Increase in Gini due to concentration in the periphery

	Countries with revealed comparative advantage (location quotient ≥ 1) in 1999	Increase in employment (80-99)	Increased share of SADC employment (80-99)
313: Beverages	B (1), Mw (4.1), Mz (1.3), T (1.7), Za (1.9), Zw (1.5)	Mw, Mu, N, SA, Sw, T, Zw	B, L, Mw, Mu, T, Zw
321: Textiles	B (4), L (1.8), Mw (1.2), Mz (1.9), T (3.4), Za (1.6), Zw (1.5)	B, L, Mu, N, Za, Zw	Mw, Mu, N, T, Za, Zw
322: Wearing apparel, except footwear	L (3.9), Mu (5.6), Sw (1.2)	Mw, Mu, SA, Zw, T*	L, Mw, Mu, N
341: Paper and products	B (2.2), Mw (3.2), Sw (5.1), T (1.2)	B, Mw, Mu, N, SA, Sw, T, Za, Zw	B, Mw, Mu, Sw, T, Zw

Table 5.5 continued…

	Countries with revealed comparative advantage (location quotient ≥ 1) in 1999	Increase in employment (80-99)	Increased share of SADC employment (80-99)
355: Rubber products	Mw (1.3), Mz (1.7), SA (1), Za (1.7), Zw (1.6)	Mw, Zw, T*	Mw, Zw
369: Other non-metallic mineral products	B (5.6), L (3.1), Mw (1.9), Mu (1.6), Mz (3.7), Sw (2), T (2.6), Za (5.3), Zw (4.9)	L, Mu*, Mz, T, Zw	L, Mz, T
384: Transport equipment	SA (1.3)	T*, Zw	N, SA, Zw
385: Professional & scientific equipment	Mu (3.2), N (5.3), SA (1)	Mu, SA, T, Z*	L, Mu, T, Za

* Increase in 1990s but overall decrease in employment 1980-1999

Source: Own calculations based on Unido (2003) data.

However, a number of industries became more concentrated in the periphery during the 1980s thus leading to an increase in the Gini, but began to be pulled towards South Africa in the 1990s increasing the value of the Gini further – but this time at the expense of the periphery. These were the pottery china and earthenware, glass and products, iron and steel, and non-ferrous metals industries.

Table 5.6: Increase in Gini due to concentration in the periphery in the 1980s then increase in Gini due to concentration in South Africa

	Countries with revealed comparative advantage (location quotient ≥ 1) in 1999	Increase in employment (80-99)	Increased share of SADC employment (80-99)
361: Pottery, china earthenware	SA (1.4)	SA, Za, Zw	Mu, SA, T
362: Glass and products	SA (1.2), Zw (1)	Mu, T, Zw	L, Mu, SA, T, Zw
371: Iron and steel	N (1.3), SA (1.1), Zw (1.8)	-	L, N, Za, Zw
372: Non-ferrous metals	SA (1.3)	SA, Zw	B, T, Zw

- no increases in employment

Source: Own calculations based on Unido (2003) data.

Industries that do not fit directly into any of the above categories are the tobacco industry, furniture except metal, wood products except furniture, machinery except electrical, and other chemicals. The Gini for the tobacco industry became more dispersed as South Africa gained an increasing share of the industry's production, thus making the industry less concentrated in a few of the smaller countries, which gives this industry its particularly high Gini coefficient. Likewise with the furniture industry, growth in South Africa affected the relatively high concentration that a few small countries had in 1980 causing the Gini to first fall, and then, once South Africa had gained a critical amount of this industry, the Gini began to show a concentration in South Africa. The wood products industry has remained stable over the duration of analysis, with a slight reshuffling of the industry amongst the peripheral countries. South Africa's share was not significantly affected. Non-electrical machinery tended to disperse towards the periphery in the 1990s after remaining fairly stagnant in the 1980s. The final sector, other chemicals, became slightly more dispersed over the 1980s, with the periphery reducing South Africa's share.

Table 5.7: Other industries

	Countries with revealed comparative advantage (location quotient ≥ 1) in 1999	**Increase in employment (80-99)**	**Increased share of SADC employment (80-99)**
314: Tobacco **dispersion towards SA**	T (5.6), Za (1.5), Zw (4)	T, Za	SA, T, Za, Zw
332: Furniture, except metal **dispersion towards SA, then concentration to SA**	Mz (2.4), N (4.5), SA (1), Za (1), Zw (1.1)	Mu, N, SA, T, Sa, Zw	Mu, N, SA
331: Wood products, except furniture **No significant change**	Mw (1.5), Mz (1.7), N (1.9), SA (1.1), Za (1.3)	B, Mw, Mu, Mz, N, SA, T, Za, Zw*	B, Mw, Mz, N, SA, T, Za
382: Machinery, except electrical **No significant change, then dispersion towards periphery**	L (1.9), SA (1.2), Za (1.1)	Mu*, N, T, Za	L, Mw, N, T, Za
352: Other chemicals **dispersion towards periphery**	SA (1.1), Za (1.3)	L, Mw, Mu, Mz, T, Zw	L, Mu, Mz, T, Zw

* Increase in 1990s but overall decrease in employment 1980-1999

Source: Own calculations based on Unido (2003) data.

A prominent theme in the literature is that those industries most prone to scale economies are the most likely to agglomerate (Kim, 1995; Amiti, 1999). Comparing the average firm size (total number of employees in the industry / number of firms in the industry), as a proxy for scale economies, to the distribution of SADC industry, scale economies were found to be an important feature of agglomerated industries. Eight of the 12 industries agglomerated above the average in SADC were also in the 12 industries most subject to scale economies. This is a marked difference from the situation in 1980, where only three of the top 12 most agglomerated industries were greatly affected by scale economies. Thus it appears that the reduction in transport costs has led to a particular emphasis on the location of large-scale industries. Likewise, 14 of the 16 industries agglomerated below the average were found to be in the 16 least affected by scale economies. Regressing the log of an industry's degree of scale economies[12] against their level of industrial concentration, scale economies were found to be significant at the 5 percent level for all years in the analysis. This suggests that within SADC scale-intensive industries tend to be agglomerated. This accords with the general finding of studies in other regional groups as indicated in the literature surveyed in section 3.5.2.

5.5 Cross-bloc comparison of SADC, Mercosur and the EU: 1980 – 1999

5.5.1 Mapping all three blocs

There are many more factors that affect the location of industry in SADC than most models allow for. Therefore, it would be of interest to see whether the overall trend in SADC, and the dispersing or agglomerating trends of the individual industries, is mirrored in other regional blocs.

The SADC, the EU and Mercosur regions have all embarked on notable regional liberalisation efforts in the last 20 years. There have been very few studies that have compared the industrial location effects of integration of different blocs. Those that have been done have generally focused on comparing the EU and the USA (Devereux *et al*,

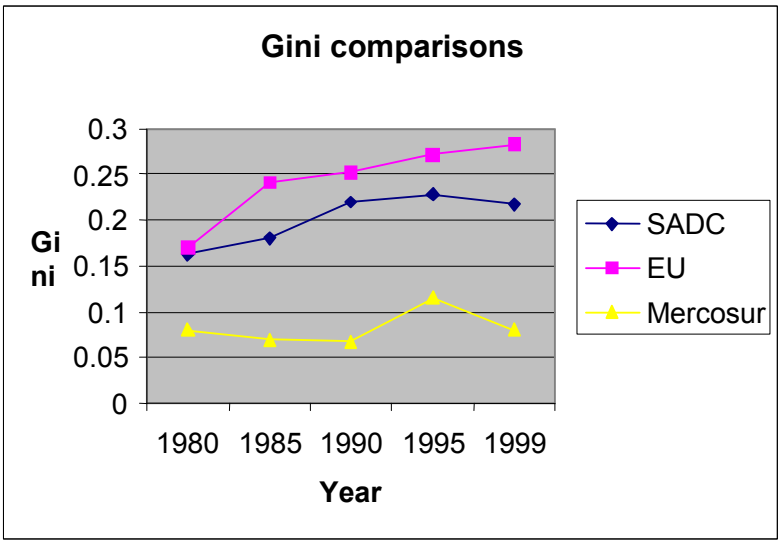
[12] Taken to be the average firm size as measured by the number of employees

2002; Brülhart, 1995; Aiginger and Rossi-Hansberg, 2003; Leitner, 2001; Krugman, 1991) or eastern Europe (Forslid *et al*, 1999b). To date there do not appear to have been any studies that have compared the locational effects of integration in either a developing country or a 'North-South' context. A comparison of the three blocs in this study will examine whether there are any cross-bloc or general effects of integration on industry regardless of the regional grouping.

As noted in chapter 2, the EU was chosen as it represents one of the most progressive attempts at regional integration in the last few decades. Although the bloc consists predominantly of developed nations, there is still a wide range of development levels and industrial production in the group. Mercosur has recently implemented a free trade area. The results for this group would be particularly interesting for SADC as it consists of developing countries with one particularly dominant member (Brazil), one medium-sized and more developed member (Argentina), and the two very small countries of Uruguay and Paraguay.

In both the EU and SADC an overall trend of increased agglomeration was present over the period under investigation. While the concentration of industry was similar in the EU and SADC in 1980, the increase in the Gini for the EU was far greater than that experienced in SADC over the same period. Conversely, the average Gini coefficient fell very slightly overall for Mercosur, indicating that the distribution of overall industry in 1999 was similar to that of 1980. It is also notable that the level of concentration was already lower in Mercosur than both SADC and the EU, and it remained so. The stability of the Gini showed a sharp deviation from the trend in 1995, where it shows that concentration increased dramatically. However, as can be seen by 1999, almost all of this increase in concentration was reversed. This period coincides with the formation of the FTA in the region, so it is possible that there was substantial reshuffling of industry, which is also reflected in the sharp rise in intra-regional trade at this time. As with any developing country group, the concern remains that this extraordinary change in the Gini could be due to data problems.

Figure 5.31: Comparison of the average Gini coefficient in SADC, EU and Mercosur 1980-1999



Source: Own calculations based on Unido (2003) data.

Taking agglomerated industries to be those that were more concentrated than the region's average, the following table illustrates common industries across blocs that were agglomerated in 1999. Three industries, tobacco, miscellaneous petroleum and coal products, and pottery china and earthenware, were all found to have Gini coefficients greater than the average in all three blocs. Additionally, wearing apparel, textiles and footwear were found to be agglomerated in peripheral countries in both SADC and the EU, while similarities between the former bloc and Mercosur were found in petroleum refineries, and beverages. Non-ferrous metals and other manufacturing products were both above average agglomeration levels in the EU and Mercosur, while falling just under the average, but still relatively agglomerated, in SADC. The remaining industry, furniture, was found to be relatively dispersed in SADC.

Table 5.8: Industries agglomerated above the region's average in 1999: SADC, EU and Mercosur

SADC+EU+MERC	SADC+EU	SADC+MERC	EU+MERC
Tobacco	Wearing apparel	Petroleum refineries	Non-ferrous metals
Misc. petroleum and coal products	Textiles	Beverages	Other manufactured products
Pottery, china and earthenware	Footwear		Furniture

Source: Own calculations based on Unido (2003) data.

There were six industries that became more concentrated over the 20 year period in all three blocs, namely, industrial chemicals, textiles, printing and publishing, iron and steel, and plastic products. Other industries that were found to agglomerate in two blocs were footwear, pottery china and earthenware, paper and products, non-ferrous metals and tobacco.

Table 5.9: Industries that increased in agglomeration greater than the average: SADC, EU and Mercosur 1980-1999

SADC+EU+MERC	SADC+EU	SADC+MERC	EU+MERC
Wearing apparel	Footwear	Paper and products	Non-ferrous metals
Industrial chemicals	Pottery, china and earthenware*		Tobacco
Textiles			
Printing and publishing			
Iron and steel			
Plastic products			

* Data not recorded for this industry in Mercosur for 1999.

Source: Own calculations based on Unido (2003) data.

Transport equipment, paper and products, machinery except electrical, plastic products, rubber products, and fabricated metal products are all industries that were relatively dispersed in all three regions. The table below shows the remaining industries that were more dispersed than each region's average level in at least two different blocs.

Table 5.10: Industries below average levels of agglomeration: SADC, EU and Mercosur 1999

SADC+EU+MERC	SADC+EU	SADC+MERC	EU+MERC
Transport equipment	Beverages	Leather products	Professional and scientific equipment
Paper and products	Food products	Printing and publishing	Plastic products
Machinery except electrical	Furniture	Wood products	Transport equipment
Plastic products	Glass and products		Machinery, electric
Rubber products	Other chemicals		
Fabricated metal products	Other non-metallic mineral products		

Source: Own calculations based on Unido (2003) data.

There were no industries that dispersed in all three blocs, although machinery except electrical, which dispersed in both the EU and Mercosur, had begun to disperse by the end of the 1990s in SADC. Food products dispersed in both SADC and the EU, while other chemicals, leather products, and wood products dispersed in SADC and Mercosur.

Table 5.11: Industries that dispersed: SADC, EU and Mercosur 1980-1999

SADC+EU	SADC+MERC	EU+MERC
Food products	Other chemicals	Machinery, except electrical
	Leather products	Beverages
	Wood products	

Source: Own calculations based on Unido (2003) data.

5.5.2 Inferences from this comparative analysis

The regional blocs of SADC, the EU and Mercosur all represent regional integration of countries of vastly different levels of development. The theory of the new economic geography predicts that depending on the initial level, as transport costs fall in a regional grouping, industrial concentration will first increase as transport costs lie at an intermediate level, and then decrease once the costs reach a critically low level. However, the reaction of the above groups to falling transport costs has been widely divergent, both in aggregate and sectoral terms. Both the EU and SADC have experienced an increase in industrial concentration over the last twenty years. What is evident is that the pace of agglomeration in the EU was far greater than that in SADC, even though transport costs and trade barriers were significantly higher in SADC in 1980. This finding could reflect the critical effect of integration at greater levels than the free trade area on the reduction of transport costs within a region. Additionally, or alternatively, actual transport costs may not have decreased significantly in SADC. Mercosur, on the other hand, displayed the expected increase and subsequent decrease in agglomeration, although at an exceedingly rapid rate. Considering that the EU is at a more advanced stage of integration, it is likely that the dispersion in Mercosur is due to factors other than explained in the new economic geography. Another potential explanation could have been the economic instability of the Mercosur region in the late 1990s which could have distorted the process.

Various studies have postulated that the EU has now reached its peak in terms of industrial concentration and is ready for a dispersion phase, with industry relocation from

the core countries to the periphery (Leitner, 2001). An interesting result of this analysis is that SADC may have reached a similar stage, in that the increase in industrial concentration had slowed down in the 1990s, and in the second half of the decade industry on average dispersed. Obviously, the EU and SADC are by no means at similar levels of development, both economically and in terms of liberalisation, so the rationale for such movements must be found elsewhere. Possible reasons why industry has begun to disperse in SADC, even as transports costs still remain relatively high, could be the role of external markets, and the extraordinarily large differences in average wages between the core countries and the periphery. As a means of comparison, the South African average labour cost in urban areas was estimated to be US$ 1.89 in 1999 (McCarthy, 1999:388). Although this figure decreases to US$ 1.08 in the former homelands it is still substantially higher than wages in the rest of SADC at US$ 0.35 in Zimbabwe and between US$ 0.27 and US$ 0.32 in the remaining countries (McCarthy, 1999:388).

The majority of SADC trade is external and not internal; hence the liberalisation of trade within the region is not likely to result in industrial relocation replacing intra-regional trade flows. This factor may be enhanced by the high levels of transport costs and non-tariff barriers (such as infrastructural inadequacies) present within the region, but less so externally. As the poorer countries obtain preferential treatment in some foreign markets (particularly the EU and USA), it may become more profitable for firms to relocate out of high-wage countries into low-wage countries with preferential access treatment. Alternatively, the large wage differentials may mean that SADC will reach a stage where the price of the immobile factors (such as labour) will take effect at a higher level of transport costs than in the EU. The question that now arises is whether a further fall in transport costs will accentuate this trend, or reverse it.

Regressing the distribution of industry in SADC to that of the EU and Mercosur, it was found that industries in Mercosur and the EU were distributed in a similar pattern to each other, but not to SADC. The results were significant at the 1 percent level for 1999, but not significant for any other year. However, what is perhaps more interesting for SADC,

is that if one regresses the distribution of industry in the EU in 1980 against the current (1999) SADC distribution, the results are significant at the 5 percent level. This may indicate that the evolution of SADC industry is at a similar stage to that of the EU 20 years ago.

5.6 Conclusion

The distribution of industry across SADC has changed substantially over the last 20 years. There has been a general trend of increasing concentration of industry from 1970 until 1995, and dispersion in the four years since. This agglomeration has not necessarily been towards the larger more developed countries, and for many industries the concentration has been in a number of the smaller peripheral countries. This is indicated in a slight decline in South Africa's share of manufacturing employment in the region. Conversely, countries that have most notably increased their share of manufacturing employment are Botswana, Lesotho, Mauritius and Swaziland.

Only 6 of the 28 industries analysed showed particular tendencies towards concentration in South Africa over the entire period. These were food products; printing and publishing, industrial chemicals, petroleum refineries, miscellaneous petroleum and coal products, and electrical machinery. The footwear and plastic products industries likewise became more concentrated in South Africa during the 1980s, but began to disperse towards the periphery in the 1990s. On the other hand, industries that concentrated in the periphery in the 1980s, but then began to concentrate in South Africa instead were pottery china and earthenware, glass and products, iron and steel, and non-ferrous metals. While, industries that still remained fairly concentrated in the periphery, but began dispersing towards South Africa, were tobacco and furniture.

There were eight industries that showed increased concentration tendencies in the periphery, these being beverages, textiles, wearing apparel, paper and products, rubber products, other non-metallic mineral products, transport equipment, and professional and scientific equipment. Industries that were concentrated in South Africa at the beginning of the period, but began to disperse towards the periphery were machinery except

electrical, and other chemicals. The level of concentration of the wood products industry remained fairly stable over the entire period of analysis. Scale-intensive industries in particular showed a tendency to be highly agglomerated, regardless of where they were.

Comparing SADC to the EU and Mercosur, the path of concentration has been fairly similar in SADC and the EU with vastly increased levels of agglomeration during the 1980s, which slowed down in the 1990s. However, industries in the EU tended to agglomerate at a much faster pace than in SADC, as in 1999 the EU was more concentrated than SADC, even though the level of agglomeration in 1980 was very similar. Although there was a similar level of agglomeration in 1980, the extent to which industries were affected by agglomeration forces was very different, and SADC's distribution in 1999 was more like the EU's distribution in 1980 than in any other year. On the other hand, the distribution of industry in the EU and Mercosur has remained fairly similar throughout the analysis, even though industry in Mercosur is significantly less agglomerated than both SADC and the EU. Unlike the increased concentration in SADC and the EU in the 1980s, industry dispersed in Mercosur during this time, but then concentrated in 1995 only to disperse again by 1999.

There were three industries that tended to be agglomerated in all three blocs, tobacco, miscellaneous petroleum and coal products, and pottery china and earthenware. The following industries were all relatively dispersed in all three blocs: transport equipment, paper and products, machinery except electrical, plastic products, rubber products, and fabricated metal products.

There appeared to be a greater correlation of industries that tended to agglomerate between the blocs than industries that dispersed, with the following industries agglomerating in all three regions: wearing apparel; textiles; industrial chemicals; printing and publishing; iron and steel; and plastic products. No industries showed trends of dispersion across all three blocs.

This analysis suggests that industries are not uniformly affected in a RIA. However, there may be similarities between some of the industries that have followed comparable paths, such as the increased concentration of the labour intensive textile and apparel industries in the peripheral regions of SADC. Other than the above example and one or two other like cases, there do not appear to be any hard-and-fast rules as to the characteristics of industries that tend to concentrate, either in the core, or in the periphery. This is a potential area for future research. It is suggested that the trends of individual industries considered indicate how each industry is likely to adjust with a further fall in transport costs. This can be seen through the degree of change, direction of change and volatility of the Gini. Additionally, in comparing the way in which individual industries have changed in different regional blocs it appears to be possible to identify particular industries that have concentration tendencies. This provides another area for further research in which similar studies could be conducted of other regions, and possibly also South Africa. The distribution of industry in South Africa would be particularly useful, as this is where the majority of SADC's manufacturing is located.

Chapter 6: Conclusion

The pending free trade area within the SADC region has brought with it concern that industry will relocate towards the larger, more established countries in the region, particularly towards South Africa. As mentioned in chapter 2, South Africa currently possesses 84 percent of SADC's manufacturing value added, and amongst the remaining members there is still a wide disparity of manufacturing capacity. This is shown in the share of MVA to GDP ranging from 0.9 percent in Malawi to 22.5 percent in Mauritius. There has been a moderate rate of growth in MVA in the last decade in all countries within SADC with the exception of Malawi and Zimbabwe, where the manufacturing sectors have declined. Mozambique stands out with an annual average increase in MVA of 18.8 percent, far above the SADC annual average increase of 3.8 percent from 1992 to 2002.

It has been argued that the SADC region is not conducive to large static gains from integration (Kirkpatrick, 1998:9; Winters, 1999:23), and hence that the rationale for the free trade area must be found in the potentially beneficial dynamic effects of integration. However, concern about polarisation of industry towards the larger markets arises in this dynamic context. Despite such concern in SADC, this is an area of research that is critically scarce in the literature and is key to the successful formation of a free trade area in the bloc. If the industrial concerns of the peripheral nations are not addressed there is likely to be a half-hearted commitment to liberalisation.

In an attempt to address this gap in the literature on southern Africa, this study turns in chapter 3 to the theory of the new economic geography to provide a framework for analysing the industrial location effects of regional integration. This body of theory, initiated by Paul Krugman in 1991, draws on both new trade theory and regional science. The new economic geography has since become popular for analysing the ongoing integration of the European Union, and the subsequent effect on industrial location. The general premise of the theory is that the interplay of agglomeration and dispersion forces will first lead to industrial concentration in the core as transport costs within a regional

bloc begin to fall, and then after some time lead to dispersion towards the periphery as transport costs reach a critically low level. This pattern was seen in the history of the USA (Kim, 1995) and, as some of the literature surveyed in chapter 4 argues, is occurring presently in the EU (Forslid *et al*, 1999; Aiginger *et al*, 2000).

The internal dynamics of the new economic geography have been a point of much discussion in the literature, but recent evidence appears to be leaning in its favour from studies in the developed world. Whether these same forces will affect industry in a developing region context, however, is questionable.

Based on the above theoretical framework, the study in chapter 5 adopted a two-pronged approach to the question of the potential for polarisation in the SADC context. Firstly, the level of industrial concentration in the 11 current signatories of the SADC trade protocol was analysed for the period 1970 to 1999. Secondly, the movement of industry in the SADC region was compared to two regional blocs that have already implemented a free trade area, the European Union and Mercosur, with the analysis ranging at 5 year intervals, from 1980 to 1999. Despite some shortcomings of the measure, but in keeping with the majority of empirical studies of this nature, the locational Gini coefficient was used to measure the degree of industrial concentration in these blocs. Manufacturing was classified according to the 28 ISIC (revision 2) industries to allow for greater time-series comparison amongst the regions.

The average level of concentration within SADC was found to have increased steadily from 1970 to 1990. Between 1990 and 1995, the level of concentration still increased, but at a lower rate and, by 1999, industry had begun to disperse. The Gini coefficient is a relative measure, and therefore does not measure the absolute level of concentration. Thus, much of the increase in concentration was towards peripheral countries, and not necessarily the core. To further interpret the Gini, the change in concentration was compared to the absolute changes in manufacturing employment in South Africa (which is assumed to be the core). From this analysis, eight of the 28 industries showed particular tendencies to concentrate in the periphery. These were beverages, textiles,

wearing apparel, paper and products, rubber products, other non-metallic mineral products, transport equipment, and professional and scientific equipment. Likewise, another six industries became more concentrated in South Africa over this time: food products, printing and publishing, industrial chemicals, petroleum refineries, miscellaneous petroleum and coal products, and electrical machinery. According to the Gini coefficient, the tobacco industry was by far the most concentrated, while the wood products industry was the most dispersed. It was also found that scale-intensive industries tended to be the most concentrated. These findings are in line with other studies in the EU and the USA as mentioned in section 3.5.2.

The second part of the analysis yielded some interesting findings. Mercosur, was found to have the lowest aggregate level of concentration with a Gini of 0.08 in 1999. This compares with Ginis of 0.28 for the EU, and 0.22 for SADC. The EU had the largest increase in concentration over the period, while the concentration in Mercosur fell during the 1980s, while it increased in the mid 1990s and then fell again by 1999. A common theme, however, between all three blocs was a trend towards dispersion in the late 1990s. This was particularly apparent in SADC and Mercosur where the Gini decreased in value, while in the EU, the Gini only increased marginally. Other studies of the EU have indicated that industry was starting to disperse at this time. This finding would be more apparent at a greater level of industrial disaggregation.

The following industries were found to be agglomerated above the average level in all three blocs: tobacco, miscellaneous petroleum and coal products, and pottery, china and earthenware. Conversely, transport equipment, paper and products, machinery, except electrical, plastic products, rubber products, and fabricated metal products tended to be more dispersed across all three. Perhaps more interesting is that there appeared to be a common theme amongst industries that became more agglomerated across all three blocs, while industries that dispersed tended to be region specific. The industries that showed universal agglomeration tendencies were the highly sensitive wearing apparel and textiles industries in addition to industrial chemicals, printing and publishing, iron and steel, and plastic products. In relation to SADC, the first two of these industries showed an

increased concentration in the periphery, as in the EU, while the remaining industries showed tendencies to concentrate in the core.

It is thus the conclusion of this study, that progress towards regional integration will affect the industrial distribution of the SADC region. However, this may not necessarily be negative for the peripheral countries as a number of industries have shown a tendency to agglomerate in marginal countries. In particular, the study shows that countries currently part of the customs union with South Africa have had the greatest increases in manufacturing during the period of analysis. Additionally, current studies of the EU are now reflecting concern by the present industrialised members that industry will disperse towards the new lower-wage accession countries. Within SADC, the degree of wage disparity is currently extremely high between South Africa and the majority of the other members. In conjunction with these differences in wages, trade concessions from developed foreign markets, such as the EU and NAFTA, will make the peripheral countries an attractive base particularly for South African exporting firms. This provides an avenue for further research in determining the relative roles of the market advantages of South Africa versus the larger blocs (such as the EU) to which SADC trade is largely focused.

This study provides a number of factors for policy consideration. Firstly, and most importantly, the change in the distribution of industry within SADC is something that has occurred in the past 30 years, and is likely to take place to an even greater extent as integration proceeds. The concentration, or dispersion tendencies of the 28 manufacturing sectors have been highlighted together with the countries that have the potential to attract these particular industries. It has been argued that many of these industries have not been pulled towards South Africa, but rather towards other countries in the bloc. It is thus recommended that member countries conduct further studies within the sectors that have shown a tendency to concentrate within their country in order to facilitate the attraction of these industries. On the other hand, if a particular industry is being attracted out of the country involved, methods should be introduced to increase the competitiveness of that industry. From the theory, it is apparent that the forces for

industrial concentration that result in industry agglomerating in the core are highest at intermediate levels of transport costs. Although the level of transport costs within SADC is still relatively high, the increase in dispersion in SADC since 1995 indicates that industry may not agglomerate to the degree seen in the European Union. This would indicate that, with a further reduction of transport costs, dispersion, rather than agglomeration, is likely to take place. Therefore, it is imperative that transport costs (both in the form of tariffs as well as NTBs) are reduced as quickly as possible in order for the peripheral countries to gain significantly. Thus, the findings of this study provide hope for the success of a free trade area in SADC. However, this is based on the full commitment of all member states towards further regional integration, and the rapid reduction of intra-regional transport costs.

Appendices

Appendix 1: Data availability of employment for SADC, Mercosur and EU

	1970	1980	1985	1990	1995	1999
SADC						
Botswana	1981	1981	1985	1990	1995	1998
Lesotho	1982	1982	1985	1990	1994	1998
Malawi	1970	1980	1985	1990	1995	1998
Mauritius	1970	1980	1985	1990	1995	1999
Mozambique	1970	1986	1986	1990	1995	2000
Namibia	1994	1994	1994	1994	1994	2000
South Africa	1970	1980	1985	1990	1995	1999
Swaziland	1970	1980	1985	1990	1995	1995
United Republic of Tanzania	1970	1980	1985	1991	1991	1999
Zambia	1970	1980	1982	1990	1994	1994
Zimbabwe	1970	1980	1985	1990	1995	1998
Mercosur						
Argentina		1980	1985	1990	1995	1999
Brazil		1980	1985	1985	1993	2001
Paraguay		1970	1991	1991	1995	1995
Uraguay		1980	1985	1990	1995	1999
EU						
Austria		1980	1985	1990	1995	1999
Belgium		1980	1985	1990	1992	2000
Denmark		1980	1985	1990	1995	1998
Finland		1980	1985	1990	1995	1999
France		1980	1985	1990	1995	2000
Germany		1980	1991	1991	1994	1999
Greece		1980	1985	1990	1995	1999
Ireland		1980	1985	1990	1995	1998
Italy		1980	1985	1990	1995	1998
Luxembourg		1980	1985	1990	1994	1994
Netherlands		1980	1985	1990	1995	1999
Portugal		1980	1985	1990	1995	1998
Spain		1980	1985	1990	1995	1999
Sweden		1980	1985	1990	1995	1999
UK		1980	1985	1990	1995	1999

Appendix 2: SADC locational Gini coefficients 1970 - 1999

	1970	1980	1985	1990	1995	1999
311: Food products	0.2371	0.1928	0.1688	0.1953	0.2021	0.1806
313: Beverages	0.1637	0.1345	0.1386	0.1696	0.1961	0.2137
314: Tobacco	0.6194	0.6542	0.5962	0.6758	0.624	0.6076
321: Textiles	0.1228	0.1937	0.2531	0.258	0.3664	0.3071
322: Wearing apparel, except footwear	0.1244	0.1428	0.2576	0.3696	0.3599	0.3244
323: Leather products	0.1638	0.1764	0.1608	0.2409	0.238	0.1633
324: Footwear, except rubber or plastic	0.1237	0.084	0.1239	0.2118	0.2386	0.2345
331: Wood products, except furniture	0.1583	0.134	0.1161	0.1174	0.1202	0.1059
332: Furniture, except metal	0.1128	0.1271	0.1168	0.1059	0.1169	0.1519
341: Paper and products	0.1756	0.1348	0.1216	0.1908	0.1524	0.1945
342: Printing and publishing	0.0391	0.0459	0.0766	0.0856	0.102	0.1123
351: Industrial chemicals	0.0968	0.0979	0.1253	0.1878	0.1739	0.2249
352: Other chemicals	0.1043	0.1245	0.1363	0.1192	0.1192	0.1192
353: Petroleum refineries	0.2016	0.2022	0.2097	0.2529	0.2704	0.2547
354: Misc. petroleum and coal products	0.2153	0.18	0.2012	0.3108	0.3108	0.3108
355: Rubber products	0.1162	0.085	0.1251	0.1558	0.1737	0.1558
356: Plastic products	0.1184	0.1069	0.126	0.1845	0.213	0.1616
361: Pottery, china earthenware	0.2143	0.1501	0.2109	0.2088	0.3171	0.2877
362: Glass and products	0.1235	0.1733	0.1834	0.2118	0.1571	0.1458
369: Other non-metallic mineral products	0.0553	0.0844	0.1206	0.121	0.121	0.121
371: Iron and steel	0.1543	0.1566	0.1698	0.2072	0.1879	0.2183
372: Non-ferrous metals	0.2207	0.2141	0.2174	0.2309	0.2067	0.2003
381: Fabricated metal products	0.0891	0.1131	0.1233	0.1355	0.1542	0.1262
382: Machinery, except electrical	0.1819	0.1734	0.2001	0.2164	0.2207	0.1913
383: Machinery electric	0.16	0.1382	0.1599	0.2114	0.2535	0.2388
384: Transport equipment	0.1459	0.1691	0.1793	0.2034	0.2149	0.2062
385: Professional & scientific equipment	0.2268	0.2371	0.2501	0.2958	0.3025	0.3141
390: Other manufactured products	0.1662	0.1666	0.1928	0.2804	0.2782	0.2124
S. Avg	**0.165404**	**0.164025**	**0.180761**	**0.219796**	**0.228264**	**0.217318**

Appendix 3: EU locational Gini coefficients 1980 - 1999

	1980	1985	1990	1995	1999
311: Food products	0.1665	0.1803	0.1823	0.2042	0.1138
313: Beverages	0.1825	0.1693	0.1722	0.1892	0.1735
314: Tobacco	0.2462	0.364	0.3541	0.3921	0.3845
321: Textiles	0.1713	0.2386	0.2376	0.276	0.3309
322: Wearing apparel, except footwear	0.1491	0.2309	0.2988	0.3817	0.4136
323: Leather products	0.1502	0.2474	0.2537	0.3395	0.3077
324: Footwear, except rubber or plastic	0.2704	0.3679	0.4184	0.5086	0.4115
331: Wood products, except furniture	0.2356	0.2267	0.256	0.2568	0.37
332: Furniture, except metal	0.114	0.1106	0.1315	0.2239	0.2967
341: Paper and products	0.1472	0.1455	0.1549	0.1765	0.2367
342: Printing and publishing	0.2214	0.2215	0.2421	0.2798	0.4436
351: Industrial chemicals	0.1358	0.4504	0.4644	0.2673	0.3051
352: Other chemicals	0.0604	0.0875	0.1302	0.1252	0.1178
353: Petroleum refineries	0.3614	0.2295	0.2594	0.2471	0.22
354: Misc. petroleum and coal products	0.2972	0.5854	0.6068	0.9122	0.6767
355: Rubber products	0.1372	0.1385	0.171	0.1926	0.2285
356: Plastic products	0.0485	0.1168	0.0884	0.1711	0.1959
361: Pottery, china earthenware	0.3637	0.3957	0.414	0.3991	0.6446
362: Glass and products	0.1251	0.1344	0.112	0.1337	0.2007
369: Other non-metallic mineral products	0.1402	0.1423	0.1401	0.2263	0.1803
371: Iron and steel	0.1257	0.4383	0.4339	0.2009	0.2658
372: Non-ferrous metals	0.0802	0.1109	0.1351	0.1577	0.1577
381: Fabricated metal products	0.0701	0.1565	0.1421	0.157	0.1165
382: Machinery, except electrical	0.1592	0.182	0.1864	0.2275	0.1583
383: Machinery electric	0.1058	0.1565	0.1718	0.2286	0.143
384: Transport equipment	0.0938	0.4238	0.4297	0.1849	0.1653
385: Professional & scientific equipment	0.2274	0.2403	0.2245	0.2989	0.2786
390: Other manufactured products	0.1798	0.2685	0.2344	0.2638	0.3957
S. Avg	**0.170211**	**0.241429**	**0.251636**	**0.272221**	**0.283321**

Appendix 4: Mercosur locational Gini coefficients 1980 - 1999

	1980	1985	1990	1995	1999
311: Food products	0.0724	0.0935	0.0856	0.055	0.0905
313: Beverages	0.2117	0.1938	0.1709	0.0224	0.1533
314: Tobacco	0.0389	0.0273	0.0514	0.1189	0.1946
321: Textiles	0.0303	0.0448	0.0433	0.096	0.062
322: Wearing apparel, except footwear	0.0637	0.0654	0.0783	0.1425	0.0749
323: Leather products	0.1934	0.1267	0.133	0.0446	0.0736
324: Footwear, except rubber or plastic	0.0476	0.0901	0.0877	0.0555	0.0448
331: Wood products, except furniture	0.0783	0.0491	0.0575	0.2744	0.0573
332: Furniture, except metal	0.1018	0.0987	0.0858	0.1301	0.088
341: Paper and products	0.0141	0.0105	0.0415	0.0671	0.0663
342: Printing and publishing	0.0168	0.0074	0.0182	0.0475	0.07
351: Industrial chemicals	0.0452	0.0446	0.0301	0.1219	0.0507
352: Other chemicals	0.105	0.05	0.0322	0.0283	0.0962
353: Petroleum refineries	0.1058	0.085	0.1547	0.101	0.1553
354: Misc. petroleum and coal products	0.1331	0.0388	0.0351	0.4158	0.1331
355: Rubber products	0.0575	0.0303	0.0175	0.0919	0.04
356: Plastic products	0.0206	0.0035	0.0103	0.0331	0.029
361: Pottery, china earthenware	0.1254	0.131	0.1486	0.3452	**0.1204**
362: Glass and products	0.0761	0.1113	0.0731	0.0864	0.1072
369: Other non-metallic mineral products	0.0928	0.0611	0.0212	0.1297	0.1019
371: Iron and steel	0.0402	0.023	0.0293	0.1379	0.0526
372: Non-ferrous metals	0.1043	0.086	0.0813	0.1637	0.1557
381: Fabricated metal products	0.0616	0.0693	0.0623	0.0312	0.026
382: Machinery, except electrical	0.0929	0.0925	0.0953	0.1473	0.0243
383: Machinery electric	0.0399	0.0669	0.0735	0.0648	0.0078
384: Transport equipment	0.1132	0.0799	0.0744	0.1553	0.0478
385: Professional & scientific equipment	0.0421	0.0468	0.0091	0.0936	0.0248
390: Other manufactured products	0.142	0.1333	0.1144	0.0272	0.1061
S. Avg	**0.080954**	**0.070021**	**0.068414**	**0.115296**	**0.080507**

Appendix 5: US locational Gini coefficients: 1860 - 1987

	Industries	1860	1880	1900	1914	1927	1947	1967	1987
20	**Food**	0.322	0.311	0.215	0.231	0.249	0.26	0.196	0.153
21	**Tobacco**	0.63	0.385	0.276	0.303	0.455	0.719	0.73	0.776
22	**Textiles**	0.357	0.401	0.452	0.443	0.497	0.575	0.653	0.707
23	**Apparel**	0.249	0.218	0.217	0.307	0.284	0.338	0.36	0.351
24	**Lumber and Wood**	0.418	0.263	0.369	0.486	0.566	0.559	0.451	0.259
25	**Furniture and fixtures**	0.167	0.246	0.238	0.255	0.211	0.189	0.223	0.21
26	**Paper**	0.221	0.286	0.249	0.235	0.211	0.088	0.061	0.094
27	**Printing and Publishing**	0.253	0.144	0.151	0.154	0.132	0.139	0.122	0.116
28	**Chemicals**	0.414	0.242	0.381	0.334	0.279	0.204	0.198	0.185
29	**Petroleum and coal**	0.257	0.165	0.189	0.214	0.434	0.442	0.461	0.373
30	**Rubber and Plastics**	0.284	0.497	0.532	0.373	0.454	0.438	0.215	0.124
31	**Leather**	0.224	0.229	0.23	0.371	0.357	0.373	0.422	0.33
32	**Stone, clay and glass**	0.194	0.191	0.095	0.166	0.105	0.106	0.083	0.137
33	**Primary metal**	0.216	0.2	0.235	0.256	0.256	0.21	0.224	0.247
34	**Fabricated metal**	0.092	0.123	0.21	0.324	0.248	0.167	0.164	0.162
35	**Machinery**	0.113	0.084	0.015	0.241	0.236	0.276	0.233	0.149
36	**Electrical machinery**	0	0.239	0	0.222	0.238	0.227	0.123	0.087
37	**Transportation**	0.105	0.24	0.219	0.3	0.296	0.309	0.238	0.203
38	**Instruments**	0.289	0.155	0.244	0.288	0.372	0.577	0.292	0.274
39	**Miscellaneous**	0.232	0.248	0.218	0.22	0.25	0.34	0.24	0.244
Unweighted Average		0.265	0.243	0.256	0.286	0.307	0.327	0.284	0.259
Weighted Average		0.273	0.253	0.242	0.311	0.316	0.259	0.239	0.197

Source: Kim (1995)

Appendix 6: Employment, MVA, wages and number of establishments by industry and country

300: Total Manufacturing

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
Gini	*0.164*	*0.181*	*0.220*									
B	6600	24300	23066	54	195	216	3803	4046	2451	184	310	858
L	4173	18628	19812	14	21	-	884	118	32	46	688	258
Mw	38722	34147	40160	123	102	105	1046	1199	865	116	86	102
Mu	42930	114737	99421	136	527	878	1662	1904	3805	529	1070	927
Mz	62490	76369	32976	210	-	-	1636	1339	220	311	320	166
N	21052	21052	22922	-	393	-	6106	6106	5608	-	278	-
SA	1392000	1525000	1416970	17847	23170	22833	6112	7701	7787	18640	23612	-
Sw	10757	20029	19242	104	252	335	3907	3409	4949	131	128	131
T	100993	126425	126050	361	123	155	119	38	-	705	883	-
Za	59084	67595	50988	780	627	304	3246	1691	2000	510	434	591
ZW	160747	184275	166696	1480	2229	1088	3848	3959	1869	1312	1020	966

Source: UNIDO (2003)

Employment

	Real change			% Change			% of SADC		
	80-90	90-99	80-99	80-90	90-99	80-99	1980	1990	1999
B	17700	-1234	16466	268.2%	-5.1%	249.5%	0.3%	1.1%	1.1%
L	14455	1184	15639	346.4%	6.4%	374.8%	0.2%	0.8%	1.0%
Mw	-4575	6013	1438	-11.8%	17.6%	3.7%	2.0%	1.5%	2.0%
Mu	71807	-15316	56491	167.3%	-13.3%	131.6%	2.3%	5.2%	4.9%
Mz	13879	-43393	-29514	22.2%	-56.8%	-47.2%	3.3%	3.4%	1.6%
N	0	1870	1870	0.0%	8.9%	8.9%	1.1%	1.0%	1.1%
SA	133000	-108030	24970	9.6%	-7.1%	1.8%	73.2%	68.9%	70.1%
Sw	9272	-787	8485	86.2%	-3.9%	78.9%	0.6%	0.9%	1.0%
T	25432	-375	25057	25.2%	-0.3%	24.8%	5.3%	5.7%	6.2%
Za	8511	-16607	-8096	14.4%	-24.6%	-13.7%	3.1%	3.1%	2.5%
ZW	23528	-17579	5949	14.6%	-9.5%	3.7%	8.5%	8.3%	8.3%

Source: Own calculations based on UNIDO (2003) data

Key:	
B = Botswana	SA = South Africa
L = Lesotho	Sw = Swaziland
Mw = Malawi	T = Tanzania
Mu = Mauritius	Za = Zambia
Mz = Mozambique	Zw = Zimbabwe
N = Namibia	

311: Food Products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
Gini	0.1928	0.1953	0.1806									
B	2400	5200	5029	17	69	78	4716	5296	801	26	51	140
L	1540	3015	2174	10	15	-	730	2534	1086	11	26	90
Mw	15514	11082	13215	54	11	18	897	1071	195	27	12	20
Mu	9776	11421	9858	36	80	126	2567	2984	1582	162	223	114
Mz	24320	30693	15914	62	-	-	1385	1098	43	51	69	46
N	13553	13553	8851	-	260	-	6046	6046	2596	-	110	-
SA	174000	199000	178070	1624	2219	2221	4354	5893	1758	1786	1881	-
Sw	4069	9616	-	39	74	-	3696	1949	-	11	9	-
T	20857	35718	36801	58	27	32	21	10		145	147	-
Za	16536	18598	12668	92	151	59	2221	1430	593	90	105	149
ZW	23971	25302	23150	193	237	148	3610	3789	531	159	99	97

Source: UNIDO (2003)

Employment

	Real change			% Change			% of SADC		
	80-90	90-99	80-99	80-90	90-99	80-99	80	90	99
B	2800	-171	2629	116.7%	-3.3%	52.3%	0.8%	1.4%	1.6%
L	1475	-841	634	95.8%	-27.9%	29.2%	0.5%	0.8%	0.7%
Mw	-4432	2133	-2299	-28.6%	19.2%	-17.4%	5.1%	3.1%	4.3%
Mu	1645	-1563	82	16.8%	-13.7%	0.8%	3.2%	3.1%	3.2%
Mz	6373	-14779	-8406	26.2%	-48.2%	-52.8%	7.9%	8.5%	5.2%
N	0	-4702	-4702	0.0%	-34.7%	-53.1%	4.4%	3.7%	2.9%
SA	25000	-20930	4070	14.4%	-10.5%	2.3%	56.8%	54.8%	58.2%
Sw	5547	-9616	-4069	136.3%	-100.0%	-	1.3%	2.6%	0.0%
T	14861	1083	15944	71.3%	3.0%	43.3%	6.8%	9.8%	12.0%
Za	2062	-5930	-3868	12.5%	-31.9%	-30.5%	5.4%	5.1%	4.1%
ZW	1331	-2152	-821	5.6%	-8.5%	-3.5%	7.8%	7.0%	7.6%

Source: Own calculations based on UNIDO (2003) data

313: Beverages

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
B	300	1300	732	4	31	32	6294	6709	282	2	7	7
L	-	-	555	-	-	-	-	-	-	-	-	2
Mw	1680	1900	4913	8	17	26	1466	1427	64	4	4	5
Mu	2060	2264	2414	10	57	86	2216	3480	371	14	13	14
Mz	2580	2734	2168	18	-	-	1785	1685	31	16	17	6
N	1078	1078		-	41	-	9380	9380	.	-	6	-
SA	33000	36000	33620	457	1054	1082	5797	8235	470	258	258	-
Sw	345	535	-	4	101	-	4974	7384	-	4	3	-
T	3063	6372	6526	14	16	19	6	2		13	20	-
Za	3444	4566	2849	193	125	55	3812	2045	172	10	18	9
ZW	6287	6702	7536	92	302	170	4760	4721	166	46	15	20

Source: UNIDO (2003)

	Real Change			% Change			% of SADC		
B	1000	-568	432	333.3%	-43.7%	144.0%	0.6%	2.0%	1.2%
L	0	555	555	0.0%	0.0%	Inf	0.0%	0.0%	0.9%
Mw	220	3013	3233	13.1%	158.6%	192.4%	3.1%	3.0%	8.0%
Mu	204	150	354	9.9%	6.6%	17.2%	3.8%	3.6%	3.9%
Mz	154	-566	-412	6.0%	-20.7%	-16.0%	4.8%	4.3%	3.5%
N	0	-1078	-1078	0.0%	-100.0%	-100.0%	2.0%	1.7%	0.0%
SA	3000	-2380	620	9.1%	-6.6%	1.9%	61.3%	56.7%	54.8%
Sw	190	-535	-345	55.1%	-100.0%	-100.0%	0.6%	0.8%	0.0%
T	3309	154	3463	108.0%	2.4%	113.1%	5.7%	10.0%	10.6%
Za	1122	-1717	-595	32.6%	-37.6%	-17.3%	6.4%	7.2%	4.6%
ZW	415	834	1249	6.6%	12.4%	19.9%	11.7%	10.6%	12.3%

Source: Own calculations based on UNIDO (2003) data

314: Tobacco

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	6006	6000	74	9	11	2	964	525	81	6	4	1
Mu	400	336	207	2	22	48	3429	5827	107	1	1	1
Mz	500	560	209	11	-	-	846	755	10	5	4	2
N	-	-	0	-	-	-	-	-	-	-	-	-
SA	4000	4000	3110	110	83	89	8025	9952	109	13	11	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	3271	4551	5135	12	20	13	3	2		3	3	-
Za	396	-	503	58	-	21	10070	-	37	1	-	2
ZW	6117	5414	4290	55	76	52	3815	3408	20	19	8	5

	Real Change			% Change			% of SADC		
B	0	0	0	0.0%	0.0%	0.0%	0	0	0
L	0	0	0	0.0%	0.0%	0.0%	0	0	0
Mw	-6	-5926	-5932	-0.1%	-98.8%	-98.8%	0.290285	0.287618	0.00547
Mu	-64	-129	-193	-16.0%	-38.4%	-48.3%	0.019333	0.016107	0.015302
Mz	60	-351	-291	12.0%	-62.7%	-58.2%	0.024166	0.026844	0.015449
N	0	0	0	0.0%	0.0%	0.0%	0	0	0
SA	0	-890	-890	0.0%	-22.3%	-22.3%	0.19333	0.191745	0.229894
Sw	0	0	0	0.0%	0.0%	0.0%	0	0	0
T	1280	584	1864	39.1%	12.8%	57.0%	0.158096	0.218158	0.379583
Za	-396	503	107	-100.0%	∞	27.0%	0.01914	0	0.037182
ZW	-703	-1124	-1827	-11.5%	-20.8%	-29.9%	0.29565	0.259527	0.31712

Source: Own calculations based on UNIDO (2003) data

321: Textiles

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
B	1100	4200	6453	7	20	17	2760	3025	183	40	72	189
L	887	8245	2578	1	3	-	714	876	611	8	351	30
Mw	4157	5379	3500	12	7	6	1037	1179	38	8	6	7
Mu	2154	4963	4751	9	28	59	1294	2135	489	13	42	50
Mz	10550	10735	3290	24	-	-	1840	1808	8	18	21	4
N	733	733	1295	-	5	-	2361	2361	162	-	18	-
SA	111000	97000	65420	885	850	672	3933	5268	607	705	911	-
Sw	670	2423	-	3	19	-	2066	5344	-	35	16	-
T	32977	30424	32490	95	2	-35	31	8		79	87	-
Za	4299	8286	5777	51	62	23	2963	1601	223	28	31	28
ZW	17373	23268	17878	147	255	99	2918	3233	155	71	50	45

	Real Change			% Change			% of SADC		
B	3100	2253	5353	281.8%	53.6%	486.6%	0.005917	0.021466	0.04499
L	7358	-5667	1691	829.5%	-68.7%	190.6%	0.004771	0.04214	0.017974
Mw	1222	-1879	-657	29.4%	-34.9%	-15.8%	0.022361	0.027492	0.024402
Mu	2809	-212	2597	130.4%	-4.3%	120.6%	0.011587	0.025366	0.033124
Mz	185	-7445	-7260	1.8%	-69.4%	-68.8%	0.056751	0.054867	0.022938
N	0	562	562	0.0%	76.7%	76.7%	0.003943	0.003746	0.009029
SA	-14000	-31580	-45580	-12.6%	-32.6%	-41.1%	0.597095	0.495768	0.456105
Sw	1753	-2423	-670	261.6%	-100.0%	-100.0%	0.003604	0.012384	0
T	-2553	2066	-487	-7.7%	6.8%	-1.5%	0.177391	0.155497	0.226518
Za	3987	-2509	1478	92.7%	-30.3%	34.4%	0.023125	0.04235	0.040277
ZW	5895	-5390	505	33.9%	-23.2%	2.9%	0.093453	0.118923	0.124644

Source: Own calculations based on UNIDO (2003) data

322: Wearing apparel, except footwear

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	8776	-	-	-	-	-	-	-	-	34
Mw	1650	1100	3900	2	3	1	660	1299	47	12	8	5
Mu	16298	76209	62626	28	204	350	906	1505	707	99	401	352
Mz	5170	4414	1572	6	-	-	1103	1291	18	35	23	7
N	-	-	1292	-	-	-	-	-	-	-	-	-
SA	115000	127000	126140	476	701	664	2925	3889	836	1231	1631	-
Sw	-	-	2537	-	-	10	-	-	904	-	-	14
T	3890	1183	1940	10	0	1	4	0		63	53	-
Za	5868	3672	2280	34	9	4	2276	997	302	108	34	46
ZW	14624	20748	16939	70	102	33	2468	2309	209	118	111	91

	Real Change			% Change			% of SADC		
B	0	0	0	0.0%	0.0%	0.0%	0	0	0
L	0	8776	8776	0.0%	∞	∞	0	0	0.038491
Mw	-550	2800	2250	-33.3%	254.5%	136.4%	0.010154	0.004694	0.017105
Mu	59911	-13583	46328	367.6%	-17.8%	284.3%	0.100295	0.325226	0.274673
Mz	-756	-2842	-3598	-14.6%	-64.4%	-69.6%	0.031815	0.018837	0.006895
N	0	1292	1292	0	∞	∞	0	0	0.005667
SA	12000	-860	11140	10.4%	-0.7%	9.7%	0.707692	0.54198	0.553241
Sw	0	2537	2537	0.0%	∞	∞	0	0	0.011127
T	-2707	757	-1950	-69.6%	64.0%	-50.1%	0.023938	0.005049	0.008509
Za	-2196	-1392	-3588	-37.4%	-37.9%	-61.1%	0.036111	0.01567	0.01
ZW	6124	-3809	2315	41.9%	-18.4%	15.8%	0.089994	0.088543	0.074293
							162500	234326	228002

Source: Own calculations based on UNIDO (2003) data

323: Leather products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
B	300	600	379	2	4	3	1833	3160	16	16	17	18
L	-	2528	13	-	-	-	-	1107	3231	-	55	1
Mw	-	102	76	-	-	0	-	-	57	-	1	3
Mu	282	1187	1207	1	5	6	1401	1808	44	5	10	9
Mz	340	115	36	1	-	-	101	299	-	4	3	4
N	-	-	517	-	-	-	-	-	-	-	-	-
SA	10000	12000	9510	40	75	125	3595	3929	76	161	180	-
Sw	-	-	-	-	-	-	-	-	-	-	-	1
T	1755	842	898	7	0	1	2	0		12	8	-
Za	255	1105	122	4	1	0	3665	1618	4	3	4	3
ZW	620	1200	1753	4	7	5	3053	1872	19	14	13	16

	Real Change			% Change			% of SADC		
B	300	-221	79	100.0%	-36.8%	26.3%	0.022137	0.030489	0.026118
L	2528	-2515	13	∞	-99.5%	∞	0	0.128462	0.000896
Mw	102	-26	76	∞	-25.5%	∞	0	0.005183	0.005237
Mu	905	20	925	320.9%	1.7%	328.0%	0.020809	0.060318	0.083178
Mz	-225	-79	-304	-66.2%	-68.7%	-89.4%	0.025089	0.005844	0.002481
N	0	517	517	0.0%	∞	∞	0	0	0.035628
SA	2000	-2490	-490	20.0%	-20.8%	-4.9%	0.737898	0.609787	0.655365
Sw	0	0	0	0.0%	0.0%	0.0%	0	0	0
T	-913	56	-857	-52.0%	6.7%	-48.8%	0.129501	0.042787	0.061884
Za	850	-983	-133	333.3%	-89.0%	-52.2%	0.018816	0.056151	0.008407
ZW	580	553	1133	93.5%	46.1%	182.7%	0.04575	0.060979	0.120805

Source: Own calculations based on UNIDO (2003) data

324: Footwear, except rubber or plastic

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	2367	-	-	1	-	-	-	-	-	12
Mw	501	273	375	1	-	3	1177	-	37	2	1	1
Mu	465	780	650	2	3	-	1839	1777	82	9	16	14
Mz	1210	1065	152	1	-	-	426	484	9	14	8	5
N	-	-		-	-	135	-	-	-	-	-	-
SA	27000	32000	21010	152	315	-	3995	4409	117	166	264	-
Sw	-	-	308	-	-	0	-	-	-	-	-	1
T	2387	314	2811	8	1	2	4	1		13	9	-
Za	1020	-	975	15	-	22	3666	-	44	6	-	9
ZW	4546	6051	6246	34	66		3374	3220	45	19	14	14

	Real Change			% Change			% of SADC		
B	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
L	0	2367	2367	0.0%	0.0%	0.0%	0.0%	0.0%	6.8%
Mw	-228	102	-126	-45.5%	37.4%	-25.1%	1.3%	0.7%	1.1%
Mu	315	-130	185	67.7%	-16.7%	39.8%	1.3%	1.9%	1.9%
Mz	-145	-913	-1058	-12.0%	-85.7%	-87.4%	3.3%	2.6%	0.4%
N	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SA	5000	-10990	-5990	18.5%	-34.3%	-22.2%	72.7%	79.0%	60.2%
Sw	0	308	308	0.0%	∞	∞	0.0%	0.0%	0.9%
T	-2073	2497	424	-86.8%	795.2%	17.8%	6.4%	0.8%	8.1%
Za	-1020	975	-45	-100.0%	∞	-4.4%	2.7%	0.0%	2.8%
ZW	1505	195	1700	33.1%	3.2%	37.4%	12.2%	14.9%	17.9%

Source: Own calculations based on UNIDO (2003) data

331: Wood products, except furniture

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	400	1400	965	1	5	1	2510	2505	199	16	25	59
L	-	-	21	-	-	-	-	-	-	-	-	3
Mw	1151	1800	2900	2	2	2	721	855	62	4	5	5
Mu	366	911	454	1	5	3	1637	1617	421	7	17	11
Mz	20	3074	1715	9	-	-	123078	801	11	1	8	11
N	255	255	2101	-	5	-	5826	5826	67	-	6	-
SA	53000	61000	72710	213	468	408	2641	3669	350	684	845	-
Sw	2540	1811	-	8	6	-	2075	2034	-	14	14	-
T	3485	4287	4898	7	3	2	4	1		72	80	-
Za	1682	4333	3126	8	8	10	1968	580	99	6	12	20
ZW	8678	5565	7815	38	43	32	2042	2833	117	34	29	26

	Real Change			% Change			% of SADC		
B	1000	-435	565	250.0%	-31.1%	141.3%	0.6%	1.7%	1.0%
L	0	21	21	0.0%	∞	∞	0.0%	0.0%	0.0%
Mw	649	1100	1749	56.4%	61.1%	152.0%	1.6%	2.1%	3.0%
Mu	545	-457	88	148.9%	-50.2%	24.0%	0.5%	1.1%	0.5%
Mz	3054	-1359	1695	15270.0%	-44.2%	8475.0%	0.0%	3.6%	1.8%
N	0	1846	1846	0.0%	723.9%	723.9%	0.4%	0.3%	2.2%
SA	8000	11710	19710	15.1%	19.2%	37.2%	74.0%	72.2%	75.2%
Sw	-729	-1811	-2540	-28.7%	-100.0%	-100.0%	3.5%	2.1%	0.0%
T	802	611	1413	23.0%	14.3%	40.5%	4.9%	5.1%	5.1%
Za	2651	-1207	1444	157.6%	-27.9%	85.9%	2.3%	5.1%	3.2%
ZW	-3113	2250	-863	-35.9%	40.4%	-9.9%	12.1%	6.6%	8.1%

Source: Own calculations based on UNIDO (2003) data

332: Furniture, except metal

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	572	896	251	0	0	-	779	-	61	8	92	12
Mw	555	205	-	1	-	-	1058	-	-	3	-	-
Mu	566	1430	1217	2	4	8	1620	2310	300	17	33	32
Mz	3290	1224	434	3	-	-	269	723	3	31	27	10
N	700	700	3580	-	5	-	2883	2883	38	-	17	-
SA	29000	43000	50260	218	307	304	5047	4638	345	1092	1516	-
Sw	-	-	589	-	-	3	-	-	148	-	-	6
T	1880	2415	2165	6	2	2	2	1		60	133	-
Za	1721	1432	1814	12	7	3	2008	632	56	18	12	33
ZW	5094	4934	6460	26	32	22	2687	2211	76	60	44	45

	Real Change			% Change			% of SADC		
B	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
L	324	-645	-321	56.6%	-72.0%	-56.1%	1.3%	1.6%	0.4%
Mw	-350	-205	-555	-63.1%	-100.0%	-100.0%	1.3%	0.4%	0.0%
Mu	864	-213	651	152.7%	-14.9%	115.0%	1.3%	2.5%	1.8%
Mz	-2066	-790	-2856	-62.8%	-64.5%	-86.8%	7.6%	2.2%	0.6%
N	0	2880	2880	0.0%	411.4%	411.4%	1.6%	1.2%	5.4%
SA	14000	7260	21260	48.3%	16.9%	73.3%	66.9%	76.5%	75.3%
Sw	0	589	589	0.0%	∞	∞	0.0%	0.0%	0.9%
T	535	-250	285	28.5%	-10.4%	15.2%	4.3%	4.3%	3.2%
Za	-289	382	93	-16.8%	26.7%	5.4%	4.0%	2.5%	2.7%
ZW	-160	1526	1366	-3.1%	30.9%	26.8%	11.7%	8.8%	9.7%

Source: Own calculations based on UNIDO (2003) data

341: Paper and products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
B	200	1500	1858	1	8	25	4541	5972	184	10	18	75
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	209	-	4800	2	12	7	760	3334701	58	2	9	11
Mu	156	402	806	1	4	8	1876	2293	220	3	15	16
Mz	800	648	304	2	-	-	1223	1510	31	4	4	3
N	70	70	102	-	0	-	8219	8219	388	-	3	-
SA	35000	49000	51050	591	1208	1044	6860	9197	565	283	386	-
Sw	1163	3764	3562	31	40	60	9098	6176	433	13	20	5
T	1647	5463	5369	8	6	35	2	2		8	8	-
Za	860	1575	941	15	6	3	4397	1241	92	12	12	13
ZW	2469	4691	4413	30	64	23	5133	5256	144	26	15	13

	Real Change			% Change			% of SADC		
B	1300	358	1658	650.0%	23.9%	829.0%	0.5%	2.2%	2.5%
L	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Mw	-209	4800	4591	-100.0%	∞	2196.7%	0.5%	0.0%	6.6%
Mu	246	404	650	157.7%	100.5%	416.7%	0.4%	0.6%	1.1%
Mz	-152	-344	-496	-19.0%	-53.1%	-62.0%	1.9%	1.0%	0.4%
N	0	32	32	0.0%	45.7%	45.7%	0.2%	0.1%	0.1%
SA	14000	2050	16050	40.0%	4.2%	45.9%	82.2%	73.0%	69.7%
Sw	2601	-202	2399	223.6%	-5.4%	206.3%	2.7%	5.6%	4.9%
T	3816	-94	3722	231.7%	-1.7%	226.0%	3.9%	8.1%	7.3%
Za	715	-634	81	83.1%	-40.3%	9.4%	2.0%	2.3%	1.3%
ZW	2222	-278	1944	90.0%	-5.9%	78.7%	5.8%	7.0%	6.0%

Source: Own calculations based on UNIDO (2003) data

342: Printing and publishing

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	313	362	320	0	0	-	2441	939	64	3	6	20
Mw	982	-	-	8	-	-	1841	-	-	7	-	-
Mu	1216	1606	1814	5	12	26	2157	3393	455	41	30	49
Mz	2710	2621	1535	8	-	-	787	814	12	25	24	13
N	867	867	680	-	11	-	7354	7354	599	-	17	-
SA	41000	50000	50780	548	763	654	8330	10412	564	1338	1627	-
Sw	-	-	505	-	-	4	-	-	399	-	-	20
T	2678	3439	2177	14	4	5	4	1		49	53	-
Za	1816	2546	2183	17	31	7	4589	1167	77	25	23	41
ZW	5143	5927	5028	59	94	31	6541	6716	182	77	69	70

	Real Change			% Change			% of SADC		
B	0	0	0	0	0	0	0.0%	0.0%	0.0%
L	49	-42	7	15.7%	-11.6%	2.2%	0.6%	0.5%	0.5%
Mw	-982	0	-982	-100.0%	-	-100.0%	1.7%	0.0%	0.0%
Mu	390	208	598	32.1%	13.0%	49.2%	2.1%	2.4%	2.8%
Mz	-89	-1086	-1175	-3.3%	-41.4%	-43.4%	4.8%	3.9%	2.4%
N	0	-187	-187	0.0%	-21.6%	-21.6%	1.5%	1.3%	1.0%
SA	9000	780	9780	22.0%	1.6%	23.9%	72.3%	74.2%	78.1%
Sw	0	505	505	-	-	-	0.0%	0.0%	0.8%
T	761	-1262	-501	28.4%	-36.7%	-18.7%	4.7%	5.1%	3.3%
Za	730	-363	367	40.2%	-14.3%	20.2%	3.2%	3.8%	3.4%
ZW	784	-899	-115	15.2%	-15.2%	-2.2%	9.1%	8.8%	7.7%

Source: Own calculations based on UNIDO (2003) data

351: Industrial chemicals

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	100	1000	1947	1	14	10	6573	6589	357	11	21	48
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	400	800	300	2	6	8	1536	1878	388	3	6	3
Mu	384	547	530	3	12	14	2927	3973	804	4	11	8
Mz	690	194	201	2	-	-	298	1060	70	23	6	3
N	895	895	151	-	27	-	7252	7252	4368	-	24	-
SA	34000	41000	93930	1005	932	1014	8648	12905	1296	247	267	-
Sw	527	350	7	11	2	0	5824	3405	248	10	17	1
T	3320	7595	1739	11	11	5	4	1		10	11	-
Za	1499	2056	1769	22	11	15	5436	2065	383	7	10	15
ZW	2769	3010	2682	58	115	40	6630	7684	384	18	12	11

	Real Change			% Change			% of SADC		
B	900	947	1847	900.0%	94.7%	1847.0%	0.2%	1.7%	1.9%
L	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mw	400	-500	-100	100.0%	-62.5%	-25.0%	0.9%	1.4%	0.3%
Mu	163	-17	146	42.4%	-3.1%	38.0%	0.9%	1.0%	0.5%
Mz	-496	7	-489	-71.9%	3.6%	-70.9%	1.5%	0.3%	0.2%
N	0	-744	-744	0.0%	-83.1%	-83.1%	2.0%	1.6%	0.1%
SA	7000	52930	59930	20.6%	129.1%	176.3%	76.3%	71.4%	91.0%
Sw	-177	-343	-520	-33.6%	-98.0%	-98.7%	1.2%	0.6%	0.0%
T	4275	-5856	-1581	128.8%	-77.1%	-47.6%	7.4%	13.2%	1.7%
Za	557	-287	270	37.2%	-14.0%	18.0%	3.4%	3.6%	1.7%
ZW	241	-328	-87	8.7%	-10.9%	-3.1%	6.2%	5.2%	2.6%

Source: Own calculations based on UNIDO (2003) data

352: Other chemicals

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-		-	-		-	-	
L	136	578	150	1	1	-	1907	1285	51	3	14	2
Mw	1007	900	1600	5	12	8	2446	4357	35	8	7	13
Mu	721	1089	1337	4	10	26	2011	2848	84	16	28	24
Mz	270	1886	1032	9	-	-	7670	1098	4	5	18	10
N	-	-		-	-	-	-	-	-	-	-	-
SA	43000	59000	-	638	1254	1167	8570	12244	-	597	663	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	1555	3036	2872	10	3	7	2	1		32	39	-
Za	3359	2916	2568	47	43	33	4144	1751	28	23	25	37
ZW	3976	5797	5244	80	127	55	6349	5736	56	52	47	45

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	442	-428	14	325.0%	-74.0%	10.3%	0.3%	0.8%	1.0%
Mw	-107	700	593	-10.6%	77.8%	58.9%	1.9%	1.2%	10.8%
Mu	368	248	616	51.0%	22.8%	85.4%	1.3%	1.4%	9.0%
Mz	1616	-854	762	598.5%	-45.3%	282.2%	0.5%	2.5%	7.0%
N	0	0	0	-	-	-	0.0%	0.0%	0.0%
SA	16000	-59000	-43000	37.2%	-100.0%	-100.0%	79.6%	78.5%	0.0%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	1481	-164	1317	95.2%	-5.4%	84.7%	2.9%	4.0%	19.4%
Za	-443	-348	-791	-13.2%	-11.9%	-23.5%	6.2%	3.9%	17.3%
ZW	1821	-553	1268	45.8%	-9.5%	31.9%	7.4%	7.7%	35.4%

Source: Own calculations based on UNIDO (2003) data

353: Petroleum refineries

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	-	-	-	-	-	-	-	-	-	-	-	-
Mu	-	-	-	-	-	-	-	-	-	-	-	-
Mz	1370	457	0	2	-	-	379	1135	27	2	2	1
N	-	-	331	-	-	-	-	-	-	-	-	-
SA	13000	18000	18410	633	1243	1157	6495	12089	362	-	32	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	973	485	369	15	5	6	3	0		-	1	-
Za	336	471	458	9	12	12	8539	2264	173	2	3	1
ZW	22	-	-	0	-	-	394	-	-	-	-	-

	Real Change			% Change			% of SADC		
B	0	0	0	0	0	0	0.0%	0.0%	0.0%
L	0	0	0	0	0	0	0.0%	0.0%	0.0%
Mw	0	0	0	0	0	0	0.0%	0.0%	0.0%
Mu	0	0	0	0	0	0	0.0%	0.0%	0.0%
Mz	-913	-457	-1370	-66.6%	-100.0%	-100.0%	8.7%	2.4%	0.0%
N	0	331	331	0	-	-	0.0%	0.0%	1.7%
SA	5000	410	5410	38.5%	2.3%	41.6%	82.8%	92.7%	94.1%
Sw	0	0	0	0	0	0	0.0%	0.0%	0.0%
T	-488	-116	-604	-50.2%	-23.9%	-62.1%	6.2%	2.5%	1.9%
Za	135	-13	122	40.2%	-2.8%	36.3%	2.1%	2.4%	2.3%
ZW	-22	0	-22	-100.0%	0	-100.0%	0.1%	0.0%	0.0%

Source: Own calculations based on UNIDO (2003) data

354: Misc. petroleum and coal products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	-	-	-	-	-	-	-	-	-	-	-	-
Mu	-	-	-	-	-	-	-	-	-	-	-	-
Mz	-	-	0	-	-	-	-	-	-	-	-	-
N	-	-		-	-	-	-	-	-	-	-	-
SA	4000	6000	-	110	217	202	0	11982	-	-	69	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	-	-	0	-	-	-	-	-		-	-	-
Za	112	-	-	3	-	-	-	-	-	1	-	3
ZW	348	-	-	7	-	-	-	-	-	-	-	-

	Real Change			% Change			% of SADC		
B	0	0	0	0	0	0	0.0%	0.0%	0
L	0	0	0	0	0	0	0.0%	0.0%	0
Mw	0	0	0	0	0	0	0.0%	0.0%	0
Mu	0	0	0	0	0	0	0.0%	0.0%	0
Mz	0	0	0	0	0	0	0.0%	0.0%	0
N	0	0	0	0	0	0	0.0%	0.0%	0
SA	2000	-6000	-4000	50.0%	-100.0%	-100.0%	89.7%	100.0%	0
Sw	0	0	0	0	0	0	0.0%	0.0%	0
T	0	0	0	0	0	0	0.0%	0.0%	0
Za	-112	0	-112	-100.0%	0	-100.0%	2.5%	0.0%	0
ZW	-348	0	-348	-100.0%	0	-100.0%	7.8%	0.0%	0

Source: Own calculations based on UNIDO (2003) data

355: Rubber products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	147	138	600	1	6	1	1960	10091	17	2	7	5
Mu	315	340	227	1	2	2	1663	2295	95	9	10	9
Mz	660	953	550	3	-	-	6536	4527	16	6	5	3
N	-	-	176	-	-	-	-	-	-	-	-	-
SA	20000	18000	16010	297	400	268	7190	9555	193	95	185	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	1370	859	879	11	1	7	2	1		9	7	-
Za	1566	1517	980	20	16	6	4696	5890	55	4	8	6
ZW	2259	2869	2902	30	37	29	4995	4546	55	20	12	14

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mw	-9	462	453	-6.1%	334.8%	308.2%	0.6%	0.6%	2.7%
Mu	25	-113	-88	7.9%	-33.2%	-27.9%	1.2%	1.4%	1.0%
Mz	293	-403	-110	44.4%	-42.3%	-16.7%	2.5%	3.9%	2.5%
N	0	176	176	-	-	-	0.0%	0.0%	0.8%
SA	-2000	-1990	-3990	-10.0%	-11.1%	-20.0%	76.0%	72.9%	71.7%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	-511	20	-491	-37.3%	2.3%	-35.8%	5.2%	3.5%	3.9%
Za	-49	-537	-586	-3.1%	-35.4%	-37.4%	6.0%	6.1%	4.4%
ZW	610	33	643	27.0%	1.2%	28.5%	8.6%	11.6%	13.0%

Source: Own calculations based on UNIDO (2003) data

356: Plastic products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	23	-	-	-	-	-	-	-	-	1
Mw	464	962	900	2	-	3	1396	-	34	5	-	6
Mu	315	1195	1095	1	6	10	1406	2275	191	11	35	32
Mz	930	980	369	2	-	-	3871	3674	25	13	6	4
N	-	-		-	-	-	-	-	-	-	-	-
SA	25000	44000	40820	354	559	546	6574	7431	282	507	837	-
Sw	-	-	39	-	-	1	-	-	-	-	-	2
T	801	491	787	8	0	0	1	0		5	8	-
Za	423	527	685	7	6	4	3666	1595	67	10	9	13
ZW	2206	3161	3377	25	47	17	4376	4462	91	31	22	20

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	23	23	-	-	-	0.0%	0.0%	0.0%
Mw	498	-62	436	107.3%	-6.4%	94.0%	1.5%	1.9%	1.9%
Mu	880	-100	780	279.4%	-8.4%	247.6%	1.0%	2.3%	2.3%
Mz	50	-611	-561	5.4%	-62.3%	-60.3%	3.1%	1.9%	0.8%
N	0	0	0	-	-	-	0.0%	0.0%	0.0%
SA	19000	-3180	15820	76.0%	-7.2%	63.3%	82.9%	85.7%	84.9%
Sw	0	39	39	-	-	-	0.0%	0.0%	0.1%
T	-310	296	-14	-38.7%	60.3%	-1.7%	2.7%	1.0%	1.6%
Za	104	158	262	24.6%	30.0%	61.9%	1.4%	1.0%	1.4%
ZW	955	216	1171	43.3%	6.8%	53.1%	7.3%	6.2%	7.0%

Source: Own calculations based on UNIDO (2003) data

361: Pottery, china and earthenware

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	-	-	-	-	-	-	-	-	-	-	-	-
Mu	-	65	53	-	0	0	-	1449	216	1	3	2
Mz	80	80	0	0	-	-	444	444	-	1	1	-
N	-	-		-	-	-	-	-	-	-	-	-
SA	3000	6000	66550	28	42	36	5992	5025	466	81	123	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	-	42	84	-	0	0	-	0		23	3	-
Za	89	538	256	1	7	0	3690	1560	111	2	4	1
ZW	391	800	436	3	3	1	2359	2145	60	7	5	4

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mw	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mu	65	-12	53	-	-18.5%	-	0.0%	0.9%	0.1%
Mz	0	-80	-80	0.0%	-100.0%	-100.0%	2.2%	1.1%	0.0%
N	0	0	0	-	-	-	0.0%	0.0%	0.0%
SA	3000	60550	63550	100.0%	1009.2%	2118.3%	84.3%	79.7%	98.8%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	42	42	84	-	100.0%	-	0.0%	0.6%	0.1%
Za	449	-282	167	504.5%	-52.4%	187.6%	2.5%	7.1%	0.4%
ZW	409	-364	45	104.6%	-45.5%	11.5%	11.0%	10.6%	0.6%

Source: Own calculations based on UNIDO (2003) data

362: Glass and products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	25	-	-	-	-	-	-	-	-	5
Mw	-	-	-	-	-	-	-	-	-	-	-	-
Mu	21	51	94	0	0	1	1456	3034	41	1	1	3
Mz	870	1023	178	2	-	-	3948	3357	-	1	3	1
N	-	-		-	-	-	-	-	-	-	-	-
SA	10000	10000	9750	154	292	280	4879	9701	103	58	76	-
Sw	234	572	64	1	3	0	2356	2666	10	12	13	1
T	299	649	690	0	-1	1	0	0		-	1	-
Za	288	-	-	3	-	-	3416	-	-	2	-	1
ZW	583	900	987	9	9	3	5837	4902	26	5	5	5

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	25	25	-	-	-	0.0%	0.0%	0.2%
Mw	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mu	30	43	73	142.9%	84.3%	347.6%	0.2%	0.4%	0.8%
Mz	153	-845	-692	17.6%	-82.6%	-79.5%	7.1%	7.8%	1.5%
N	0	0	0	-	-	-	0.0%	0.0%	0.0%
SA	0	-250	-250	0.0%	-2.5%	-2.5%	81.3%	75.8%	82.7%
Sw	338	-508	-170	144.4%	-88.8%	-72.6%	1.9%	4.3%	0.5%
T	350	41	391	117.1%	6.3%	130.8%	2.4%	4.9%	5.9%
Za	-288	0	-288	-100.0%	-	-100.0%	2.3%	0.0%	0.0%
ZW	317	87	404	54.4%	9.7%	69.3%	4.7%	6.8%	8.4%

Source: Own calculations based on UNIDO (2003) data

369: Other non-metallic mineral products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	1214	-	-	-	-	-	4	-	-	-
L	219	1098	575	0	0	-	874	466	11	6	41	21
Mw	1900	900	707	3	2	8	713	1099	33	4	3	2
Mu	1675	1252	1476	6	11	32	1665	2461	112	27	15	33
Mz	430	3424	1241	12	-	-	15682	1969	7	4	10	10
N	1170	1170	125	-	12	-	3710	3710	591	-	28	-
SA	67000	71000	-	754	794	742	4983	6347	-	1073	1155	-
Sw	-	-	365	-	-	2	-	-	-	-	-	7
T	2604	3048	3400	11	5	16	3	1		-	17	-
Za	3152	2604	2554	33	33	10	2205	1899	30	15	13	24
ZW	6136	5900	7681	44	54	63	2848	3746	33	43	33	35

	Real Change			% Change			% of SADC		
B	0	1214	1214	-	-	-	0.0%	0.0%	6.3%
L	879	-523	356	401.4%	-47.6%	162.6%	0.3%	1.2%	3.0%
Mw	-1000	-193	-1193	-52.6%	-21.4%	-62.8%	2.3%	1.0%	3.7%
Mu	-423	224	-199	-25.3%	17.9%	-11.9%	2.0%	1.4%	7.6%
Mz	2994	-2183	811	696.3%	-63.8%	188.6%	0.5%	3.8%	6.4%
N	0	-1045	-1045	0.0%	-89.3%	-89.3%	1.4%	1.3%	0.6%
SA	4000	-71000	-67000	6.0%	-100.0%	-100.0%	79.5%	78.5%	0.0%
Sw	0	365	365	-	-	-	0.0%	0.0%	1.9%
T	444	352	796	17.1%	11.5%	30.6%	3.1%	3.4%	17.6%
Za	-548	-50	-598	-17.4%	-1.9%	-19.0%	3.7%	2.9%	13.2%
ZW	-236	1781	1545	-3.8%	30.2%	25.2%	7.3%	6.5%	39.7%

Source: Own calculations based on UNIDO (2003) data

371: Iron and steel

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	109	-	-	-	-	-	227	-	-	4
Mw	-	-	-	-	-	-	-	-	-	-	-	-
Mu	1299	574	517	7	4	7	2458	3856	458	36	8	8
Mz	1510	1713	222	2	-	-	1165	1027	19	10	10	5
N	-	-	1175	-	-	-	-	-	-	-	-	-
SA	102000	80000	62120	2133	2342	2207	8799	11793	1007	211	178	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	1255	3672	527	6	3	1	2	0		5	2	-
Za	1090	1238	1035	10	8	4	3832	1948	208	5	5	10
ZW	14032	16000	11774	194	184	86	5445	5778	163	26	22	19

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	109	109	-	-	-	0.0%	0.0%	0.1%
Mw	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mu	-725	-57	-782	-55.8%	-9.9%	-60.2%	1.1%	0.6%	0.7%
Mz	203	-1491	-1288	13.4%	-87.0%	-85.3%	1.2%	1.7%	0.3%
N	0	1175	1175	-	-	-	0.0%	0.0%	1.5%
SA	-22000	-17880	-39880	-21.6%	-22.4%	-39.1%	84.2%	77.5%	80.2%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	2417	-3145	-728	192.6%	-85.6%	-58.0%	1.0%	3.6%	0.7%
Za	148	-203	-55	13.6%	-16.4%	-5.0%	0.9%	1.2%	1.3%
ZW	1968	-4226	-2258	14.0%	-26.4%	-16.1%	11.6%	15.5%	15.2%

Source: Own calculations based on UNIDO (2003) data

372: Non-ferrous metals

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	223	-	-	-	-	-	35	-	-	-
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	-	-	-	-	-	-	-	-	-	-	-	-
Mu	-	-	-	-	-	-	-	-	-	-	-	-
Mz	160	-	89	-	-	-	-	-	-	1	-	-
N	-	-		-	-	-	-	-	-	-	-	-
SA	18000	21000	19330	555	641	1238	8702	9515	319	111	116	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	-	695	868	-	3	7	-	0		-	4	-
Za	112	139	100	2	1	0	3623	613	26	2	2	2
ZW	928	1400	1162	10	13	8	5442	3676	35	12	7	6

	Real Change			% Change			% of SADC		
B	0	223	223	-	-	-	0.0%	0.0%	1.0%
L	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mw	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mu	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mz	-160	89	-71	-100.0%	-	-44.4%	0.8%	0.0%	0.4%
N	0	0	0	-	-	-	0.0%	0.0%	0.0%
SA	3000	-1670	1330	16.7%	-8.0%	7.4%	93.8%	90.4%	88.8%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	695	173	868	-	24.9%	-	0.0%	3.0%	4.0%
Za	27	-39	-12	24.1%	-28.1%	-10.7%	0.6%	0.6%	0.5%
ZW	472	-238	234	50.9%	-17.0%	25.2%	4.8%	6.0%	5.3%

Source: Own calculations based on UNIDO (2003) data

381: Fabricated metal products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**	**1980**	**1990**	**1999**
B	500	4500	2108	3	-	34	4709	2907	534	21	43	144
L	208	1143	249	1	1	-	1086	-	-	4	74	13
Mw	1600	1400	1100	6	12	9	1308	1016	215	12	9	10
Mu	-	1137	1361	-	14	14	-	2834	764	-	39	37
Mz	550	2476	809	14	-	-	3618	804	45	22	17	11
N	1449	1449	532	-	25	-	8221	8221	3347	-	32	-
SA	136000	137000	122800	1574	1696	1391	6694	7851	1076	2958	3955	-
Sw	504	563	618	4	5	7	4427	4383	-	23	27	17
T	2890	3923	4797	20	3	5	5	1		43	85	-
Za	5034	5718	4275	50	42	16	3738	2179	248	61	67	77
ZW	15240	15800	13135	132	135	64	4018	3545	307	206	171	175

	Real Change			% Change			% of SADC		
B	4000	-2392	1608	800.0%	-53.2%	321.6%	0.3%	2.6%	1.4%
L	935	-894	41	449.5%	-78.2%	19.7%	0.1%	0.7%	0.2%
Mw	-200	-300	-500	-12.5%	-21.4%	-31.3%	1.0%	0.8%	0.7%
Mu	1137	224	1361	-	19.7%	-	0.0%	0.6%	0.9%
Mz	1926	-1667	259	350.2%	-67.3%	47.1%	0.3%	1.4%	0.5%
N	0	-917	-917	0.0%	-63.3%	-63.3%	0.9%	0.8%	0.4%
SA	1000	-14200	-13200	0.7%	-10.4%	-9.7%	82.9%	78.2%	80.9%
Sw	59	55	114	11.7%	9.8%	22.6%	0.3%	0.3%	0.4%
T	1033	874	1907	35.7%	22.3%	66.0%	1.8%	2.2%	3.2%
Za	684	-1443	-759	13.6%	-25.2%	-15.1%	3.1%	3.3%	2.8%
ZW	560	-2665	-2105	3.7%	-16.9%	-13.8%	9.3%	9.0%	8.7%

Source: Own calculations based on UNIDO (2003) data

382: Machinery, except electrical

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	1472	-	-	-	-	-	-	-	-	5
Mw	-	619	1200	-	1	5	-	2131	107	1	4	5
Mu	721	465	659	3	4	6	3225	3661	421	10	5	13
Mz	1120	1262	185	2	-	-	1040	923	72	8	13	-
N	160	160	213	-	2	-	6585	6585	385	-	9	-
SA	83000	82000	69410	1349	1432	1227	9313	9908	761	1894	2569	-
Sw	565	373	-	2	2	-	3192	1348	-	3	5	-
T	1147	1810	2019	3	2	2	2	1		15	31	-
Za	957	1116	2223	18	8	14	5301	2385	198	18	9	18
ZW	4786	3500	2501	39	43	12	3715	4027	145	37	42	36

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	1472	1472	-	-	-	0.0%	0.0%	1.8%
Mw	619	581	1200	-	93.9%	-	0.0%	0.7%	1.5%
Mu	-256	194	-62	-35.5%	41.7%	-8.6%	0.8%	0.5%	0.8%
Mz	142	-1077	-935	12.7%	-85.3%	-83.5%	1.2%	1.4%	0.2%
N	0	53	53	0.0%	33.1%	33.1%	0.2%	0.2%	0.3%
SA	-1000	-12590	-13590	-1.2%	-15.4%	-16.4%	89.8%	89.8%	86.9%
Sw	-192	-373	-565	-34.0%	-100.0%	-100.0%	0.6%	0.4%	0.0%
T	663	209	872	57.8%	11.5%	76.0%	1.2%	2.0%	2.5%
Za	159	1107	1266	16.6%	99.2%	132.3%	1.0%	1.2%	2.8%
ZW	-1286	-999	-2285	-26.9%	-28.5%	-47.7%	5.2%	3.8%	3.1%

Source: Own calculations based on UNIDO (2003) data

383: Machinery electric

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	147	-	-	-	-	-	-	-	-	2
Mw	594	-	-	5	-	-	1592	-	-	4	-	-
Mu	1497	914	578	3	5	7	1348	2495	757	10	23	17
Mz	940	1214	280	3	-	-	3727	2886	66	5	9	3
N	-	-	494	-	-	-	-	-	-	-	-	-
SA	70000	86000	119120	1227	970	1342	7796	8885	1139	845	1201	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	1279	1248	1611	6	4	7	2	0		7	9	-
Za	1719	1350	-	27	30	-	5293	3684	-	20	12	10
ZW	5280	6400	5743	44	88	37	3738	4770	246	77	60	53

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	147	147	-	-	-	0.0%	0.0%	0.1%
Mw	-594	0	-594	-100.0%	-	-100.0%	0.7%	0.0%	0.0%
Mu	-583	-336	-919	-38.9%	-36.8%	-61.4%	1.8%	0.9%	0.5%
Mz	274	-934	-660	29.1%	-76.9%	-70.2%	1.2%	1.2%	0.2%
N	0	494	494	-	-	-	0.0%	0.0%	0.4%
SA	16000	33120	49120	22.9%	38.5%	70.2%	86.1%	88.5%	93.1%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	-31	363	332	-2.4%	29.1%	26.0%	1.6%	1.3%	1.3%
Za	-369	-1350	-1719	-21.5%	-100.0%	-100.0%	2.1%	1.4%	0.0%
ZW	1120	-657	463	21.2%	-10.3%	8.8%	6.5%	6.6%	4.5%

Source: Own calculations based on UNIDO (2003) data

384: Transport equipment

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	-	-	-	-	-	-	-	-	-	-
Mw	205	587	-	1	-	-	2721	-	-	2	-	-
Mu	844	483	460	2	4	6	1278	2159	474	5	6	11
Mz	1240	2487	475	7	-	-	1425	711	34	5	9	2
N	-	-	625	-	-	-	-	-	-	-	-	-
SA	106000	104000	87720	1257	1704	2103	7462	10082	1011	1099	1258	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	4747	2876	3027	19	2	15	6	1		26	40	-
Za	1293	957	561	28	7	2	4362	2504	165	16	8	11
ZW	4295	7036	5000	38	81	30	4552	4562	232	58	56	50

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mw	382	-587	-205	186.3%	-100.0%	-100.0%	0.2%	0.5%	0.0%
Mu	-361	-23	-384	-42.8%	-4.8%	-45.5%	0.7%	0.4%	0.5%
Mz	1247	-2012	-765	100.6%	-80.9%	-61.7%	1.0%	2.1%	0.5%
N	0	625	625	-	-	-	0.0%	0.0%	0.6%
SA	-2000	-16280	-18280	-1.9%	-15.7%	-17.2%	89.4%	87.8%	89.6%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	-1871	151	-1720	-39.4%	5.3%	-36.2%	4.0%	2.4%	3.1%
Za	-336	-396	-732	-26.0%	-41.4%	-56.6%	1.1%	0.8%	0.6%
ZW	2741	-2036	705	63.8%	-28.9%	16.4%	3.6%	5.9%	5.1%

Source: Own calculations based on UNIDO (2003) data

385: Professional & scientific equipment

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	-	-	-	-	-	-	-	-	-	-	-	-
L	-	-	7	-	-	-	-	-	-	-	-	1
Mw	-	-	-	-	-	-	-	-	-	-	-	-
Mu	425	1365	1513	2	13	10	1113	3169	31	9	13	16
Mz	100	72	0	-	-	-	1475	2048	-	-	1	1
N	-	-	570	-	-	-	-	-	-	-	-	-
SA	5000	7000	7050	49	160	155	5649	8117	59	215	288	-
Sw	-	-	-	-	-	-	-	-	-	-	-	-
T	-	117	118	-	0	0	-	0		-	4	-
Za	-	-	44	-	-	0	-	-	13	-	-	1
ZW	179	100	171	2	2	1	3814	6536	13	14	13	9

	Real Change			% Change			% of SADC		
B	0	0	0	-	-	-	0.0%	0.0%	0.0%
L	0	7	7	-	-	-	0.0%	0.0%	0.1%
Mw	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mu	940	148	1088	221.2%	10.8%	256.0%	7.5%	15.8%	16.0%
Mz	-28	-72	-100	-28.0%	-100.0%	-100.0%	1.8%	0.8%	0.0%
N	0	570	570	-	-	-	0.0%	0.0%	6.0%
SA	2000	50	2050	40.0%	0.7%	41.0%	87.7%	80.9%	74.4%
Sw	0	0	0	-	-	-	0.0%	0.0%	0.0%
T	117	1	118	-	0.9%	-	0.0%	1.4%	1.2%
Za	0	44	44	-	-	-	0.0%	0.0%	0.5%
ZW	-79	71	-8	-44.1%	71.0%	-4.5%	3.1%	1.2%	1.8%

Source: Own calculations based on UNIDO (2003) data

390: Other manufactured products

	Employees			MVA (US$ millions)			Average wage per employee (US$)			Establishments		
	1980	1990	1999	1980	1990	1999	1980	1990	1999	1980	1990	1999
B	1300	4600	2158	18	-	16	2602	3328	53	42	56	178
L	298	763	-	0	0	-	151	358	.	3	29	-
Mw				-	-	-	-	-	-	-	-	-
Mu	1115	3751	3517	4	16	20	1449	2047	91	19	70	51
Mz	80	265	16	2	-	-	1803	544	-	1	2	1
N	121	121	112	-	0	-	4203	4203	140	-	8	-
SA	21000	25000	22270	415	448	359	5747	5148	160	932	1130	-
Sw	140	22	14	0	0	0	2699	756	0	6	4	4
T	863	871	1053	2	2	1	1	0		13	20	-
Za	158	335	242	2	2	0	4895	1072	23	15	8	8
ZW	2395	1800	2393	17	13	5	3243	2678	26	63	46	42

	Real Change			% Change			% of SADC		
B	3300	-2442	858	253.8%	-53.1%	66.0%	4.7%	12.3%	6.8%
L	465	-763	-298	156.0%	-100.0%	-100.0%	1.1%	2.0%	0.0%
Mw	0	0	0	-	-	-	0.0%	0.0%	0.0%
Mu	2636	-234	2402	236.4%	-6.2%	215.4%	4.1%	10.0%	11.1%
Mz	185	-249	-64	231.3%	-94.0%	-80.0%	0.3%	0.7%	0.1%
N	0	-9	-9	0.0%	-7.4%	-7.4%	0.4%	0.3%	0.4%
SA	4000	-2730	1270	19.0%	-10.9%	6.0%	76.4%	66.6%	70.1%
Sw	-118	-8	-126	-84.3%	-36.4%	-90.0%	0.5%	0.1%	0.0%
T	8	182	190	0.9%	20.9%	22.0%	3.1%	2.3%	3.3%
Za	177	-93	84	112.0%	-27.8%	53.2%	0.6%	0.9%	0.8%
ZW	-595	593	-2	-24.8%	32.9%	-0.1%	8.7%	4.8%	7.5%

Source: Own calculations based on UNIDO (2003) data

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