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Economic Geography and the Implications of a Free Trade Area within SADC

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LIST OF ABBREVIATIONS

CMA	Common Monetary Area
COMESA	Common Market for Eastern and Southern Africa
CU	Customs Union
DBSA	Development Bank of Southern Africa
EEC	European Economic Community
IDC	Industrial Development Corporation
IMF	International Monetary Fund

JIT	Just in Time
NAFTA	North American Free Trade Area
NTB	Non-Tariff Barrier
RIA	Regional Integration Agreement
SACU	Southern African Customs Union
SADC	Southern African Development Community
SADCC	Southern African Development Coordination Conference

ABSTRACT

This study investigates the impact of a free trade area (FTA) on industrial distribution within the Southern African Development Community (SADC). As such the study is grounded in new theories of international trade analysing the impact of trade agreements on countries of different sizes. SADC represents a consortium of countries of radically different size, and further trade integration has given rise to concern of polarisation of industry to the larger countries. The study applies existing international experience and theory to the SADC scenario.

An analysis of industrial location Gini coefficients is used to measure distribution of industry in the region with regard to external economies. Coefficients are calculated for the industries of five SADC countries and again for South African provinces, which are then compared to US coefficients. Thus the analysis takes three parts. Firstly, Gini coefficients are calculated for industries from the five SADC countries, South Africa, Zimbabwe, Mauritius, Malawi and Botswana over a fourteen year time period (1985 – 1999). Secondly, the SADC situation is compared to the present extent of localisation of South African industries. Lastly, a trend path is inferred from localisation experience in the USA over the last century.

Using the above analyses, two scenarios are established. The first scenario uses the South African experience as a basis of completed integration within a Southern African setting. It is found that in the short term there is likely to be polarisation of industry towards the core. The following industries are most likely to be affected by agglomeration forces, apparel, textiles, furniture and fixtures and electrical machinery. However, as transport costs decrease further with reductions in non-tariff barriers, the pull of the low wage periphery will eventually dominate the initial centripetal forces. Thus, the Krugman and Venables (1995) *U-shaped* pattern of localisation occurs. The second scenario envisages that SADC is already at an advanced stage of the *U-shaped* cycle, where agglomeration forces are presently near their height. This would indicate a lower value of polarisation towards the core. Both scenarios lead to the conclusion that the cycle will result in a net gain of manufacturing to the periphery. This is because dispersion forces will affect a larger base of manufacturing than will be influenced by the pull to the core.

In order for the peripheral countries to gain, it is thus imperative that member countries are locked into the agreement and that integration goes 'all the way'. It is not sufficient for tariffs to be reduced in isolation. Other transport costs (*i.e.* NTBs) need to be reduced as rapidly as possible, for it is at intermediate levels of transport costs that industrial agglomeration towards the core is likely to take place.

1. INTRODUCTION

An explosion of regional integration agreements (RIAs) has transformed an already globalised world. The success of the European Union and more recently NAFTA has led to a trend of regional agreements. In Africa these developments although closely tied to trade agreements, place a strong emphasis on industrialisation (Mytelka, 1975:240). Even though the focus of regional agreements is moving away from the import substitution methods of industrialisation, and more towards multilateralism it is hoped that increased openness will be the primary growth stimulus. Thus, most Southern African countries have moved away from the import-substitution policies of the 1970s and 1980s and have embarked upon RIAs as a progressive step towards industrialisation. However, in light of South Africa's economic dominance in the region, legitimate concerns arise of polarisation of industry from the smaller countries towards South Africa with a further opening of trade. This is a particular worry as experiments with openness under IMF liberalisation programs have led to the closure of many small country domestic industries.

This paper will investigate the likely core-periphery industrial movements within SADC in the light of new theories of economic geography. Section Two will give a brief overview of the levels of industrialisation and regional integration within SADC. Section Three introduces economic geography and will present the case for analysis using dynamic theories of trade. This will be followed by various time-series studies in light of the preceding theory in Section Four. Finally, in Section Five conclusions will be presented together with policy implications, and areas for further research.

2. REGIONAL TRADE AGREEMENTS AND SADC

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 have largely been focused on reducing dependence on first world countries and apartheid South Africa (Steel and Evans, 1986:3), such as the Common Monetary Area (CMA), the Common Market for Eastern and Southern Africa (COMESA), its predecessor, the PTA, and the Southern African Development Community (SADC). 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 part of COMESA.

The Southern African Development Community (SADC) was initiated in 1980 as the Southern African Development Coordination Conference (SADCC). The purpose of SADCC was primarily as a means of regional coordination in order to reduce economic dependence on South Africa. With the demise of apartheid, South Africa was accepted as a member, along with four additional countries and a greater focus was placed on trade integration as members sought access to the large market of South Africa. On the 25th of January 2000 the SADC Protocol on Trade was ratified

by some member states initiating the implementation of a free trade area over 8 to 10 years.

Table 1: SADC in figures: general indicators

	LAND AREA (KM^2)	POPULATION (MILLION)	GDP: CURRENT PRICES (US$ MILLION)	GDP GROWTH (%)	GDP PER CAPITA (US$)	INFLATION (%)	FDI (% OF GDP)
Country		1999	1999	2000	1999	1999	1990-1999
Angola	1,247,000	12.94	5606	7	433	329	5.7
Botswana	585,000	1.61	5021	6.5	3117	7.2	0.3
Congo D. R.	2,345,409	49.3	10000	5	203	243	0.0
Lesotho	30,355	2.1	917	4	437	12.3	13.9
Malawi	118,484	10	1816	3	182	44.9	1.3
Mauritius	1,865	1.18	4230	8	3582	6.9	0.8
Mozambique	790,380	16.84	4068	8	242	6.2	2.7
Namibia	824,269	1.77	2914	2.5	1647	8.6	3.3
Seychelles	455	0.08	591	2	7346	6.3	6.8
South Africa	1,223,201	43.05	131049	3.2	3044	5.2	0.6
Swaziland	17,000	1.02	1281	3	1255	7	5.3
Tanzania	945,000	31.6	7667	5.5	243	7.8	1.3
Zambia	752,614	10.42	3150	3	302	20.6	3.5
Zimbabwe	390,757	13.08	3632	-3	278	58.5	1.3
Total/Average	9,274,789	195	181943	3.5	933	8.2	

Sources: 1990 and 1995 CSOs of SADC Member States and ECA. 2000 UN, World Population Prospects, 1999 Revision, 2000 estimates are from IMF, World Economic Outlook, May 2000, SADC Secretariat, World Debt Tables 1996, Jenkins and Thomas, (2002:3).

The SADC region represents a cumulative GDP of US$ 181,943 million, however, the majority of this value is contributed by South Africa. Manufactured value added (MVA) has grown by 6 percent in the period 1991 to 1998. However, taking the disproportionately rapid MVA growth rates of Mozambique and Tanzania the real growth rate for this period is estimated to be around 1 percent (Imani Development, 2001:6). The overall share of manufacturing to GDP has fallen during this time,

spurred by significant declines in the manufacturing sector in Zimbabwe, and a sluggish South Africa (Imani Development, 2001:7).

Table 2: Manufacturing in SADC

COUNTRY	SHARE OF MANUFACTURING SECTOR TO GDP (%) 1998	GROWTH OF MANUFACTURING VALUE ADDED (MVA) 1998	UNWEIGHTED AVERAGE GROWTH OF MANUFACTURING VALUE ADDED (MVA) (1991-98)
Angola	6.5	5.0	- 0.5
Botswana	4.8	4.7	3.9
Lesotho	17.0	10.4	9.6
Malawi	13.2	-2.9	- 1.5
Mauritius	24.7	6.1	5.6
Mozambique	14.7	124.9	31.8
Namibia	14.2*	5.30	6.4
South Africa	23.7	-2.7	0.4
Swaziland	25.9*	1.20	3.0
Tanzania	6.9*	8.0	16.3
Zambia	12.0	13.5	- 1.3
Zimbabwe	15.2	-0.7	- 1.1
Comparative average*	14.7*	14.4	6

Source: Imani Development (2001:5)
* 1997 figures

3. ECONOMIC GEOGRAPHY

3.1 The Case For a Dynamic Approach

Traditionally RIAs have been evaluated *vis-à-vis* static trade effects. This standard neoclassical view assumes resources to be internationally mobile, while there is free trade of goods with little attention paid to transport costs. Additionally, production occurs under constant returns to scale and diminishing marginal returns, with a strong focus on comparative advantage.

It can be argued that conditions in SADC are not conducive to large static gains. This is because production structures are not complementary as only a small proportion of total trade is conducted within the region, and members compete for the same overseas markets (Kirkpatrick, 1998:9). Over whether trade creation versus trade diversion will result there remains dispute (See Holden, 1996; Evans 2000), but whatever the direction the magnitude of these static effects is generally considered fairly small (Winters, 1999:23). Thus, proponents of regional agreements have recently turned to the dynamic effects for justification of integration.

Dynamic effects are the ongoing effects on a country's economic structure and performance under the conditions of a RIA (Appleyard and Field, 1998:361). This is a relatively new and increasingly important field of research that incorporates a new

wave of literature from the 1970s modelling the effects of regional integration under conditions of imperfect competition (McCarthy, 1999:382; Holmes and Smith, 1998:67 and Winters, 1999:23). Part of the reason for the late development of these theories is the inherent complexity of modelling dynamic effects empirically. Although there have been a number of studies conducted recently, this is a new and complex body of theory that still requires much attention, particularly when analysing the integration of countries of different size and stages of development. Most of the present literature available has come from studies within the EU and the analysis of internal industrial movements within the USA.

A number of authors have emphasised the importance of dynamic effects. Henrekson, Tostensson and Torstensson (1997) find that European integration has significantly increased member country growth rates. The Cecchini report (in Holmes and Smith, 1998:64) likewise indicates that the dynamic effects of the EU accounted for five percent of GDP in the later 1980s. Molle (1997:440) estimates that the GDP of the lower income countries of Spain, Portugal, Greece and Ireland was significantly higher as a result of further integration. So what exactly are these dynamic effects?

There is a great air of mystery that surrounds dynamic effects, as they are often difficult to pinpoint. However, a number of general effects can be highlighted.

1. **Increased economic efficiency** – from increased competition and pressure for higher productivity (Mutambara, 2001:89). In particular, the Cecchini report (in Holmes and Smith, 1998:68) highlights the beneficial effect of regional integration on corporate behaviour. Additionally, specialisation may result, generating economies of scale and greater intra-industry trade.
2. **Increased capacity utilisation and industrial maturity** – from larger markets that result from integration. Infant industries also have a chance to blossom in a semi-protected environment before being exposed to worldwide competition. Kennes (1998:31) argues that successful integration amongst the countries of the South would ultimately facilitate future North-South integration.
3. **Greater investment** – could result from the reduction in risk and market uncertainty (Blomstrom, 1997). Firms would also wish to invest in the union in order to avoid being frozen out later. Jenkins and Thomas (2002:24), find local market size to be the most important factor *vis-à-vis* foreign direct investment, and thus conclude that a "functioning and sustainable free trade area is more likely to offer the economies of scale required for investment to be profitable and thus should encourage more direct investment in the region."
4. **Increased credibility and security** – This is a vital factor especially within developing countries where investor confidence is often critically low. This may be through time consistency, i.e. countries are 'locked into' reforms; signalling to the rest of the world; insurance against future negative events; increased bargaining power and means of a coordination device (Fernandez, 1998:39-44). Fernandez, (1998:46) goes so far to claim that "in some cases the reduction in uncertainty resulting from an FTA may even be a necessary precondition to realizing gains from liberalisation at all". The EEC was a prime example of how regional integration has been used to promote security and decrease the threat of war (Schiff and Winters, 1998:51). Schiff and

Winters (1998:50) go on to say that these relevant effects alone outweigh any negative static effects that may occur.

5. **Faster transfer of technology** – regional integration can facilitate "international flows of knowledge, reducing duplication of innovative effort, market size effects, and resource allocation effects". Numerous studies have been conducted that show the positive correlation between increased trade flows and knowledge, technology and research and development flows (Holden, 1996; Coe and Helpman, 1995).

3.2 The Basic Theory

The above dynamic effects do not fit well into traditional 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 increasing returns to scale. The main focal point of this revolution was Dixit and Stiglitz's formalisation of monopolistic competition, which although somewhat unrealistic provides a useful, simplistic 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 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 geography' theories of the 1990s (Fujita et al, 1999:3).

The study of economic geography arose out of the need to explain concentrations of population and economic activity, where agglomerations or clustering of industries occurs (Fujita et al, 1999:4). An extensive body of urban systems literature exists that documents these occurrences, however, it does not adequately explain how such situations arise and evolve. Thus, we turn to modelling increasing returns and their effect on spatial concentration. Alfred Marshal, (1920:271) provided the basis for such analysis giving three reasons for spatial concentration. Marshal (1920) argued that industrial districts arose due to knowledge spillovers, labour market pooling and the backward and forward linkages that arise from large local markets. Although all three factors are important, the focus of economic geography has been on the role of linkages. Linkages are important as producers wish to have good access to large markets and to suppliers. Consequently, once a spatial concentration of manufacturing is established this imbalance of industry may persist and the growth patterns of two otherwise equivalent locations may diverge.

Krugman's (1991) model of geographic concentration has been the spearhead of the economic geography revolution (Krugman and Venables, 1995; Henderson, Shalizi, and Venables, 2001; Sukkoo, 1995; Petersson, 2000). Krugman (1991:14-15) 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.

Krugman and Venables (1995) extend the model in a later paper. This model assumes two initially identical regions, 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. 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. After some time, 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, "at some point the decline in transportation costs will be sufficient that the lower wage rate in the periphery more than offsets the disadvantage of being remote from markets and suppliers" and therefore an incentive is created for firms to move to the lower wage periphery, thus increasing 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. 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". Transport costs are assumed to be of the von Thunen and Samuelson "iceberg" variety. This allows greater simplification in modelling, where one merely assumes that a fraction of a good disappears in transit, thus avoiding the complexity of modelling a separate transportation sector.

3.3 Additional Literature

Empirical testing of the model is still in the infant stages, but what studies have been done, generally support theory (Lall, Shalizi and Deichmann, 2001; Puga and Venables, 1998; Schiff and Winters, 1998b; Kennes, 1998; Fernandez, 1998; Coe and Helpman, 1995; Petersson, 2000).

For instance, 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 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 (Kennes, 1998:29). However, the initial transition phase may lead to shifts in production, increased macroeconomic instability and social problems (Kennes, 1998:31).

Confirming forces for agglomeration, 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.

Steinle and Schiele (2002) investigate what causes some industries to agglomerate more than others. It is found that industries with the following characteristics are more likely to agglomerate. If industries have a(n)

- Divisible production process;
- Transportable product or service;
- Long value chain including multiple distinct competencies;
- Innovation-intensity characterised by "network innovations;
- Volatile markets (Steinle and Schiele, 2002:849).

The harmonisation of international markets combined with a general reduction in transport costs have increased the importance of where a firm is located (Steinle and Schiele, 2002:849). This is shown in the success of Italian "one-product towns" and the existence of manufacturing areas like Silycon Valley and the US manufacturing belt.

Martin (1999) takes the issue of transport costs 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.

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 relocate to the South. The cost to the region as a whole would be a decrease in innovation, and 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.

Martin, (1999:98) concludes that the best method to both increase overall growth and equity would be to increase research and development subsidies to the South. This would reduce income differences inducing more firms to relocate to the South, which further reduces the cost of innovation. However, in countries with an almost non-

existent manufacturing base innovation may not be the critical factor. In addition, limited resources available for these kind of subsidies would mean that they would have a minimal effect on aggregate demand.

3.4 SADC Studies

There is not a great deal of literature investigating polarisation of industry within SADC. There are particularly few "dynamic" studies, and even fewer of the economic geography of SADC, thus the findings of seminal studies, some of which are not necessarily 'dynamic' in nature will be presented.

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 presented (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 effect for the possibility of direct investment from South Africa to the region. Since 1995 at least R2 500 million has been invested by South African firms in SADC (McCarthy, 1999:389). Thirdly, McCarthy highlights the spatial disparities in South Africa as a country arguing that many regions in South Africa 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 is 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 would also reduce the possibility of an effective regional industrialisation policy. Separate trade agreements with other countries outside the block may influence investment decisions into 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.

McCarthy (1999:382), acknowledging the importance that external economies of scale play in agglomeration of industry, 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 lesser developed SADC countries through the play of various factors, namely, the institutionally determined comparative advantage in labour costs; 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 DBSA and the IDC madates have been extended from South Africa to the rest of the region to promote 'normal' investment (Thomas, 1998:52). The DBSA committed R1.8 billion in funds to SADC in 1998 alone (Thomas, 1998:52).

Petersson (2000) 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 (2000:16) finds that non-ferrous metal, 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 (2000:18) 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 (2000:18) finds that industries prone to scale economies and external economies are geographically concentrated in regions with close access to large markets.

Petersson (2000:17) 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 effect of the FTA indicates that it cannot be concluded that smaller countries will lose disproportionately, and 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 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 *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 would 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 o 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.

4. ANALYSIS

4.1 Method of Analysis and Calculation of the Locational Gini Coefficient

This section will analyse the SADC scenario under a framework of economic geography. This study more than anything else is an attempt to determine what the

present state of industrial agglomeration is within SADC, and to provide an indication of what industries are most likely to be affected by regional integration.

With the lack of an adequate 'African' case of long term regional integration between countries, it was decided to use South Africa as an example. South Africa, like SADC is characterized by a set of provinces which vary greatly with respect to their levels of development and industrial make-up. These provinces have over more than a century become more and more integrated with consequent reductions in transport costs. Although there are substantial differences between nations and regions within nations the basic theory remains very similar. Here lies the advantage of new theories of economic geography over traditional trade analysis, where the theory of new economic geography allows one to compare both regions within nations, and nations within regional groupings. The only real difference within the theory of nations and regions is the effect of labour mobility. Labour mobility could have an effect on real wages, aggregate expenditure and thus influence agglomeration and dispersion forces. However, with real wages being the deciding factor the importance of this difference between nations and regions would be assumed to decrease with labour market rigidity, as in the case of South Africa. Additionally, employment figures (rather than trade figures or more complex manufacturing value added (MVA)) are used in this study in accordance with the literature on new economic geography. Together with the fact that South Africa has a diverse and comparatively large manufacturing sector an investigation of the distribution of industry within the country is likely to provide interesting results for SADC.

It was also decided that a time series analysis of industrial dispersion could provide clues as to what industries have tended to agglomerate over time. As such this study would need to span a long time period, and the region should have reached a state of high integration and consequently low internal transport costs. Ideally a time series analysis of South Africa's industrial history should be taken, however, this data has been notoriously difficult to find, and as such is an area for further study. Although not optimal, the USA is a well-documented example of the gradual reduction of transport costs between regions over a significant period of time. It is thus used to determine the extent and direction in which different industries have reacted to a reduction in transport costs. This is not the first time in the literature that there has been a crossover between national and regional studies. Petersson (2000) conducts an analysis using South African provinces in the same category as other SADC countries.

Within this study, location coefficients, as calculated by Hoover (1936) are used to measure the level of industrial dispersion. The coefficient of localisation by industry is based on employment levels, thus enabling the comparison between international and inter-regional (within country) forces of agglomeration. The Hoover coefficient of localisation is calculated as follows.

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

Eij = employment in industry 'i' for region 'j'
Ej = total employment in region 'j'
Eic = employment in industry 'i' for country 'c'
Ec = total employment in country 'c'

This will calculate the 'locational quotient' (Lij) defined as follows

$$Lij = \frac{Eij / Ej}{Eic / Ec}$$

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.

The regions are subsequently ranked by their locational quotients in descending order, and the cumulative percentage of employment in industry 'i' (ΣEij/Eic), and the cumulative percentage of employment in total manufacturing (ΣEj/Ec) are calculated. The Lorenz curve is then calculated with (ΣEj/Ec) on the X-axis and (ΣEij/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).

4.2 SADC, South Africa and the USA

4.2.1 SADC time-series 1985 – 1999

Locational Gini coefficients are calculated for manufacturing sub-sectors of five SADC countries for 1999 and 1985. These countries, Botswana, Malawi, Mauritius, South Africa and Zimbabwe [collectively referred to as the SADC(5)] account for roughly 95 percent of total SADC MVA, and 86 percent of manufacturing employment, of which South Africa contributes the majority.

It was decided to omit the remaining SADC countries for the purposes of this study due to the small contribution each makes to overall to regional manufacturing, in addition to the scant availability and dubious reliability of data. A review of the five countries chosen, factoring in the dominance of the major 'power-houses' of the region (recognised as being the only countries with significantly diversified and established manufacturing sectors, notably South Africa, but also Zimbabwe, and Mauritius), is likely to provide an indicator of the majority effect on the region as a whole.

The following locational coefficients were calculated for the SADC(5) for 1985 and 1999.

Table 3: Locational coefficients for SADC industries, 1985 and 1999

		HOOVER'S LOCATIONAL COEFFICIENT			
CODE	**Branch**	**Type of Industry**	**1985**	**1999**	**Difference**
20	Food	RB	0.07	0.076	0.006
21	Tobacco	RB	0.422	0.479	0.057
22	Textiles	LI	0.117	0.161	0.044
23	Apparel	LI	0.222	0.261	0.039
24	Lumber and Wood	RB	0.071	0.084	0.013
25	Furniture and fixtures	RB	0.054	0.074	0.02
26	Paper	SI	0.061	0.102	0.041
27	Printing and Publishing	SI	0.07	0.077	0.007
28	Chemicals	SI / DIF	0.064	0.085	0.021
29	Petroleum and coal	RI / SI	0.57	0.222	-0.348
30	Rubber and Plastics	SI	0.071	0.079	0.008
31	Leather	LI	0.045	0.113	0.068
32	Stone, clay and glass	RB	0.081	0.055	-0.026
33	Primary metal	RB	0.08	0.115	0.035
34	Fabricated metal	LI	0.065	0.071	0.006
35	Machinery	DIFF	0.119	0.133	0.014
36	Electrical machinery	DIFF	0.09	0.142	0.052
37	Transportation	SI	0.115	0.135	0.02
38	Instruments	SB	0.158	0.208	0.05
39	Miscellaneous	LI	0.125	0.145	0.02
Unweighted average			0.133	0.141	0.008
Weighted average			0.14	0.147	0.007

Source: Own calculations based on data from UNIDO (2001) and the IDC (undated).

Key: RB = Resource Based
LI = Labour Intensive
SI = Scale Intensive
DIFF = Differentiated / Science Based

The results show that between 1985 and 1999 both the weighted and unweighted average coefficients of localisation increased, with the unweighted average increasing from 0.133 to 0.141. All industries except for petroleum and coal, and stone, clay and glass become more localised over this period as their Gini Coefficients increased. However, the most notable increases in the coefficient were found in leather, tobacco, electrical machinery, instruments and textiles, while a notable decrease was noted for petroleum and coal. Heavily agglomerated industries, that is, industries that remained above the average in 1985 and 1999 are petroleum and coal, tobacco, apparel and instruments.

Not all industries would face the same forces for agglomeration or dispersion. For example resource intensive industries may face substantially higher transport costs in

relocating production. In order to investigate what industries would be most likely to re-locate either towards the core or the periphery (depending on the stage of the integration) it might be useful to classify industries into four categories. Industries that are

1. **resource intensive (RB)** – tend to locate close to abundant supplies of natural resources, such as coal and metal industries.
2. **labour intensive (LI)** – would tend to locate where labour is cheapest and most productive
3. **scale intensive (SI)** – where the length of the production run is important, and
4. **differentiated and/or science based goods (DIFF)** – where products are tailored to highly varied demand characteristics and/or rapid application of new technology (Petersson, 2000:11-12).

Petersson (2000:12) suggests that categories 3 and 4 (i.e. scale intensive and differentiated industries) are most likely to be affected by increasing returns to scale and external economies, and thus would feel the pull towards the core the most. However, it must be noted that these categories are not 'hard and fast', and an industry, and particularly a further disaggregated sub-sector, may have attributes of other categories. It is also not a clear fact within the theory that technologically reliant industries face greater forces for agglomerated than others (Kim, 1995:898). In the case of SADC, though, with the limited infrastructure and diversity of industry in many countries, one would expect these industries to be pulled towards the core. Labour intensive industries on the other hand are liable to go both ways; there is potential for them to converge on the core, but conversely, the pull towards the low wage periphery would be greatest for this category.

Aside from tobacco and furniture, all the industries with increased locational coefficients agglomerated during the fourteen-year period belong to the latter three categories, and thus are likely to agglomerate with a further reduction in transport costs.

The overall increase in agglomeration of 5.3 percent for this period coincides with the accession of South Africa to the SADC, the culmination of the COMESA free trade agreement, the implementation of various bilateral trade agreements and a general policy of trade liberalisation within the region. Thus indicating that industrial dispersion may be high and that immediate further integration will lead to an increase in agglomeration of industry.

4.2.2 SADC and agglomeration in South Africa

The Gini coefficients for South Africa represent the spatial distribution of industry by province. The coefficients are based on 1992 IDC data which is aggregated into 12 sectors as opposed to the 20 used above for the SADC analysis. However, the SADC(5) Gini coefficients were weighted and converted to match the corresponding classification system in an effort to retain as much comparability as possible. It is assumed that transport costs within South African are relatively low. Thus, industry is assumed to have arrived at a mature stage, i.e. has arrived at a stable equilibrium with regard to industrial dispersion. Thus as the SADC 'Region' becomes more like a

single economic unit (with the consequently lower transport costs), industries will face similar forces for agglomeration as those presently in South Africa. However, it is uncertain to what extent the decentralisation policies of the South African government may have influenced this outcome. Taking the assumption that South Africa *has* reached the end of its agglomeration/dispersion cycle we can use this as a benchmark to compare the extent of agglomeration of the various industries in SADC and South Africa, as well as the average manufacturing coefficient. Thus, it is possible to compare the tendency of each industry to agglomerate. Taking the extent of present agglomeration in South Africa as a benchmark for future agglomeration in SADC, we can then estimate the impact of polarisation of industry towards South Africa.

Table 4: Differences between SADC and South African coefficients

	IDC Category	**SA**	**SADC (5)**	**SA-SADC**
1	Food processing & tobacco	0.079	0.253	**-0.174**
2	Textiles	0.189	0.117	**0.072**
3	Clothing, leather & footwear	0.200	0.138	**0.062**
4	Wood & furniture	0.660	0.063	**0.596**
5	Paper & printing	0.093	0.068	**0.025**
6	Chemicals, rubber, plastics, coal & petroleum products	0.079	0.248	**-0.169**
7	Non-metallic minerals	0.103	0.081	**0.022**
8	Basic metals	0.200	0.080	**0.120**
9	Metal products	0.132	0.065	**0.067**
10	Machinery	0.149	0.110	**0.039**
11	Motor vehicles & transport equipment	0.154	0.115	**0.040**
12	Other manufacturing	0.121	0.122	**-0.001**
	Average	**0.180**	**0.122**	**0.058**

Source: Own calculations based on data from UNIDO (2001) and the IDC (undated).
Note: Coefficients for the SADC(5) were weighted and aggregated to correspond with the IDC categories.

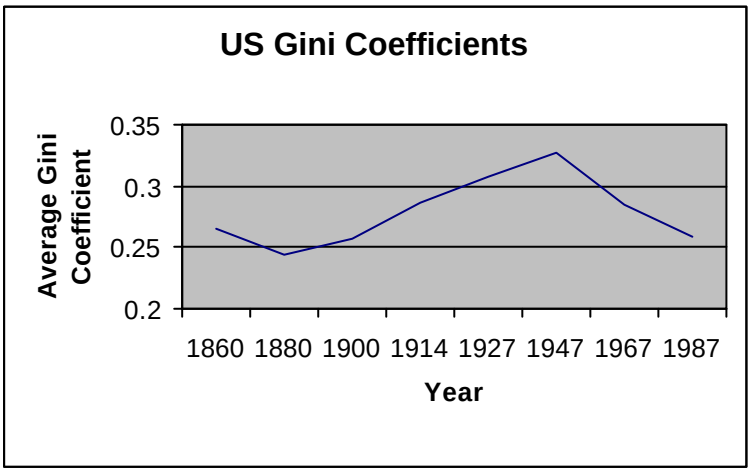
The above table shows the differences in present localisation between the SADC(5) and South Africa. The unweighted average Gini coefficient is higher for South Africa, thus indicating that industry is more agglomerated in South Africa than in the SADC(5). This could partly be due to the policies of import substitution undertaken by most SADC economies in the past. However, the distribution of industries that are agglomerated differs. Comparing the two sets of coefficients, we would expect an increase in agglomeration in SADC of non resource-based industries, particularly textiles, metal products, clothing, leather & footwear, transport equipment, and machinery.

4.2.3 Comparison to Time-Series in the USA

It is possible to track changes over time within a country to monitor the likely path of agglomeration forces in particular industries over time. Numerous studies have been completed on localisation within the USA, as the USA provides a classic example of the integration of initially independent regions. Since the 19th century, most of U.S. manufacturing has been based in the relatively small area of the Northeast and Eastern Midwest, and at one stage this area accounted for 74 percent of U.S. manufacturing (Krugman, 1991:12). Although there may have been certain initial natural resource advantages in the initial location of manufacturing, the majority of these advantages soon disappeared, but overall industry stayed together (Krugman, 1991:14). This has implications for those industries analysed above and classed as 'Resource-Based' – once transport costs decrease below a certain level, they too may be susceptible to locational shifts.

The graph below shows an inverted *U-shaped* curve of localisation where industry follows the Krugman (1991) model of first agglomerating and then moving out to the periphery. We compare the percentage change in SADC(5) Gini coefficients over the 14 year period, to the change in similar time periods in the USA. Setting aside any comparison of SADC's locational coefficients to South Africa, SADC would appear to be in a stage on the curve between 1880-1890 or 1914-1947. In the first scenario they would be at the beginning and top left of the *U*, and in the latter, and more positive case, approaching the base of the *U*, and preparing for the upswing.

Figure 1: US Gini coefficients



Source: Based on data from Kim (1995)

Table 5. Percentage changes in the Gini coefficient over time in the USA

	Percentage Change in *unweighted* coefficient over period	**Percentage Change in *unweighted* coefficient converted to a 14 year period**	**Percentage Change in *weighted* coefficient converted to a 14 year period**
USA			
1860-1880	-8.302	-5.811	-5.128
1880-1900	5.350	3.745	-3.043
1900-1914	11.720	10.490	28.512
1914-1927	7.343	7.907	1.731
1927-1947	6.515	4.560	-12.627
1947-1967	-13.150	-9.205	-5.405
1967-1987	-8.803	-6.162	-12.301
SADC			
1985 - 1999		**5.279**	**5.665**

Source: Own calculations based on data from Kim (1995) and UNIDO (2001).

Between the nineteenth and twentieth centuries the U.S. was transformed from a set of regional economies to an integrated national economy (Kim, 1995:885). In particular, the integration of U.S. 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 progressively fell until 1987. The degree of regional specialisation was around 35 percent in 1860, increasing to 43 percent in 1927 and 1939, but continually fell to 23 percent in 1987 thus adding credence to the idea of a U-shaped pattern of localisation (Kim, 1995:887).

According to Hoover's coefficient of localisation the following industries displayed an (inverted) *U*-shaped rising and then falling trend in agglomeration. This pattern was noted in lumber and wood, rubber and plastic, fabricated metal, non-electrical 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 under study in 1987 (Kim, 1995:894).

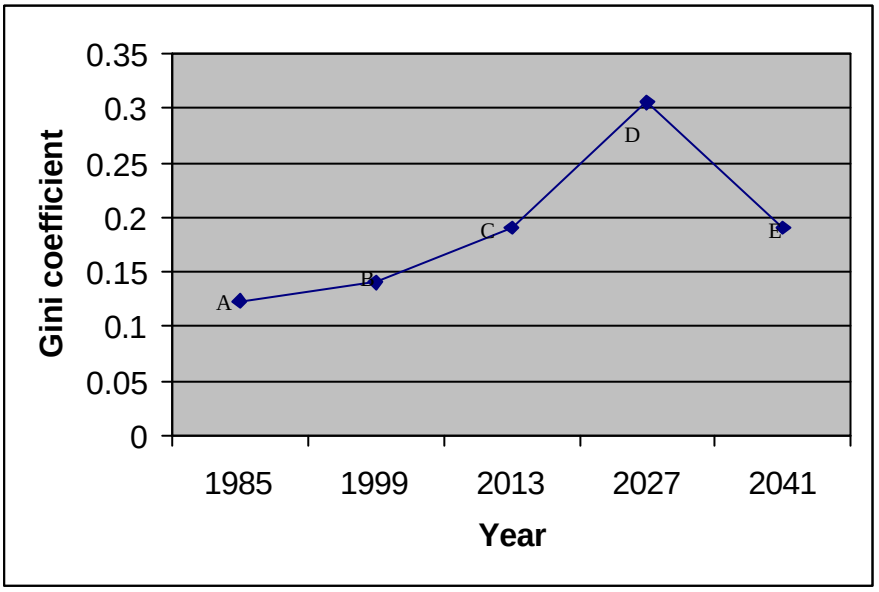
4.3 Inferring the path of SADC industry

Using the information from locational coefficients within SADC, South Africa and the USA we can complete a very rough scenario of the likely path of industry location within SADC as integration proceeds. Firstly, we use the present extent of localisation within South Africa as a benchmark for the future dispersion of industry within SADC (points C and E in Figure 3). Secondly, we calculate the percentage difference between the final (stable, end of *U*) and highest levels of localisation within the USA, 60.4 percent, which corresponds to a change in the coefficient of 0.115. We

then use this figure to estimate the highest level of localisation that will occur in SADC, that is, the bottom point of the *U* (i.e. the top of the inverted *U*, point D in Figure 3).

An arbitrary length of time between each stage in the cycle is assumed. The period is taken as 14 years so as to correspond with the time period analysed in the SADC (5) data. It is not suggested that the entire cycle will be over by 2041. Indeed it may be much sooner, or much later. The entire cycle in the USA took place over a century, however due to modern technological advances as well as the presence of established states within SADC, the entire cycle for SADC is likely to be shorter. It must also be acknowledged that prior to the start of the cycle there are already substantial forces for agglomeration and dispersion, which may speed up the entire process. South African industries generally reap greater benefits from external economies at present, while at the same time a substantial wage gap is also present between the existing core and periphery. The use of a consistent time period itself is merely for simplification. It may be the case that the initial decrease to the bottom of the *U* will occur faster than the upward path to the periphery, or *visa-versa*.

Figure 2: Path of localisation within SADC

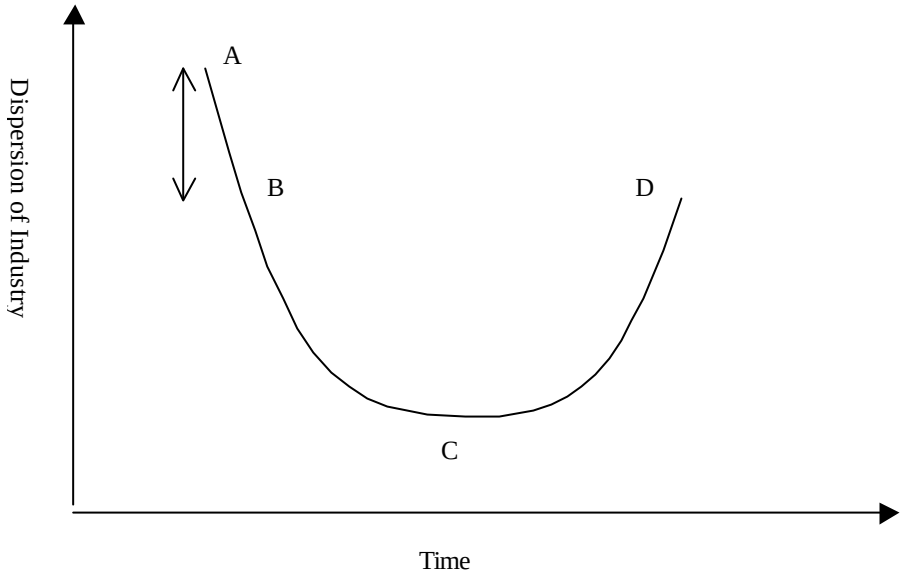


Source: Own calculations based on data from UNIDO (2001), the IDC (undated) and Kim (1995).

Figure 3 shows the inverted *U-shaped* pattern of localisation that could be expected in SADC. It is inverted as the Y-axis shows locational coefficients in ascending order.

If they were displayed in descending order we would get our customary *U-shape*.
Using this model, we have a distorted 'U' which could look as follows.

Figure 3. Dispersion of industry over time



Source: Own calculations

It should be noted that the beginning point of the U is higher than the end point by a distance of A-B. This discrepancy could be the taken to be the result of inefficient import substitution undertaken by SADC countries. Thus the movement from A to B is outside the U-shaped cycle and would represent a loss of industry within this model from the periphery to the core that will not return.

So far it has been assumed that South Africa provides an index for completed integration, and that agglomeration forces in SADC are presently higher than those in South Africa. SADC, in this case would still need to embark on the entire *U*-shaped cycle. However, South Africa already possesses significant advantages of external economies that normally arise at a later stage in the cycle in the model. Additionally, the forces for dispersion are also present as there is already a substantial wage gap between South Africa and the periphery. The South African average labour cost in urban areas is estimated to be US$ 1.89 (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).

Thus, another scenario could be inferred where SADC is already at a later stage in the integration process. In order to determine this point the percentage change in the average SADC coefficient is compared to similar periods in the USA. The only times that the USA has seen an increase in agglomeration of a similar degree to the last fourteen years in SADC was when they were at the beginning, and at the base of their *U-shaped* cycle. Thus there is the possibility that SADC is at the bottom of the *U*, and preparing for the upswing. This supports the evidence of a significant wage difference and agglomeration forces already in force between the core and the periphery. In support of this notion, there are documented cases of firms recently

moving from South Africa to peripheral countries in order to take advantage of lower wage costs (McCarthy, 1999:394). This being the case the benefits would accrue disproportionately to the periphery at the expense of South Africa more rapidly. This would support McCarthy's (1999:388) observation that significant centripetal and centrifugal forces already exist but that the pull to the core is presently dominant.

4.4 Problems with this Analysis

The model assumes that the fall in transport costs resulting from the elimination of tariffs due to the FTA will be followed by further decreases in non-tariff barriers (NTBs) over time. This gives rise to the *U-shaped* pattern. In reality, the removal of NTBs is unlikely to occur if an initial reduction in transport costs is seen to result in polarisation of industry. Additionally, the fall in tariffs may be negated by the implementation of new NTBs. The presence of higher transport costs due to the greater geographical area represented by SADC may also mean that the optimal average coefficient of localisation for SADC will remain higher than that in South Africa. Additionally, many SADC countries have highly specialised (i.e. not diversified) manufacturing industries, which are likely to be classed as 'sensitive industries' and would thus be backdated or excluded from the trade agreement. These sensitive industries include sugar, confectionery, beer, textiles, matches and motor vehicles for Malawi, dairy products

Table 6: SADC[5] sensitive industries

COUNTRY	INDUSTRIES
Malawi	Sugar, confectionery, beer, textiles, matches and motor vehicles
Mauritius	Various products amounting to 17.11% of total tariff lines
SACU	Dairy products, wheat and other cereals, sugar and sugar confectionery, beef, pineapple juice, textiles and clothing, leather footwear, and vehicles
Zambia	Various products amounting to 4.2% of total tariff lines
Zimbabwe	Selected vehicles and sugar, various agricultural products, textiles, clothing, footwear, and selected steel products

(Adapted from Hess (2001))

The use of South African Gini coefficients as a basis for comparison of a 'completed' level of agglomeration may not be ideal. The 'completed' level of agglomeration may have been altered by South Africa's policy of decentralisation (Holden, 1996:61). However, if political differences can be put aside and similar decentralisation arrangements put into practice the comparison may still hold.

Ideally industries should be analysed at a less aggregated and more standardised level, however, there were significant problems in obtaining standardised disaggregated data for all countries involved in the study. As a result 1998 figures are used for Botswana and Malawi in the 1999 calculations, and 1994 Malawi data is used in the 1985 calculations. This is not likely to affect the results of the study significantly as the changes in industry that this would represent are very small. Findings may be more accurate if data is analysed at a lower level of aggregation. In particular, the further one disaggregates the more the locational coefficients are likely to increase. The level of aggregation in this study was used to provide maximum validity from available

data. However, even at the level of aggregation used there were problems in obtaining data for certain SADC countries. For some sectors data was already aggregated to a greater degree than the measure used. Consequently employment in one industry may represent employment that would rightly be classified in another. These distortions are likely to be minimal as this occurrence was not common, and data that was aggregated was most likely done so as it was significantly small.

As a means of comparison, in one of the few studies in the area done to date, Petersson (2000) calculates locational Gini coefficients for all the SADC countries with the exception of Angola, the DRC and the Seychelles (Appendix X). The resultant Gini coefficients for the SADC11 are generally higher than those for the SADC5. This could have been brought about for two reasons. Firstly, the analysis for the SADC11 is by the ISIC classification, which is slightly less aggregated than the classification used for the SADC5. As one disaggregates further, the localisation coefficient is likely to increase. Secondly the level of diversification in the six differing countries is notably lower than the region average, thus further increasing the value of the coefficient. In these economically 'smaller' countries, industry is generally oriented towards a few basic industries, mainly agricultural products (Petersson, 2000:14), thus increasing the Gini coefficient for the other industries. However, both studies show tobacco, apparel, instruments, transportation and electrical machinery to be among the ten most agglomerated industries.

4.5 Conclusion

The above study has analysed the Southern African situation with regard to the theory of economic geography and industrial dispersion and international experience. It is expected that polarisation will increase with an initial fall in transport costs. This decrease would be twofold with SADC first losing inefficient industries to South Africa until a point is reached where the distribution of industry is at its long run efficient level. A second phase of increased localisation towards South Africa would then occur due to the agglomeration economies of South Africa outweighing the lower wage costs of the periphery. However, if one discards the use of the South African situation as a reference point polarisation may still occur, but not to as great an extent as it approaches the bottom of the U. Regardless of the decrease in industry suffered by the periphery, both measures would indicate that this value would eventually be replaced by a greater movement of industry to the periphery.

The table below lists the industries that are most likely to be affected by agglomeration economies. The table takes the ten SADC(5) industries that have agglomerated the most over the period; SADC industries likely to substantially agglomerate as their Gini coefficients are presently lower than their South African counterparts; and industries that have agglomerated over the years in the USA. If the industries showed up in all three measures they are listed as SADC + SA + USA, if only in the SADC and South Africa test they are listed as SADC + SA and so on.

Table 7: Industries likely to agglomerate

SADC + SA + USA	SADC + SA	SADC + USA	SA + USA	SADC	USA
Apparel	Leather	Instruments	Transport equipment	Chemicals	Rubber and Plastics
Textiles	Primary metal	Tobacco	Fabricated Metal	Paper	Miscellaneous Industries
Furniture and fixtures					
Electrical machinery					

Source: Own calculations and Kim (1995)

5. CONCLUSION

The formation of a free trade area within the SADC provides an interesting case of a high level of integration amongst African countries of widely different levels of development. Traditionally such initiatives are analysed in terms of the static trade and welfare effects. However, it is increasingly being acknowledged that any static effects of an RIA may be significantly outweighed by dynamic effects. Although there may be numerous dynamic effects there is particular concern with integration's effect on industrial dispersion. The theory of economic geography with the *U-shaped* pattern of polarisation of industry, put forward in the Krugman (1991) and Krugman and Venables (1995) models is recognised as the foremost theory in this area. The SADC situation was fitted to the Krugman and Venables (1995) model of economic geography and an empirical study was conducted.

A three-pronged approach was used to determine the effects of integration on industrial location within SADC. First, recent trends in SADC manufacturing were investigated by a comparison of location coefficients for five SADC countries between 1985 and 1999. Secondly, in order to create a point of reference for SADC it was decided to analyse the agglomeration situation within South Africa. This is useful as the manufacturing base in South Africa is fairly well developed and established. In addition, South Africa as a country represents the integration of regions with significantly different levels of development. Thirdly in order to place the SADC situation into a time series, an investigation of the path of agglomeration within the USA was examined. It would perhaps be more accurate to use a time series for South Africa, but this is an area for further study.

Using the above analysis it was found that over the last fourteen years agglomeration of industry has increased in the SADC(5). South African locational coefficients were also found to be higher than their SADC counterparts, and consequently we would expect SADC agglomeration to increase to approach the 'reference' levels in South Africa. This is likely to represent a once-off shift of inefficient manufacturing that would not return to the periphery, as Gini coefficients are expected to 'settle' at a higher level.

It is possible to infer a path of agglomeration for SADC from the experience of the USA. Placing SADC into the path followed by the USA agglomeration would be expected to increase substantially further. Alternately if one considers the extent of the existing centripetal and centrifugal forces, and compares the rate of change in the SADC Gini coefficient to that of the USA SADC would appear to be approaching the base of the *U* and therefore near the height of the agglomeration forces.

Provided transport costs continue to decrease it would be expected that industry would return to the periphery in response to the lower wage costs. The fall in Gini coefficients is likely to affect a larger base of manufacturing than was initially affected when they were rising. Thus, the value of the shift back to the periphery is likely to exceed the initial decrease in manufacturing incurred by polarisation. The pull to the periphery will now affect a much larger base of manufacturing and consequently the shift in manufacturing is likely to be larger. Although the final result may be highly beneficial for the periphery, the value of the initial loss of manufacturing in the periphery, although small, is likely to represent a substantial proportion of manufacturing in smaller countries. As integration decisions are likely to be affected by politics, this short term loss will need to be compensated in some form (McCarthy, 1999:396). The initial loss of manufacturing in the periphery is likely to bias policy makers against further integration. However, it is imperative that the integration process continues to move forward rapidly, as once transport costs have begun to fall, a corresponding fall in all remaining transport costs is necessary. This would necessitate the elimination of NTBs and substantial investment in infrastructure. This analysis merely models existing industries. It does not take into account the possibility of additions to overall manufacturing through increased investment and other dynamic effects. These effects are likely to be beneficial for all countries.

Some industries are likely to be more affected by agglomeration forces than others. In all three analyses the following industries were shown to be most prone to agglomeration forces; apparel, textiles, furniture and fixtures and electrical machinery. Other industries that showed a tendency to agglomerate further are leather, primary metal, instruments, tobacco, transport equipment, fabricated metal, chemicals, paper, rubber and plastics and miscellaneous industries.

The study concludes that in the short run economies associated with agglomeration forces are likely to outweigh the low wage costs of the periphery. This will create a polarisation of industry towards the core of South Africa. The extent of this move is uncertain, but likely to be small. Once transport costs are reduced to a critical level industry will begin to move out of the core to the periphery. The final result is likely to be a net gain of manufacturing by the periphery. The critical factor in the periphery realising these gains is continued integration and persistently decreasing transport costs beyond the formation of the FTA. Thus, in the formation of a free trade area needs to focus on the persistent reduction of all transport costs if gains to the periphery are to be realised. Integration needs to 'go all the way'.

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