

The New Economic Geography of a SADC Free Trade Area: An overview

Author: Simon Hess
Institution: Rhodes University

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Abstract

This paper provides an overview of the current literature on the ‘new economic geography’. The theory provides a dynamic analytical framework in which to study regional integration. From its inception in the early 1990s, it has drawn from both the new theories of international trade and various geographically based theories. The model includes a number of factors not included in the traditional static analysis of international trade, such as increasing returns to scale, monopolistic competition and transport costs, at the same time incorporating lessons from geography into a sound economic model. Using these tools, the model is able to endogenize forces for agglomeration and dispersion, using labour or intermediate inputs as the critical factor.

Empirical research of the theory is scarce, but what studies have been done, both foreign and within SADC provide interesting results for the industrial geography of a SADC free trade area. In particular, research to date shows that the apparel, textiles, furniture and fixtures and electrical machinery are the most likely industries to agglomerate towards the core of the SADC region, followed by the leather, primary metal, instruments, tobacco, transport equipment, fabricated metal, chemicals, paper, rubber and plastics and miscellaneous industries. On the other hand, industries that would be more likely to relocate to peripheral areas are petroleum and coal, food processing and tobacco, paper, printing and publishing, chemicals and stone and clay and glass (Hess, 2002). Further research is in progress to include the experiences of other regional groups such as Mercosul, the European Union and the Southern African Customs Union that may provide useful indications for SADC.

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Introduction

The analysis of regional integration agreements (RIAs) has taken a new turn with the introduction of the new theories of economic geography. The traditional analysis, relying on potential static gains or losses from trade may not be so applicable when it comes to the rationale for such agreements. While this paper by no means seeks to undermine the importance of such analysis, as indeed it is the basis of international trade theory, it seeks to introduce an alternative method of study. The paper will first provide an argument for the use of a dynamic theory of trade. It will then proceed to outline the core theory of the 'new economic geography' (NEG) and finally provide an overview of empirical research conducted with regard to SADC in the light of the free trade area being implemented.

The rationale for a dynamic analysis of regional integration

While trade flows are important, for the majority of SADC countries these flows generally consist of primary sector exports overseas and the importation of manufactures from South Africa and abroad. Thus, according to trade theory based on comparative advantage, this would lead to a focus on primary sector production within the periphery of the bloc. Trade diversion of manufacturing towards the more established industrial nations would result (South Africa, Mauritius etc...) (Holden, 1996:61), and while being positive for regional GDP and potentially providing larger export markets for the remaining countries, the poorer nations are unlikely to observe this benefit. On the other hand, trade creation, traditionally seen as increasing world welfare would result in a fall in the manufacturing production of some nations as manufacturing moves to the lower cost regional producers. Although it is not definite that these effects will bias against the periphery it is likely. Even so, it is generally recognised that within the SADC the static effects are likely to be minimal (Holden, 1996; Evans, 2000), particularly because trade flows within the SADC are a small proportion of total trade of member countries, and additionally it is argued that domestic production structures are not complementary (Kirkpatrick 1998:9). If the focus of the RIA is on the effect of internal trade flows, this provides a weak basis for such an accord and further progress is likely to be hampered by non-committal members.

A large area of concern within the region has been the effect of lower trade barriers on existing industry. Thus, a dynamic method for analysing an RIA on the basis of its effect on domestic industry needs to be sought. Indeed, it has been suggested that the dynamic effects of an FTA on general growth and industry are likely to outweigh static trade effects (Schiff and Winters, 1998:50; Cattaneo, 1998). There are potentially numerous dynamic effects of an FTA, amongst others an increase in increased economic efficiency (Mutambara, 2001:89), increased capacity utilisation and industrial maturity (Kennes, 1998:31), increased credibility and security (Fernandez, 1998:39-44; Schiff and Winters, 1998:51), greater levels of investment (Blomstrom, 1997; Jenkins and Thomas, 2002:24) and a faster transfer of technology (Holden, 1996; Coe and Helpman, 1995). However, dynamic effects are notoriously difficult to model and predict, so little empirical work has been conducted resulting in these dynamic effects having a decreased emphasis in policy decisions.

Although the potential dynamic benefits that accrue to all members may be substantial, and an increased realisation of this may lead to more proactive steps being taken by national governments there will still be some that gain more than others. The geographical location of industry within the region becomes more important both to see where new industry will locate, as well as to analyse the way in which existing industry will re-shape as domestic markets merge. This introduces the case for a dynamic, geographically based industrial study of the region. While industrial studies have been conducted in the past, this paper seeks to introduce a new theoretical framework within which these may be placed.

The ‘new economic geography’

The history

The new economic geography as a body of theory has 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 phenomenon of increasing returns, monopolistic competition and transport costs into a model used to analyse trade and industrial location. Neoclassical models based on comparative advantage and constant returns to scale fail to explain concentrations of economic activity (such as the Silicone 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 these 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 fail to explain how specialization of regions in the production of specific industries arises. Additionally, 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). Thus, as Neary (2000:1) puts it, the core contribution that the new economic geography has made is in building a framework in which aspects of mainstream economics are used to create a “choice-theoretic basis for a propensity to agglomerate” (Neary 2000:1).

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 Lock later in the twentieth century with his book, *The Economics of Location*. 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 somewhat abstract. The other branch, that of economic geography, on the other hand 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, cumulative causation proposed by Myrdal 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, 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.

Economic geography continued to depart further away from acceptable mainstream economics. This was until a number of "highly prominent writers" (Martin 1999:66) from trade, growth and geography, such as Paul Krugman, Michael Porter, W. Brian Arthur, Robert Barro, Xavier Sala-i-Martin, Barry Eichengreen, Oliver Blanchard, Lawrence Katz, Anthony Venables and Danny Quah initiated the body the new economic geography in the early 1990s. These authors sought to include pieces that were discarded by economists and geographers alike and form them into a model acceptable to economists. Well respected research institutions such as the Center for Economic Performance (LSE), Center for Economic Policy Research, the World Bank and the Oxford Review of Economic Policy have all initiated research groups to investigate the 'new economic geography' (Martin 1999:67).

The core theory of the new economic geography

Krugman's seminal paper (1991) shows how it is possible for manufacturing to agglomerate from an initially symmetrical beginning. In this model factor mobility between regions reduces the pressure on the concentration of production activities, enabling agglomeration to take place for longer, while the higher bids for production factors is 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. 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 labour's 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 help 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 theory Krugman and Venables (1995) and Venables (1996) extend the above model, creating a situation where agglomeration is not dependent on labour's geographical mobility but instead relies on Hirshman type input-output linkages.

The Krugman and Venables (1995) 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.

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. As long as each country maintains some level of agricultural employment at equilibrium real wage differences will not emerge. The critical factor here is the firms' dependence on intermediate inputs. The more intermediate inputs a downstream firm can source within a 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 dominates 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

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.

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 (1991) 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 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). The self-prophetic element of beliefs may also play a large role that acts as the catalyst for agglomeration (Ottaviano and Puga 1997:16).

Going further, extending the primarily local analytic result into a multi-location model Fujita et al (1999) borrow from Alan Turing his mathematical work on theoretical biology (Neary 2000:14). 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 a certain time that the wage differences between this and the next country is 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 to eventually 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 neighbors, not in smooth succession as traditional theory predicts, but in waves.

So far 'industry' has been assumed to be homogenous, however, it may be the case that some industries are more prone to agglomeration forces than others, and *visa-versa*.

Brulhart (1996) (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 industries of imperfect competition 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 outweigh the 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. In the case of developing countries infrastructure, governance, stability, confidence and the possibility that the inter-sector positive externalities may play a particularly large role in the choice of industrial location. The fact that the super-large discrepancy in wages between South Africa and the rest of the SADC has persisted over time lays testament to the above hypothesis.

Overall, the NEG points to three distinct phases in the process of integration. When trade costs are high, firms locate in different 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 their 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 there needs to be clear provision of those goods and factors that remain immobile through the process of regional integration (Ottaviano and Puga 1997:23).

Further theoretical contributions

Adding another dimension to the Krugman and Venables (1995) model, Baldwin (1997) explains how 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 (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. 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.

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. When transport costs are zero, the price of non-tradable factors will determine location (Ottaviano and Puga 1997:17).

Helpman (1997) creates a model, where the dispersion force is not real wage differences, but rather the cost of housing. In his model, Helpman (1997) uses the standard Krugman (1991) 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 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 center in order to benefit from the cheaper lifestyle (Helpman 1997). However, at intermediate levels of transport costs, the Krugman (1991) and Helpman (1997) models both predict that industry will be agglomerated.

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 (Martin 1999:77), the latter, somewhat underplayed in the standard NEG models.

Ottaviano and Thisse (1998) break the initial Krugman model of research in 'new economic geography' 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 'ice-burg' 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), where the effect of moving from segmented to integrated economies.

Empirical research

Although the nature of this body of research could have serious policy implications, little research has been done, and as with many emerging theories, 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 be because the nature of the models within the theory make it difficult for empirical estimation, 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 Silicone Valley and the Detroit motor industry. More applied analysis use 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). Examples of such studies are Krugman (1991a, 1993d), Brulhart (1996), Brulhart and Torstensson (1996), Davis and Weinstein (1997), Ellison and Glaeser (1997), Hanson (1994, 1997a, 1997b) and Petersson (1999). Even so, the research that has been done so far has almost purely focused on the ‘important’ economies and economic blocks, such as NAFTA and the EU. Conclusions from these studies may be useful, but the need remains to test compatibility with the developing world, and particularly Africa. This section will present empirical work that has analyzed various underpinnings of the NEG and empirical studies of regions other than the SADC. This will focus on studies on concentration, scale economies, input-output linkages, transport costs, the role of technology and home market effects. A separate section that gives an overview of the empirical work on the SADC will follow.

CONCENTRATION / DISPERSION

Steinle and Schiele (2002) investigate general forces for industrial agglomeration, and note how the following characteristics may make some industries more successful to agglomeration forces 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 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.

Brulhart (2001) also 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.

SCALE ECONOMIES

Kim (1995) uses the locational Gini coefficient to analyse concentration of industry in the USA from 1860 to 1987. Kim (1995) regresses the locational Gini index on a proxy for internal scale economies (production workers per plant), a resource intensity 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 significant.

A number of studies within Europe have emerged in response to Kim's finding of spatial concentration and scale economies being positively related. Amiti (1999), finds a positive correlation between firm size (as a proxy for increasing returns) and changes in spatial concentration. Brulhart and Torstensson (1996) find a 0.69 rank correlation between locational Gini coefficients and returns to scale. They also found a strong correlation between increasing returns and a 'core-periphery bias'. This was done through relating the geographic distribution of industry employment to the likely market potential. However, this finding is not echoed by Brulhart (2001) in a study using longer time-series, and Haaland et al (1999) found the opposite, that their proxy of scale economies had a negative impact on concentration.

Brulhart (1996, in Ottaviano and Puga 1997:24) using locational Gini coefficients found that during the 1980s 14 of the 18 industries in the study became increasingly agglomerated in Europe. As the theory predicts, those industries prone to large economies of scale showed a greater movement towards concentration than most. Brulhart and Torstensson (1996) find support for the U-shaped hypothesis, of increasing and then decreasing agglomeration as integration proceeds in regions where labour mobility is low. It was also found that industries with large-scale economies became increasingly agglomerated in the geographical core of the EU at first, but since the 1980s this process has reversed.

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.

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 kinds of subsidies would mean that they would have a minimal effect on aggregate demand.

Brakman, Garretsen and Schramm (2002) test the Helpman-Hanson hypothesis on Germany in the mid-1990s. 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 *aka* Helpman), and the elasticity of substitution for manufactured goods. All the above variables were found to be significant lending proof 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).

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 for almost all manufacturing and service sectors.

Relating the Gini index to non-tariff barriers (NTBs) Brulhart (2001) finds the paradoxical scenario that concentration of industry increases with the level of NTBs, while Haaland et al (1999) using the same measure find no effect of NTBs. Head and Mayer (2003:33) fault the way in which NTBs were calculated in both these papers

(using the Bruges et al (1999) classification), which consequently casts doubt on the validity of the results. Ades and Glaeser (1995) use a different approach, using the log of the size of the dominant city as evidence for agglomeration. Transport costs are captured in three ways, firstly and traditionally, area is used. 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 relation between trade costs and agglomeration, contradicting Krugman (1991).

INPUT-OUTPUT LINKAGES

The importance of input-output linkages as a force for agglomeration was first brought into the NEG literature by Venables (1996). Ellison and Glaeser (1997) create a model linking co-agglomeration and input-output linkages between pairs of industries. 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 see 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. However, Rosenthal and Strange (2001) merely find weak empirical evidence, and that, only at the state level in the USA. Haaland et al (1999) finds very weak input-output linkages.

Redding and Venables (2000) use a model of intermediate goods (as the agglomerating factor) together with income and number of establishments to analyse cross-sectional data on one-hundred-and-three countries. Demand and cost linkages are measured through the use of estimated coefficients drawn from a gravity equation for trade flows. The results find that demand and cost linkages account for up to 70 percent of cross-country variations in incomes and 50 percent of manufacturing wage variation.

TECHNOLOGY

Theories of new economic geography are closely linked to developments in new growth theory. In particular they both have a common focus on 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).

Keller (2002) investigates the role that geography plays in technological diffusion. Keller (2002:120) finds that technological diffusion is mostly local, and in fact declines with distance at an estimated half per 1,200 kilometres. Technological knowledge has become more global over time, and language skills are especially salient. These findings are verified by the numerous other studies, such as Jaffe et al (1993), Eton and Kartum

(1996, 1999) and Hanson (2000). In particular, Ciccone and Hall (1996) show that productivity is positively correlated with density of economic activity.

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) 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, particularly in electronics, optics, and nuclear technology (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).

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. 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.

HOME MARKET EFFECT

Hanson (1997) finds agglomeration of industry and increasing returns to be present in his study of Mexico and the USA. Additionally, integration between the countries has led to the center of Mexico’s industry moving from Mexico City to 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 associated emerging between sectors. Hanson (1996) also finds evidence of US industry moving closer towards the border with Mexico. With the process of integration in this region, the importance of demand and cost linkages, particularly within individual industry has grown in determining industrial location.

Davis and Weinstein (1998) compare the home-market effect, of the new economic geography, and 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 OECD countries. The remainder is determined by trade based on comparative advantage. This finding was backed up in a similar study conducted on Japan. Hanson (1998) finds support for the theory from a study of 3,705 counties in the USA in terms of labour movement in causing agglomeration.

The results of these studies are critical in determining an empirical model of the NEG. However, the relationship between increasing returns and spatial concentration in the literature has been mixed. The question is whether this discounts the relevance of increasing returns in the NEG, or whether the proxies or concentration indexes need to be improved (Head and Mayer, 2003:34). Likewise, transport costs have not been conclusively shown to empirically fit the theoretical predictions in the NEG. However,

the evidence for the importance of vertical or input-output linkages in agglomeration is more promising and has found support in empirical work (Head and Mayer, 2003:34).

Empirical research in SADC

Research in this area is infant and ongoing at present. This section will highlight some relevant research conducted with regard to 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 mandates 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 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.

Hess (2002) conducts a preliminary analysis on the locational distribution of industry in five SADC countries, Botswana, Malawi, Mauritius, South Africa and Zimbabwe. Locational Gini coefficients measuring the level to which individual industries are regionally concentrated were calculated for the years 1985 and 1999. As South Africa represents the overwhelming majority of manufacturing in this group, similar coefficients were calculated for the country. This level of distribution was used to ascertain an equilibrium distribution of SADC industry under conditions of free trade. As the theory of the ‘new economic geography’ is dynamic, and not merely represent a once-off shift in

industry Hess (2002) turned to the experience of industrial location in the USA. The USA provided a means for tracking tendencies to agglomerate over a long period of time (1860 – 1987) during which transport costs continued to fall. Thus, using the distribution of industry as a benchmark, and following the trends observed in the USA a number of predictions were made.

In particular, two scenarios were 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.

Some industries were found 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.

Table 1: Industries showing a tendency to agglomerate

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

(Source: Hess, 2002)

On the other hand, industries that showed a tendency to disperse over time were petroleum and coal, food processing and tobacco, paper, printing and publishing, chemicals and stone, clay and glass.

Table 2: Industries showing a tendency to disperse

SADC + SA + USA	SA + USA	USA	SADC
Petroleum and Coal	Food Processing and Tobacco	Paper	Stone, Clay and Glass
		Printing and Publishing	
		Chemicals	

(Source: Hess, 2002)

Current research in this area is ongoing and a particular attempt is being made to incorporate the experience of additional RIAs between developing countries, such as the MERCOSUR. However, the biggest problem is a lack of data both on updating new figures and additional countries for SADC as well as for foreign countries.

Criticism of the theory

As an emerging body of theory, the ‘new economic geography’ has attracted a fair amount of criticism, from mainstream economics and geographers alike.

Criticism from the Economists

Ottaviano and Puga (1997:25) ask three critical questions over the theory. Firstly, if different specifications of the functional forms were used, if transportation technology and market structure were changed what effect would this have. In particular, 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.

Ottaviano and Puga (1997) also stress the need to incorporate the activities of multinational corporations into the model. Again, in SADC where many of the large (and dominant) firms are MNCs. This has been explored in the work of Markusen and Venables (1995) and Baldwin and Ottaviano (1998).

The issue of unemployment has perhaps been one of the greatest issues of regional integration in the EU, as it is in the SADC. With the models based on the assumption of full employment, how relevant will they be, and how does unemployment fit in? (Ottaviano and Puga 1997:26). The additional issue of long run growth and agglomeration has also got to be progressed further together with the question of the location determinants of industries of the ‘new economy’, such as information technology.

The question of infrastructure has been looked at by Martin and Rogers (1995). Venables and Gasiorek (1997) introduce a calibrated model of new economic geography and show how this can be used together with standard cost-benefit analysis in the development of

infrastructure. Linked to the issue of infrastructure is positioning in the integration area, both in geographical and infrastructural terms. This may have an important impact in SADC, as many of the countries are reliant of the export of primary products to the rest of the world. Ottaviano and Puga (1997:27) also stress the importance of integrating a political economy dimension to the model.

Neary (2000:16-18) criticizes the cost function underpinning the effect of increasing returns in the model. However, based on the Dixit-Stiglitz model the standard measure of the degree of returns to scale are not reliant on the fixed and variable cost parameters (F and c), but rather on the elasticity of substitution σ . Thus, although σ is initially stated as a taste parameter, it ends up determining the degree of returns to scale. If σ is high, indicating that there is less preference for diversity, different varieties are closer substitutes, or that products are more homogenous and fewer varieties of the good will be produced, indicating a higher firm output. This creates what Krugman (1991:490) terms “an inverse index of equilibrium economies of scale”. Therefore, the costs faced by firms, and hence the scale of production is determined by σ .

Although Neary (2000:17) applauds the usefulness of the above measure of increasing returns in “local analysis”, he criticizes it as being both unnecessary and undesirable in non-local comparisons. It is unnecessary as it narrows the “dimensionality of the parameter space”, and undesirable because the effects of an increase in substitutability in demand is now tied to, and cannot be separated from a higher ratio of variable to fixed costs (Neary 2000:18). This creates a weak argument that can be criticized from an industrial organization point of view, and provides little help in the way of analysis of individual firms.

Taking the point a little further, Neary (2000:18) shows how the above factor combined with the assumption of free entry “allows almost no role for strategic interactions between firms”. The consequent effect is that the theory is increasingly divorced from reality, where sunk costs and barriers to entry and exit exist. The industrial structure in SADC, and that of many small countries is may be found to contain number of very large sunk costs. This is particularly the case where only a few firms exist to service an entire industry, with the initial capital setup costing a fair proportion of the nations total income (and foreign currency reserves). Neary (2000:18) finds the assumption of footloose industry to be particularly implausible when it is further extended from an individual firm to entire footloose cities. The lock-in effects of industrial clusters in an economy with comparatively little industry may be considerable.

Thus, the basic model thus ignores many issues that are prevalent in current discussion on industrial policy, such as technological externalities and local public goods such as research and development, focusing purely on pecuniary externalities. Additionally, the model does not allow for strategic industrial strategies often used by industry to retain market position, such as creating artificial barriers to entry, out-sourcing and cross-border horizontal mergers (Neary 2000:19). However, the essence of the model is the analysis of changing trade costs on industrial production – and the above strategies could be seen as transport costs that could be reduced.

As a follow-on, the next criticism Neary (2000:19) has of the new economic geography is the way in which transport costs are incorporated into the model. The use of 'iceberg' transport costs assumes that the same technology is used in the transport as in the production of the good, quoting von Thunen's example of grain with the transport cost comprising principally of the grain fed to the horses pulling the cart (Neary 2000:19). In particular, costs in the transport industry are largely comprised of large fixed costs and relatively smaller variable costs. This aspect has largely been ignored due to the complexities of modeling, which leaves the links between transportation, technology and agglomeration somewhat vague (Neary 2000:19). Based on work done by Davis (1998), Neary (2000:20) faults the theory for assuming zero transport costs in the agricultural sector, as real world transport costs in this sector have been shown to be of a similar magnitude to that of manufacturing. However, Venables (1996) creates a similar model in which there is no sector with constant returns, but multi-sectors of increasing returns, which are all subject to transport costs.

The third major criticism Neary (2000:20) has is that the model is largely one-dimensional and this ignores strategic location issues of a two dimensional forms (such as overlapping shadows from competing cities).

The units of analysis, as specified by Krugman (1991) and many of his associates are not specific, and this may pose problems particularly when analyzing regional versus international spatial issues. In the theory national boundaries are only distinguished by the decreased role of labour mobility as a force for agglomeration. However, Neary (2000:21), looking back on past work of his shows through calibration studies that "the extent of intermediate input usage is not sufficient to yield strong agglomeration effects at the national level". The effect of technological spillovers is played down by Krugman (1991), but these may play a significant role particularly at the local level, decreasing as the distance gets larger (Neary 2000:21).

Criticism from the Geographers

Although the 'new economic geography' is being heralded as 'new turn' in economics, those who come from a geographical as opposed to economical stand see little 'new' in the theory. Rather, it is seen as a rehash of tools previously used in geography which have been discarded for a number of years, those of regional science and urban economics models (Martin 1999:67). The mathematics behind the new economic geography may be more impressive and comprehensive than the previous models, but geographers claim the results are remarkably similar and are thus open to the same criticisms (Martin 1999:67).

From an historical perspective, Martin (1999:70) shows how the essence of the NEG models has been drawn from urban and regional analysis (even from the 1960s) in the use of externalities, increasing returns and cumulative causation in explaining industrial location. Although much of this work has died out, there are many new studies emanating from geography on 'industrial districts' (Martin 1999:71). The importance of 'historical accident' placed within the models of NEG, Martin (1999:71) has been a factor well recognized in the fields of geography, likewise with the 'locking in' effect.

Additionally, Martin (1999:71) lists a number of studies that he claims “provide greater insight into the role of labour and technology in regional development than do the new spatial agglomeration models”.

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). However, as any body of theory reliant on proof through mathematics, it has to be somewhat reduced, which means that “messy social, cultural and institutional factors involved in spatial economic development are neglected” (Martin 1999:75). In particular, Martin (1999:75) criticizes the pioneers of NEG for putting these crucial issues ‘on the back seat’, and quoting Krugman in that they are “best left to sociologists”. By contrast, geographers incorporate the issue of ‘institutional thickness’ within regions (Amin and Thrift, 1994), where the spatial distribution and composition of institutions (from formal to informal) contribute to the organization of economic activity (Martin 1999:75). These factors are likely to play a large role in developing countries, and as such, these institutional effects may be substantial and perhaps outweigh the basic centripetal and centrifugal forces of the NEG.

Martin (1999:76) claims that the focus NEG places on quantitative modeling, and the selected determinants of location ignores important qualitative aspects. In fact, Martin (1999:76) goes on to say that the ‘locking-in’ effects prevalent in NEG models do not stand up in today’s world, where there has been massive structural change across all borders. However, the models of NEG do not deny this occurrence, and many of these changes could even be explained within this framework, as the model is essentially dynamic in nature. Part of Krugman’s rationale for the NEG was the advantages of placing geographical contexts into new mathematical models – a feat he claims geographers lacked and economists shied away from. Martin (1999:81), criticizes this boast, saying that the reason economic geographers did not pursue the route of the NEG was because of this fundamental mathematical reductionism. Geographers prefer to analyze each situation in terms of its place, history and particular context – which is left out in the abstracted ‘general-space’ economies in the NEG (Martin 1999:81).

In a similar vein, Martin (1999:77) points towards 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”. Although Krugman (1991) acknowledges many of these factors, the rigid mathematics of proof for the NEG sacrifices the “richness” of Kaldor’s original models (Martin 1999:77). This, Martin (1999:77) sees as a mere return to the paradigm of regional science.

Martin’s (1999:77) next criticism of the NEG is the abstractedness of analysis, the avoidance of real ‘geographical’ places. Again, this ignores local factors that may affect the location of industry substantially. This is particularly evident in that the same model is used at vastly different levels of geographical disaggregation, from a city level to international, cross boundary analysis (Martin 1999:78). This highlights a major difference between the ‘economic geographers’ and the ‘geographical economists’, in

that the issue of space is central to the latter, while spatial scale is largely ignored by the former (Martin 1999:78). Although not focused on, the NEG does acknowledge that specific types of externalities may be more localized than others (pecuniary less so than technological or informational). However, the relative importance and interaction of these externalities is not discussed (Martin 1999:78).

Martin (1999:78) likens this mathematically induced 'narrow mindedness' of the NEG with regional science, although it appears that the NEG has focused where regional science is growing out of. Martin (1999:79) notes how 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". This, likewise increases the gulf between the NEG and 'economic geography proper', where the economic geographers proper emphasise the "political, economic, institutional and social bases of regional development and industrial agglomeration" (Martin 1999:79). Martin (1999:79) lists a number of influences on this trend in economic geography. The first factor is the emergence of theories on 'flexible specialisation' put forward by authors such as Piore and Sabel (1984), the *Second Industrial Divide* and Gertler (1992). The second influence arose from the work being done on the industrial districts of the 'third Italy'. Here, detailed empirical studies are done that incorporate "social, cultural and institutional foundations of local industrial growth" and likewise "the networks of trust, cooperation, competition and governance" (Martin 1999:79). Thirdly, the movement towards 'post-Fordism' advocated by the French regulation political economy. The technological learning literature (Lundvall, 1992) and the distinction between area-based networks and learning regions. Additionally, the issue of sunk costs has been incorporated. In Africa, where many industries have been government funded and are often large monopolies, this may play a large role, where there have been substantial sunk costs, and an unwillingness to give them up. Lastly, the cultural bases of "industrial organization and corporate behaviour" and its effect on production location (Martin 1999:80). Through all these factors, Martin (1999:80) agrees that it would be difficult to find an all-encompassing theory of location, however, the underlying factor is the study of 'real places', where "[p]ath dependence thus has a place-dependent character".

Martin (1999:84) concludes that the NEG is merely a reincarnation of the old regional science, and as such is not a 'new' branch of theory, nor a part of geography, as the NEG "contains too little region and too much mathematics". As such, and due to the lack of empirical research to back the theory up, Martin (1999:84) warns against the use of NEG for policy application.

In the studies that have been done, Martin (1999:70) claims they are too simplistic and fail to include such (potentially) important factors such as the role of local infrastructure, institutions, state interference, regulations foreign investment amongst others. In the case of SADC these factors could play a large role due to the sensitive nature and issue of domestic industry, where an entire industry could consist of one or two firms. Another factor that is getting increasing amounts of attention is the effect of technological spillovers, although these have yet to be fully incorporated into the models of the new

economic geography (Martin 1999:70). In fact, Krugman (1991) himself argues that technological spillovers are overrated.

An astounding reality is the antagonism present between these two branches of theory, in many a conversation initiated with a fellow academic (from all around the world) discussing location and space, the conversation has abruptly ended when the new economic geography is mentioned. There is not even a will to discuss it, surely, as Martin (1999:83) says there is room for “cross-fertilisation of ideas between geographers and economists”. Within each paradigm there are benefits and failures, you lose some things when you reduce, but you can also lose out when the field is too broad. An important question to ask in this particular case is whether in the study of developing countries you gain significantly from a reduced form, abstracted model, or whether there are other ‘developing country specific’ factors in this context, that may have been omitted in the original model that have more effect in the choice of industrial location.

Neary (2000:22) however, provides support for the theory against Martin’s criticism of excessive mathematical modeling in the new economic geography, likening economic modeling to the comment of the Roman poet Propertius on his lover “difficult to live with, impossible to live without”. In terms of Krugman’s model merely being an extension of location theory and regional science, Neary (2000:22) believes that the behavioural underpinnings of contributed in the new theory contribute a significant variation to the past paradigms. Neary (2000:23) calls for closer cooperation between those of the new economic geography and those in the related, but increasingly antagonized fields of economic geography and regional science. Scope for collaborative research is particularly open in empirical implementation. This is where the proof and usefulness of the new economic geography will be proven.

Conclusion

This paper has sought to give an overview of the new economic geography and introduce the rationale for such studies in the study of regional integration processes in Africa. The body of theory has emerged out of the new theories of international trade, while at the same time incorporating aspects from geography. Empirical research in this area is presently in its infant stages, and is particularly scarce within developing nations and even more so in Africa. A review of empirical research conducted to date has been presented, and new research should be forthcoming depending on the availability of data. It is hoped that this paper has provided an introduction to the theory of economic geography as an alternate method of analyzing regional integration.

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