

**The further the distance, the closer the ties**

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## **Abstract**

In his article ‘death of distance’, Caincross (1997) challenged the orthodoxy with regard to the role and direction of proximity in international trade. The mainstream model for trade analysis, the gravity model has only two prominent determinants – one of which is distance. But while this theory predicts a negative impact of distance on trade, empirical evidence seems to be evenly split between those finding a positive and those finding a negative impact of distance on trade. South Africa’s total exports to three groups of countries at different distances are measured to determine the impact of distance. The results indicate that distance shows a negative sign when African countries are concerned but turns positive when European countries, even more distant, enter the equation.

## **1. INTRODUCTION**

A well-known explanation why distance matters in the international trade context is that transport costs increases over distance. A product must travel a certain distance to reach a market and in general, the further the distance, the higher the costs of transporting the product. The negative effect of distance on trade is somewhat intuitive as it reflects transportation costs.

However, with his announcement of the ‘death of distance’, Caincross (1997) challenged the orthodoxy with regard to the role and direction of the distance effect in international trade. His declaration was no more than a formal proclamation of a widely-held but weakly-verified perception of the impact of the phenomenal growth in information and communication technology on trade. He neither orchestrated the debate about the impact of distance on trade nor did his perception fall among the standard group of arguments. Both before and since his publication, arguments have raged over the magnitude and direction of impact of distance on international trade. In fact, the mainstream model for trade analysis, the gravity model has only two prominent determinants – one of which is distance. But while this theory predicts a negative impact of distance on trade, empirical evidence seems to be evenly split between those finding it positive and those finding it negative. Caincross, which seems to infer that trade has become distance-neutral, generated a significant literature that is no longer content with the standard

theorisation about the impact of distance and empirical evidence continues to vary. Consequently, at present, there is little, if any agreement on the nature and direction of the impact of distance on trade.

There are a significant number of results that show that distance can and does have an impact on trade (Carrère and Schiff, 2004; Linders, 2005; and Disdier and Head, 2006). There is however, no consensus that such impact must always be negative as several authors have either found the impact of distance completely ambiguous or “counter-intuitively” signed. This is particularly the case with studies running since the information and communication technology revolution. Globalisation and regionalisation, no doubt, challenge territorial significance of economic spaces.

The sample country in this analysis is South Africa and its exports to a selection of African and European countries. The choice of South Africa is partly defined by the fact that it occupies a satellite position in Southern Africa. While the analyses on South Africa may not apply to all other countries on the continent, a number of them do. For example, South Africa is relatively industrialised and exports manufactures unlike many African countries. Therefore its trading partners would naturally be more diverse and the volume of trade higher. But then like most other African countries, its major trading partners are outside the continent. So it is expected that the drivers of trade between South Africa and the rest of the world compared to the rest of Africa may be somewhat different.

The rest of the paper is structured as follows: Section 2 discuss the matter of distance, while Section 3 describe the fact that distance is still a very important aspect in international trade. In Section 4 the estimation procedure is addressed and the results are provided and discussed in Section 5. The conclusions drawn from the analysis is discussed in Section 6.

## **2. THE MATTER OF DISTANCE**

Disdier and Head (2006) highlighted the continued puzzling effect of distance on bilateral trade. It is therefore important to examine the concept of distance in more detail, including the potential

factors that may have an impact on the distance variable. Distance can manifest itself along four basic dimensions namely geographic, economic, cultural and administrative. Geographic distance is the obvious one and it mainly affects the costs of transportation and communications. The level of wealth or income in a country is perceived as the most important economic attribute that creates distance between trading countries. Cultural distance determines how people interact with one another and includes several factors such as religious beliefs, race, social norms and language. Administrative distance, also sometimes referred to as political distance, include historical and political associations shared among trading partners. Each of these dimensions of distance includes many different factors of which some is fairly apparent, while other is less obvious. A distance framework provide a summary of the main factors impacting on each of the four dimensions, shown in Table 1 (Ghemawat, 2001).

**Table 1: Factors creating distance**

<b>Geographic distance</b>	<b>Economic distance</b>	<b>Cultural distance</b>	<b>Administrative distance</b>
Physical remoteness	Income levels	Languages	Colonial ties
Common border	Natural resources	Ethnicities	Shared monetary or political association
Landlocked	Financial resources	Religions	Political hostility
Size of country	Human resources	Social norms	Government policies
Transportation or communication links	Infrastructure		Institutional development
Climate	Intermediate inputs		
	Information or knowledge		

The distance variable is commonly used in gravity equations as a proxy for transport costs under the assumption that distance costs are a linear function of distance (Márquez-Ramos, L., Martínez-Zarzoso, I. and Suárez-Burguet, 2007). Contracting and general cost of doing business are obviously easier the shorter the distance between two trading partners. Conflict resolution is also easier with firms in proximate countries than they are with firms in faraway lands.

However, it is evident given these distance effects from Table 1 that distance may only be remotely connected to transport costs. Glaeser and Kohlhase (2003) show that transport costs alone are not enough to explain the estimated distance effects. Such non-economic factors as cultural and administrative differences have been brought in as potential contributors. Distance in general may include other factors such as cultural proximity, colonial past, perception of proximity and information costs. It seems that the major component of the impact of distance is not necessarily transport costs as much as it is the many (often intangible) costs associated with trading relationships among distant (and unfamiliar) partners. Proximity sometimes goes with similar culture, better understanding and greater ease in locating trading partners.

Linders (2005) acknowledges that heterogeneity in distance may arise, not only from sample and estimation differences, but also from influence of regressors that may be correlated to distance. Some of the prominent identified regressors in this category include trade agreements, contiguity, common language and colonial ties. Most of these factors lead to stronger socioeconomic ties between two countries, which often cause higher trade than ordinarily would have been predicted by the distance measure. With a potentially positive impact on trade, their exclusion in a regression of the impact of distance on trade may lead to biased results. For example, higher concentration of trade along borders of two contiguous countries (where this is not part of the informal economy as is the case with many African countries) will likely lead to a dilution of the potential impact of estimated distance between trading partners, especially when the distance measure is taken between the capital cities of the countries involved as is often the case.

Likewise, common language and historical/colonial ties imply a stronger relationship at the expense of contiguous, but less closely related neighbours. The extent of cultural differences (which includes language and other measures of cultural identity) between a country and any particular trading partner goes a long way in defining the extent to which the distance between them will have an impact on the quantity of trade that goes on between them. Linders' empirical results confirm these assumptions. Language and colonial ties lead to disproportionately higher trade between two countries given that such non-economic factors like poor familiarity, different

languages, lack of (or weak) trust and coordination, that ordinarily should impact trade negatively, are kept at the minimum.

Extending the argument and incorporating such factors as the output and income of the surrounding nations lead to an assumption which even makes it possible for the distance parameter to be positive under certain circumstances. This is part of Linders' (2005) point about the effect of geographical distance on aggregate trade flows being heterogeneous. According to him, the distance effect on trade varies according to the estimation and specification characteristics of the primary studies. The omission of several bilateral variables may lead to substantial biasedness in the distance parameter. He referred to such factors as membership in a common trade bloc or regional grouping, common language or colonial ties and contiguity of countries. Other factors that may impact on the distance parameter may include aspects such as the level of trade facilitation and even the size of income of the sample countries. Agu and Jordaan (2009) for example, using South Africa's export data, found that regional integration and proximity might avail little if the quality of trade facilitation within a region and the purchasing power of surrounding countries are meagre.

In many parts of the world, regional integration is currently being used to force the hands of governments to reduce technical barriers to trade and thereby reduce trade costs to only those associated with distance. Similarly, it is being used as an instrument to pool resources in order to enhance provision of public goods that reduce overall costs of doing business across regions and thereby reduce facilitation-associated costs to the barest minimum. Maur (2008) examines this relationship in-depth, noting that most regional trade agreements presently incorporate trade facilitation dimensions. Others like Pitigala (2005) and Dennis (2006) provide empirical evidence of the impact of trade facilitation on trade volumes among regional groupings, contiguous countries or countries with some form of economic relationship. Others like Fox et al (2003), OECD (2003) and Hertel and Keeney (2005) have also worked extensively on studying the impact of trade facilitation on trade volume and direction, transaction costs, income and welfare of participating countries using a variety of techniques. Overall then, there is ample demonstration in the literature that trade facilitation and levels of income could swing the overall impact of distance in trade one way or another.

In the same vein, trade costs increase with weaker quality of trade facilitation. Shorter distances may have much higher costs owing to difficulties associated with customs and ports, goods clearing, and time costs of transaction. Communications costs and internal transportation costs can also be very high on account of poor, expensive and outdated facilities and substantially add to the overall costs of trading. In fact, this seems to be the case with many African countries where trade costs between one proximate country and another are very high despite short distances.

According to Huang (2007), geographic distances between two countries are an indication of transportation costs but also unfamiliarity, which is also referred to as informational barriers. This last concept, especially in an uncertainty aversion environment, can keep people from doing business with unfamiliar people in far away countries. It is, however not easy to determine whether transport cost alone, or combined with unfamiliarity, have an impact on distance as both are increasing in geographical terms. Casella and Rauch (2003) indicate that matching buyers and sellers in an unfamiliar foreign country can cause barriers for international trade. Rauch (1999) found empirical proof that a common language and colonial ties can overcome some of these barriers and promote bilateral trade. This is in line with Portes, Rey and Oh (2001) which states that the closer countries are to one another, they tend to know more about one another. This is so because of more interaction due to tourism, business, media coverage or learning each other's language. This unfamiliarity concept plays a role especially in some cultures where the unknown is perceived as dangerous while in others, the unknown creates curiosity (Huang, 2007). But much beyond transport costs (estimated to have only 4 percent of total impact of distance effect), it is a fact that cultural familiarity decreases as distance increases leading to increased geographical information asymmetries. Such information asymmetries and decreasing cultural familiarity imply higher transaction costs and particularly account for the 'mystery of missing trade', a term used to explain low foreign trade intensity in most countries' overall trade (Deardorff, 1995; Trefler, 1995; and Rauch, 1999).

## 2.1 Centre versus periphery

It is further argued that the overall impact of distance between any two countries depends on how isolated the country is from other countries (Smarzynska, 2001). In a way, while a country might not be completely isolated from other countries, it might be surrounded by countries with lower levels of development. Aspects to take into account include whether there are many close-by neighbouring countries or only a few. Also of importance is whether close-by countries are small or big. Remoteness and internal distance then becomes important factors (Melitz, 2007). If, as found by Linders (2005) the estimated distance effect are usually affected by omitted variables, then the challenges emanating from the interaction or impact of other variables on the overall effect of distance on trade remains an unresolved research question. In other words, the last is yet to be said on the direction and size of distance particularly when other non-economic variables are incorporated. For example, it is known that Australia's trade with New Zealand is multiples of that between Austria and Portugal despite each duo having about the same distance between them. The reason given is that the first two are relatively more isolated from other developed countries while being closer to each other than the last two.

The above is a mute but emphatic way of making the *centre versus periphery* argument in international trade an issue with more than cursory and theoretical implication for trade growth in Africa (Lloyd, Matthew, and de Leeuw, 2005). If, for example, output (and other variables) can swamp distance in impact or completely alter the estimated direction of its impact, then struggling to solve the riddle of weak African internal and regional trade without proper understanding of what these 'other' variables are and how they work makes little sense. While we do know that distance does not always have a negative impact on trade between African countries and its neighbours, we know that relative to Europe, North America and Asia, African countries trade less among themselves. It is natural to suspect that such non-economic factors contribute highly to this situation, but this is no more than suspicion as little empirical work has been directed at explaining the phenomenon with this assumption. An important aspect is to determine whether 'other variables' alter the position of estimated distance effect. The argument here is that when output is considered, distance between two African countries may not be very important. Regional integration, in that sense, may not yield optimal results when the integrating countries are poor and have little to offer one another.



Disdier and Head (2006) note that answers to many important economic questions depend in large part on how much distance affects trade. Conceptually, trade economists need a proper understanding of distance to be able to relate a number of other notable variables to trade as well as provide an explanation to some of the more puzzling issues as the centre-periphery phenomenon. Even if only implicitly, there is the understanding that global production and trade balances on a tripod between Europe, North America and developed Asia. The rest, including under-developing Asia, Africa and Latin America, form the periphery. Discussions and considerations therefore pertaining to 'proximity to markets' are often provided with an understanding that the market consists of those countries which, by virtue of the size of their gross domestic product (GDP), have the purchasing power to impact the global demand and supply chain. As a result, both factor proportions models and models with increasing returns to scale of production somewhat have penalties for countries that are located outside this tripod. In the factor proportions model for example, potentials for factor price equalisation heavily depend on trade costs arising from spatial separation whereas in models with increasing returns to scale, there is a penalty for geographic isolation. While wages and other costs of production are generally lower in much of the periphery, additional costs related to transportation and communication raise overall cost of doing business in those places and therefore keep them marginal in global trade and production. In addition, low income means lower command over products and weaker markets, accentuating the disadvantages they face.

Krugman's (1991) economic geography theory has lent even greater weight to the argument in favour of distance. However, he approached the issue, not from the perspective of countries trading among themselves, but more from the perspective of economic hubs that relate with one another. From this perspective, 'the hub and periphery' cannot be seen only as 'producing countries' but more as producing regions located across different countries of the world and having interactions among themselves. The further a particular hub is from others determines the cost of doing business between it and other hubs. For the non-hubs, even when they exist within the same country, the cost of doing business may be high if there are no collateral benefits arising from proximity to a hub and the facilities attendant thereof. As noted, Krugman's

conclusions are not much different from earlier theories except as it refers, not to politically and geographically-defined sovereign entities but to economically empowered production regions.

Therefore, whether viewed from the perspective of proximate countries or proximate production hubs, it is acknowledged that the distance between the site of production and the 'market' for the product does have impact on the cost of transportation and therefore its competitiveness relative to substitutes. By the same token, there is a 'distance cost' to low-production countries as they strive to access markets. The final landing costs of a product will naturally depend on how far a country is from the production area as well as the relative quantity that has to be shipped to it at a point, which in turn depends on both its population and income level. So there is a penalty for being far and there is an even greater penalty for being far and poor at the same time.

## **2.2 Information and communication technology**

The whole essence of the globalisation impact on distance and trade costs come from reduced costs associated with technological improvement. Eichengreen and Irwin, (1996) and Anderson and Van Wincoop (2003) show that the technological progress in transport and communication technology may have altogether been 'distance neutral'. The argument here is simple, if transport costs were to fall proportionately, irrespective of distance, trade should have increased in direct proportion to that fall, leaving the distance parameter unaffected (Buch, Kleinert, and Toubal, 2004). However, the reality might be that a proportionate fall in transport costs for all distances might leave imports from farther places disadvantaged given that transport costs are higher for such longer distances. This forms the crux of the Grossman (1998) model which showed that where technological progress have reduced distance sensitive trade costs over time, the distance parameter should have fallen. This is because as the share of distance costs in total costs gets smaller, increases in relative price emanating from increasing distances equally gets smaller. In addition, relative transport costs for distant trade will fall leading to a fall in distance decay. However, it seems that this has not happened. According to Linders (2005), distance decay seems rather to have increased over time.

With little variations, there seems to be an agreement among trade researchers that transport cost is a critical component of the distance impact on trade. But such transport costs have been

greatly affected by advancements in technology over time. Consequently, there is an understanding that the time of a particular study, among other things, largely determines the size of the coefficient of the impact of distance on trade. The distance effect has held up in a very wide range of samples and methodologies and has not declined in importance in studies employing more recent data (Disdier and Head, 2006). For example, it should make sense that the emergence of information and communication technology should have dampened the distance effects on trade. But even more recent studies still find distance as being significant in determining trade. In their meta-analysis, they find that after slightly decreasing in the first half of the previous century, the distance effect started rising in importance again beginning from around 1950. Since the information and communication explosion, estimates have not shown as significant a reduction in the impact of distance as should have been warranted by the 'global village' phenomenon. The distance estimate has remained fairly resilient over time and that despite the vaunted developments in transport as well as communication and information technology over the years (Brun, Carrere, Guillaumont, and de Melo, 2002). It has been presumed that the many astounding innovations in transport, information and communication technologies should have reduced the influence of distance on international trade.

### **3. DISTANCE STILL MATTERS**

The process of integration of the global economy increased rapidly in recent decades. Although various factors may have contributed to this, the overall decline in trade costs may partially explain it. This decline in trade costs includes transport and communication costs. An expected consequence of this higher level of integration should have been higher levels of trade geographically. This implies that trade to more distant markets would occur as distance would play a less important role for most countries. However, various studies found the opposite where the negative impact of distance on bilateral trade actually increased over time (Leamer, 1993; Frankel, 1997; and Smarzynska, 2001). Leamer and Levinsohn (1995) mentioned that even with this decline in trade costs it does not relate to a world that is getting smaller.

Estimates of the elasticity of distance to trade vary among different empirical studies. Leamer and Levinsohn (1995) estimate elasticity of distance to trade to be about -0.6 whereas Overman, Redding and Venables, (2003) put it at between -0.9 and -1.5. Disdier and Head (2003), based on

a database of about 1467 estimates from 103 papers put the mean effect at about -0.9 with estimates from a majority of the papers lying between -0.28 and -1.55. Given the large variations in samples, methodologies and timing of the different works that have studied distance in international trade, these differences in the range of estimates are not completely unexpected. However, it has to be acknowledged that besides the so-called non-economic factors that impact on the distance effect, such economic factors as output, quality of trade facilitation and support infrastructure, as well as the nature and capacity of immediate neighbours greatly determine the overall impact that distance will have on trade (Frankel, 1997).

Coe, Subramanian, Tamirisa and Bhavnani (2002) found evidence of the declining importance of geography. Studies by Freund and Weinhold (2004) and Coca-Castaño, Mágina-Ramos and Martínez-Zarzoso (2005) found evidence of a declining importance of geography only for distance in developed countries. The distance coefficient decreased by 13.55% for developed countries and increased by 29.7% for developing countries between 1980 and 1999. However, the magnitude and sign of the distance coefficient is related to the importance of bilateral trade activities between far away partners and once close by (Buch et al, 2004).

If distance is still alive and well, how is such a country's trade affected by the production and trade activities of more proximate competitors. It is not clear from the literature how the concentration of trading partners in relatively long distances interacts with cultural (dis)affinity and relatively falling share of transport costs in overall costs associated with distant trade, to determine the quantum of its trade with others. For countries with poor infrastructure, and having relatively poor neighbours with weak trade facilitation measures, the problem can be even more daunting.

According to Berthelon and Freund (2004), the impact of distance on trade has become more important, with almost no industries where distance has become significantly less important. Consequently, while Linders (2005) announced that distance is alive and well, its impact on trade could be moderated by a number of factors. To what extent this is true in the differing national contexts of African countries is still not adequately documented in the empirical literature. Carrere and Schiff (2004) suggest that as trade costs fall, one would expect a larger share of a

country's trade to take place further away from its borders, resulting in an increase in the distance of its trade over time. Consequently, as found by Freund and Hummels (2003), the coefficient of distance can present no clear trend as it can decline (Coe et al, 2002 and Brun et al, 2002) or it can increase over time as has been shown by Leamer (1993), Frankel (1997), Gallup and Sachs (1999) and Smarzynska (2001). For African countries, the challenge is therefore not just theoretical. Prospects for growth in trade and output may depend largely on the understanding of what is impacting on this seemingly complex relationship between distance and all related variables.

#### 4. METHODOLOGY

The workhorse of trade assessment in the literature is the gravity model. Standard representation of the gravity equation in trade relations explains the size of exports from country  $i$  to country  $j$  by three factors. The first indicates the supply of the exporting country ( $i$ ), and the second one indicates the demand of the importing country ( $j$ ), and the third includes factors which represents the resistance to trade flow between countries. In its basic form, exports from country  $i$  to country  $j$  are determined by their economic sizes (GDP), population, geographical distances and a set of dummies which incorporate some kind of institutional characteristics common to specific flows. The gravity model is generally specified as (Jakab, Kovacs and Oszlay, 2001; Martinez-Zarzoso and Nowak-Lehmann, 2003):

$$\ln X_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln POP_i + \beta_4 \ln POP_j + \beta_5 \ln DIS_{ij} + \beta_6 \ln A_{ij} + u_{ij} \quad (1)$$

where  $X_{ij}$  is exports of goods from country  $i$  to country  $j$ ,  $Y_i$  and  $Y_j$  are the GDP of the exporter and importer countries,  $POP_i$  and  $POP_j$  are the populations of the exporter and importer,  $DIS_{ij}$  is the distance in kilometres between the two countries,  $A_{ij}$  represents any other factor that influence trade between the countries, and  $u_{ij}$  is the error term. A high level of GDP indicates a high level of production in the exporting country and can be interpreted as a proxy for the range of product varieties available, which increases the availability of exports. It represents THE

potential supply of exports. The importer's GDP represents potential demand for imports. A high level of GDP or income in the importing country suggests high imports. The coefficients  $\beta_1$  and  $\beta_2$  are expected to have positive signs. The population variables can influence export in two ways. A large population indicates a large domestic market and a high level of domestic consumption and thus less to export (Nilsson, 2000). Large populations also encourage division of labour and this means that there will be economies of scale in production, and therefore more opportunities to export a variety of goods. For the exporting country, a large population can increase or decrease exports depending on whether domestic consumption or economies of scale is dominant. For the importing country a large population can also increase or decrease trade for the same reasons. Thus, the effects of population for both the exporting and importing countries can be positive or negative. That means  $\beta_3$  and  $\beta_4$  are expected to have ambiguous signs (Oguledo and MacPhee, 1994). The coefficient of distance is intuitively expected to be negative because it is a measure of transport costs and supported by several studies to be negative (such Feenstra, 2002; Feenstra, Markusen and Rose, 2001). However, this is the main variable to be tested in this study and it remains to be seen whether the coefficient will be negative or positive.

While the standard gravity model does well in predicting and/or explaining trade based on just income and distances of two countries, it leaves out a significant amount of unexplained variation in trade (Head, 2003). As a consequence, many works (including Rose, 2001; Frankel and Rose, 2002; Rose and Engel, 2002; Glick and Rose, 2002; Wilson, 2003; Carrere, 2004; Wilson et al, 2004; Njinkeu et al, 2008) 'augment' the traditional gravity model.

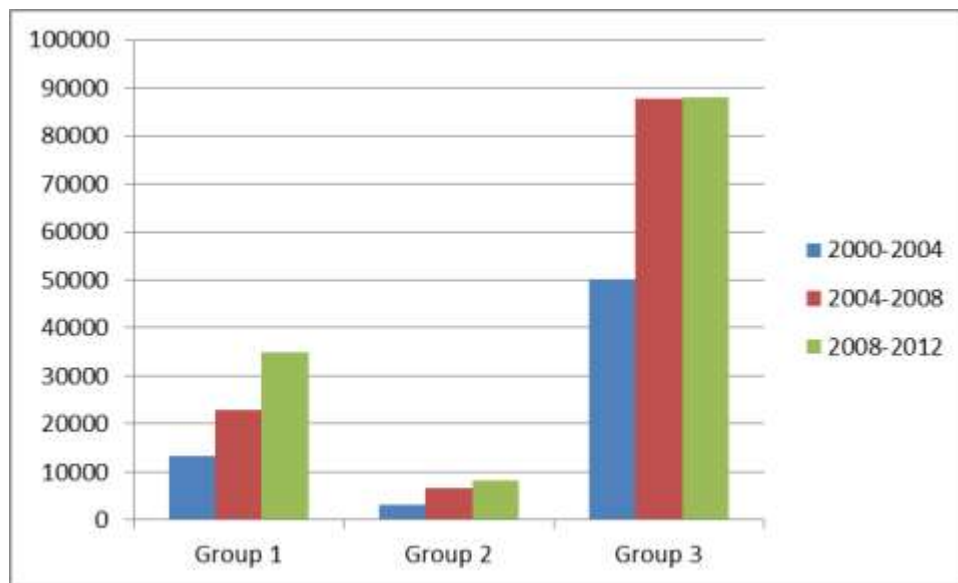
Studies (such as Mátyás, 1997 and Tri Do, 2006) extended the gravity model by including the real effective exchange rate which is also done in this study. This paper further introduces the international oil price (included in  $A_{ij}$ ) to represent factors that impact on transportation costs, which is arguably the main factor that affects the marginal cost of transportation. A dummy variable is also included namely the English language. The dummy variable takes the value of one where English is the official language, and zero otherwise. The introduction of these variables modifies Equation (1) as:

$$\ln X_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln POP_i + \beta_4 \ln POP_j + \beta_5 \ln RER_{ij} + \beta_6 \ln DIS_{ij} + \beta_7 \ln OIL + \beta_8 LANG + u_{ij} \quad (2)$$

where RER is the real effective exchange rate between countries  $i$  and  $j$  and OIL is the international oil price per barrel with LANG a dummy for the English language. A depreciation of the real effective exchange rate generally causes an increase in exports and it is expected that a higher international oil price would cause exports to decline. A common language between countries is associated with an increase in trade between countries.

A panel data approach is followed using the random effects estimation procedure to avoid eliminating the coefficients of the time-invariant variables such as distance. The within-transformation in a bilateral fixed effects model removes variables that are cross-sectional time-invariant (Brun, et al. 2002). The data covers 32 countries of which 22 are from Africa and 10 from the European Union (EU). For a complete list, see Appendix Table A1. Annual data from 2000 to 2012 is used with total exports from South Africa to these countries as the dependent variable. The data is tested over three time periods namely 2000 to 2004, 2004 to 2008 and 2008 to 2012 to see whether there is any change over time regarding the distance variable. The countries were divided into three groups, according to the distance between the capitals of the countries and South Africa. The first group (Group 1), consisting of 11 southern African countries is between 458km and 3100km from South Africa. The second group (Group 2) is 11 countries from northern Africa, with the exception of the Seychelles and is between 3500km and 7600km from South Africa. The last group (Group 3) of 10 countries is part of the EU and is between 7660km and 9400km from South Africa. The idea is to see whether the distance variable is positive or negative as distance between South Africa and these countries increases. To compare the magnitude or value of exports from South Africa flowing to each of this group of countries, Figure 1 provides some insight over the three time periods. It is clear that the majority of exports from South Africa are destined for the European market, which is also the furthest market from South Africa in terms of distance. Exports to the northern African countries are by far the lowest, given the three groups in the sample.

**Figure 1: Total exports from South Africa (million US\$)**



All variables with the exception of the language dummy are log-linearized. The Hausman test was done which confirms no misspecification problems were experienced and the F-test confirms the poolability of the data.

## 5. RESULTS

In this study, the assumption will strictly be that distance reflects frictions and transportation costs. The focus of the estimation would be to analyse the impact of the relative impact of distance on exports from South Africa. As such, the results of the other variables will not necessarily be shown. As the population variables did not really improve the results it was decided to drop it from the estimations.

Table 1 show that the distance coefficient for Group 1 is negative and statistically significant for all three time periods, which is consistent with theoretical expectations. It is interesting to note that the distance coefficient was slightly smaller in the second period, although still negative but increased again in the third period showing the largest negative impact. This group of countries is the closest to South Africa in the sample of countries tested. The coefficient of the oil variable was negative over the first two time periods but statistically insignificant. In the third time period



the coefficient of the oil variable changed to a very small positive sign and statistically significant which is rather unexpected. The coefficient of the language variable was strongly positive and statistically significant over all three time periods. The remaining variables behaved more or less as expected.

**Table 1: Estimation Results – Group 1**

Years	Distance	t-stat	prob	R <sup>2</sup>
2000-2004	-1.973	-3.937	0.0003***	0.627
2004-2008	-1.953	-4.314	0.0001***	0.729
2008-2012	-2.182	-5.584	0.0000***	0.622

Author's calculations. Notes: \*\*\*/\*\*\*/ significant at 10%/5%/1% level

Table 2 shows that although the distance coefficient for Group 2 is negative over all three time periods, it is statistically insignificant. Again the second period was negative but slightly smaller than the first period, with the coefficient in the third period the largest negative again. This group of countries is further away from South Africa and one would expect a bigger impact on distance. However, the value of exports from South Africa flowing to this group is also the lowest. The coefficient of the oil variable was negative in the first time period and statistically significant but then changed to being positive and statistically insignificant in the last two time periods. The coefficient of the language variable was again positive and statistically significant over all three time periods. The remaining variables behaved more or less as expected.

**Table 2: Estimation Results – Group 2**

Years	Distance	t-stat	prob	R <sup>2</sup>
2000-2004	-0.632	-0.584	0.561	0.568
2004-2008	-0.464	-0.390	0.698	0.570
2008-2012	-1.095	-0.942	0.350	0.334

Author's calculations. Notes: \*\*\*/\*\*\*/ significant at 10%/5%/1% level

Table 3 shows that the distance coefficient for Group 3 has now changed to being strongly positive over all three time periods, although not statistically significant. This group of countries

is all EU countries and the furthest in terms of distance from South Africa. The coefficient of the oil variable was small but positive over all three time periods and statistically significant which is against expectations. The coefficient of the language variable was negative and statistically insignificant over all three time periods. The GDP of the importing countries were all strongly positive and statistically significant.

**Table 3: Estimation Results – Group 3**

Years	Distance	t-stat	prob	R <sup>2</sup>
2000-2004	7.172	1.355	0.182	0.860
2004-2008	6.662	1.221	0.228	0.551
2008-2012	8.420	1.340	0.187	0.635

Author's calculations. Notes: \*/\*\*/\*\*\*/ significant at 10%/5%/1% level

The 'augmented' variables in the model were significant although not being consistent. The price of oil seems to matter for transport purposes within the African continent although it does not seem to impact on trade between South Africa and the European trading partners. The English language has a significant positive influence on exports of South Africa for the entire time period among African countries. This is expected given that the official language of South Africa is English and the literature is replete with studies indicating that language is a strong factor in trade ties. However, it seems as if it is not playing such an important role in trade with the European countries, given the high level of exports destined for Europe.

While gravity theory predicts a negative impact of distance, the estimate shows it is true for trade with the sample of African countries. However, the impact of distance changes to a positive impact when considering the sample of European countries. This positive sign remained consistent throughout the different time periods when dealing with the European countries. It is important to note that this is not exactly as counterintuitive as it may appear. In fact, the result is in good company with findings from the likes of Pitigala (2005) among several others. Primarily, given its geographical position, elite status in Africa and unique history, South Africa's primary trade and economic relations seem to be more with Europe and the rest of the world than with African countries. The country is one of very few African countries that export manufactures and

trade intensively with faraway countries. Many African countries do trade with South Africa but the relative share of such trade is miniscule compared to the rest of the world. This is shown by taking a look at the trends in SA's export between 2000 and 2012 (that formed the period of analysis) in Figure 1. In effect, the estimation results reflect the fact that most of South Africa's big trading partners are distant nations.

While this result may not necessarily call into question the standard proposition of the gravity model, it nevertheless shows a possible exception to the rule. As noted in the literature section, the question of the direction and even relevance of distance is one of intense debate. Caincross' announcement of the death of distance is a reaction to the great revolution in trade brought about by technological breakthroughs in information and communication technology over the years. For a long time, it was taken as axiomatic that distance has fallen in relevance in international trade. The declaration that 'distance is alive and well' by Carrere and Schiff (2004) and the many meta analyses that indicate (sometimes even increasing) relevance of distance with more recent data has fuelled fresh debates.

The results above seem to point to the fact that there is even more to the distance debate than currently goes on in the literature. It is not simply about relevance or irrelevance of the variable, it is also about the uniqueness of the sample country and the relative drivers of bonding between it and its trading partners. South Africa is surrounded by relatively low income countries and as such the country's trade with its neighbouring trading partners will be relatively lower. Most of the higher income countries are in Europe, and in a way, the further the countries, the more South Africa seem to trade with those distant countries rather than the more proximate ones.

## **6. CONCLUSION**

South Africa is unique from many other African countries in a way – it is relatively developed and exports manufactures and in this sense, would have more diversified commodities and trading partners. It is also unique in its geographic positioning relative to many other countries in Africa. But that is only as far as the uniqueness and difference to other African countries go. Most of its trading partners are outside the continent and this it shares with nearly all other

African countries. It evidently trades less with its continental neighbours than with outsiders and seemingly, this is a continent-wide challenge for trade growth among African countries. Just as it is well known that most African countries are mono-product, it is almost a stylised fact that they also trade less with one another. Some segment of the literature tries to explain this on the similarity of their products to one another, a factor that reduces attraction to trade. However, it is also a known fact that movement within the continent is relatively difficult.

In effect, while other regions are consolidating on gains and making new inroads into technological advancement of processes for trade improvement and domestic infrastructural management, proximity among African countries do not seem to be beneficial. This trend complicates the already huge challenge of poor income and reinforces historical trading relations between countries in Africa and Europe at the expense of their immediate neighbours. In a word, it makes proximity a disadvantage among African countries.

Future research can disaggregate the causes to examine the relative impact of production structure (including product classes) and trade facilitation factors on the distance effect, if and where it exists. Without having to elaborate on this, it is safe to say that African countries need to understand how this phenomenon is playing out in trade among countries in the region. Without doubt, taking it into account in the diverse arrangements for increased regional integration will prove very useful.

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**Appendix Table 1A: Country groups**

<b>Group 1</b>			
<b>Country</b>	<b>Distance (km)</b>	<b>Country</b>	<b>Distance (km)</b>
Angola	2120	Mozambique	458
Burundi	2491	Rwanda	2614
Kenya	2878	Tanzania	2425
Madagascar	2148	Uganda	2905
Malawi	1446	Zambia	1165
Mauritius	3093		
<b>Group 2</b>			
Cameroon	3849	Morocco	7578
Ivory Coast	5100	Niger	5180
Egypt	6190	Nigeria	4490
Gabon	3550	Senegal	6668
Gambia	6496	Seychelles	3687
Ghana	4622		
<b>Group 3</b>			
Austria	8285	Italy	7663
Belgium	8808	Netherlands	8951
France	8659	Portugal	8123
Germany	8798	Spain	8038
Ireland	9385	United Kingdom	9000