

Foreign Direct Investment and Trade in the Southern African Development Community

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Abstract. In this paper we use a modified gravity model to estimate the relationship between trade and foreign direct investment (FDI) in the Southern African Development Community (SADC). We find evidence of a significant causal relationship from trade to FDI for SADC. Distance (reflecting remoteness and transport costs) and political instability are also found to be significant determinants of FDI to SADC. Finally we also discern differences in the patterns and determinants of FDI to SADC whether it is from the USA and UK or from continental Europe. While the results for the USA and UK are inconclusive, we find a complementary relationship between FDI and trade to SADC in the case of continental Europe.

Key words: Foreign Direct Investment (FDI), exports, SADC, South Africa, gravity model

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1. Introduction

The growing trend towards globalisation and regionalisation of economies has led to the increased importance of international capital flows. Foreign direct investment¹ (FDI) has become a major source of capital flows in many developing nations. The study of the impacts, causes and economic relationships of FDI has gained in popularity in the last decade (Naudé and Krugell, 2007). There is substantial agreement that FDI can contribute to economic growth and can result in technology transfers to developing countries (Asiedu, 2001; Borenstein *et al*, 1998; Naudé and Krugell, 2007; Lim, 2001).

In Africa, the potential contribution that FDI can make is potentially significant. The NEPAD initiative determined that Africa requires about US\$ 64 billion annually in capital to be able to generate the growth of 7 per cent per annum that is needed to achieve the Millennium Development Goals (MDG). Historically, Africa is the region in the world most marginalised in terms of attracting FDI. Sub-Saharan Africa only attracted an average of \$7 billion annually from 1995 to 2001 (\$2.9 billion if Angola, Nigeria and South Africa are excluded). This amounts to an average of only 1.5% of total world FDI (Asiedu, 2004; UNCTAD, 2005).

Africa's failure to attract sufficient inflows of FDI is undoubtedly due to its being a high risk environment for private capital, due to various institutional and geographical features (Naudé and Krugell, 2007; Asiedu, 2006) as well as various "anti-growth policy syndromes" that have depressed investment (Fosu and O'Connell, 2006). Over the recent past, an increasing number of African countries have embarked on economic reform programs and initiatives to address these negative features of the policy and

1. "FDI refers to an investment made to acquire lasting interest in enterprises operating outside of the economy of the investor. Further, in cases of FDI, the investor's purpose is to gain an effective voice in the management of the enterprise." (UNCTAD, 2005).

institutional environment. Perhaps the most important of these measures are aimed at trade reform, and both unilateral as well as multilateral initiatives have been taken to liberalize trade (Owhoso *et al*, 2002:408). The expectation is that trade liberalization will improve the openness of African economies, with benefits to growth coming from more trade (rising exports and the ability to acquire imported inputs for manufacturing production) and FDI (Morriset, 2000). In particular, the belief exists that more trade due to trade liberalization will have a determining and positive complimentary impact on FDI². Greenaway *et al* (2007:206) claims that “the more open is the trade policy the greater is the economy’s gravitational attraction to foreign capital”. They also find evidence from a sample of 77 developing countries over the period 1990 to 2000 that FDI contributes to growth in open economies, but not closed ones (Greenaway, *et al*, 2007:208).

In this paper, we investigate the empirical evidence on the link between trade and FDI in Africa. We do so focusing on the Southern African Developing Community (SADC)³, a multilateral trade initiative, rather than on single countries or on the cross-African case. The reasons for this are twofold. First, SADC represents the most developed region of Sub-Saharan Africa and is economically the largest contributor to the African economy (SADC, 2006). Its relative large (in the African context) internal market can be seen as offering a growing market for foreign investors, as well as a “springboard” for trade with the rest of Sub-Saharan Africa (Owhoso *et al*, 2002:412)⁴. Second, regional integration has been increasing throughout the developing world in recent times (Baldwin, 2006). The pertinent question is whether the resulting growing

² Indeed, despite Africa’s poor historical record in terms of attracting FDI, there has been relatively good progress over the past decade or so, with the FDI stock in Africa rising from US \$ 26 billion in 1990 to US \$ 187 billion in 2005, with Africa’s share of FDI to developing countries increasing from 4.7 per cent to 6.3 per cent over the same period (UNCTAD, 2006).

³ SADC, established in 1992, consists of 14 countries, including Angola, Botswana, the Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe.

⁴ It can also be mentioned that the economic literature on SADC as a regional free trade area is relatively small as compared to the much larger economic literature on the West and Central African CFA “Franc” Zones.

intra and inter regional trade will contribute to more FDI? The evidence from SADC may be instructive to other countries and groupings considering trade liberalization and regional integration as strategies to obtain greater FDI.

The paper is structured as follows. In the next section (section 2), a brief review of the recent literature on FDI and its determinants in Africa is given, with an emphasis on recent discussions on the relationship between trade and FDI. Section 3 sets out the methodology (an adapted gravity model based on Bos and Van de Laar, 2004 and Borrmann *et al*, 2005), including a discussion of the data used. Section 4 presents the results of the empirical study. Section 5 concludes.

2. The recent literature

In this section we discuss the recent literature on the relationship between trade and FDI, and summarize the findings from recent studies on the determinants and effects of FDI in Africa. We point out that although important progress has been made in understanding the reasons for the low levels and growth of FDI to Africa, the recent literature has not dealt adequately with the relationship between trade and FDI in Africa.

The relationship between trade and FDI has recently been the subject of some scrutiny in the literature. Mekki (2004) pointed out that the reason for this increasing scrutiny is due to the fact that theories of FDI and trade traditionally have different origins and aims. Trade theory tries to explain why countries trade with one another whereas FDI theory tries to explain why firms produce abroad and invest in particular countries. As a consequence various studies such as Dunning (1981), Helpman (1984), Helpman and Krugman (1985), Markusen (1983), Brainard (1993), Horstmann and Markusen (1992), Markusen and Venables (1995) and Markusen (1995), Eaton and Tamura (1994) and Fontangé and Pajot (1997) have attempted to integrate FDI into trade theory. These studies have concluded that, on the one hand, FDI generates complimentary trade flows of finished goods, while on the other hand suggested that

FDI and trade can act as substitutes for finished goods but complementary for intermediate goods (Blonigen, 2001; Head and Ries, 2001; Swenson, 2004). Empirical evidence from Tunisia finds that FDI inflows and trade are indeed complementary for the manufacturing sectors of the economy, but are substitutes for some primary sectors (Mekki, 2004).

Other empirical studies found that where FDI takes place in the production of a specific good, exports in the same good declined, but exports for intermediate goods used in the production process of the same product rose significantly (Blonigen, 2005; Head and Ries, 2001; Swenson, 2004).

A number of studies also find empirical evidence that FDI and trade are correlated. Jensen (2002) finds that FDI inflows have a positive influence on the technological base of Polish exports. Alguacil and Orts (2002) find a positive relationship between FDI outflows and exports from Spain. Pontes (2004) conclude that for high levels of trade costs, FDI and trade act as compliments and otherwise as substitutes. The OECD (2002) finds that among their member countries FDI levels are strongly correlated with trade and trade openness. They however only treat FDI as a determinant of trade. The OECD (2005) confirms that the long trend among OECD member states is that FDI is becoming more trade intensive as a result of MNEs establishing global production networks and business-to-business value chains. The World Bank (2004) finds that in general Asian FDI inflows increasingly are affected by openness to trade and flows to export-orientated economies. Fontangé and Pajot (1997) finds that for France, Sweden, the US, EU and Japan the traditional trade theory of FDI acting as a substitute does not hold and that trade and FDI mostly act as compliments. Repkine and Walsh (1998) examine industrial output of Bulgaria, Hungary, Poland and Romania during the first six years of the post communist era. They found that FDI induced vertical waves of EU-orientated output where non-EU output mostly collapsed.

Jun and Singh (1996) argues for bi-directional causality between FDI inflows and exports for developing countries. They conclude that greater export orientation will attract more FDI. Liu *et al* (2002) finds empirical bi-directional causality between growth,

FDI inflows and trade in China but only one-way causality to imports. Aizenman and Noy (2005) applies various statistical techniques and find strong bi-directional linkages between FDI flows and trade on an international level, differentiating only between developed and developing countries.

As far as Sub-Sahara Africa (SSA) is concerned, there have been comparatively little studies on FDI, leading Owhoso *et al* (2002:408) to note that “the African continent has been ignored in academic studies of FDI”. Although this somewhat of a strong statement (there is a small, but increasing literature on FDI in Africa), it is the case that, bar a single exception, not one of the existing studies considered the relationship between trade and FDI in Africa⁵.

The key contributions to have focused on FDI in SSA in recent times are summarized in Table 1 below.

⁵ Most studies of FDI in Africa focuses on the determinants of FDI to Africa (Ng, 2007:5).

Table 1: Recent FDI Studies on Africa

Authors	Description of main findings / focus
Asiedu (2002)	The marginal benefit from increased openness to trade is less successful for Sub Saharan Africa. Africa is therefore different and policies that proved successful elsewhere may not be equally successful in Africa.
Asiedu (2004a)	Sub Saharan Africa has attracted more FDI due to policy reforms, but has a declining share of global FDI.
Asiedu (2004b)	In order to realize the employment benefits of FDI, Sub Saharan Africa needs to attract FDI in non-natural resource industries and host countries need to improve their infrastructure and human capital stocks.
Asiedu (2006)	From a study using panel data for 22 African countries finds that natural resources and a large domestic market are important determinants of FDI, and that macroeconomic policies are also significant.
Basu and Srinivasan (2002)	Studies the determinants of FDI in Africa and argue that these can be classified according to four categories: natural resources, specific locational advantages, policies towards FDI, and economic reforms.
Jenkins and Thomas (2002)	Africa's negative international image of political and economic instability has a severe impact to the whole continent and that a concerted effort to improve stability will also improve FDI inflows.
Morisset (2000)	Countries with attractive investment environments were able to attract a significant share of FDI. Therefore aggressive liberalization and strong economic growth will lead to an increased level of FDI.
Naudé and Krugell (2007)	Geography does not have a direct influence on FDI flows to Africa and neither market seeking nor resource seeking FDI seems to dominate. Different policy instruments are significant with different specifications. Political stability proved to be a significant determinant of FDI which indicates that good institutions are important.
Ng (2007)	Studies the link between FDI and productivity in 14 SSA countries and find only limited evidence that FDI inflows contribute to higher productivity in Africa.
Seetanah and Khadaroo (2007)	Investigate the relationship between FDI and growth in the case of 39 African countries over the period 1980-2000. They find that FDI has a positive and significant effect on growth. However, the contribution of FDI to growth is less than that of domestic private and public investment, and also less than in non-African countries.
Te Velde (2002)	Two issues of concern regarding FDI and Africa are (a) that SSA attracts only a small share of total FDI flows and (b) that it is hotly debated whether FDI really leads to economic and social development in Africa. The focus is on what host countries can do to influence FDI.

From Table 1 can be seen that the recent literature on FDI in Africa point to the need in African countries for improvements in human capital, infrastructure, political stability and appropriate macro-economic policies.

These studies on FDI to Africa omitted to take into consideration the possible relationship between FDI and trade, the exception being Asiedu (2002) who found that the marginal benefit to FDI from increased openness to trade is not significant for Sub Saharan Africa. Apart from this finding, however, it would appear that the relationship between trade and FDI is not well understood in Africa. As has been pointed out above, greater openness to trade and rising trade may lead to higher inflows of FDI. For Africa such a relationship could be important in view of (a) African economies' greater openness to trade following more and more countries' adoption of trade liberalization program and regional integration schemes and (b) the greater desire amongst African countries to further regional integration and trade (as seen for instance in objectives of the African Union, NEPAD and regional trade agreements such as SADC).

3. Methodology

3.1 Modelling approach

The modeling approach for this study involves the analysis of data by using an adapted gravity model (Bos and Van de Laar, 2004). It is derived from Newton's gravity equation that holds that the gravitational pull between to objects is directly and positively related to their mass and the distance between the objects acting as a restraint (Borrmann *et al*; 2005).

The application in economics implies that an economic flow between two economic entities will depend on their respective economic sizes and the distance between them. Distance can be represented as physical distance or a psychological restraint or encouragement to do business (Borrmann *et al*; 2005). For FDI it can also be

stated that gravity in general refers to the forces that work to bring actual FDI flows in line with expected FDI flows (Bos and Van de Laar; 2004).

The general gravity formula states that the attractive force between objects i and j can be defined as:

$$F_{ij} = G \frac{M_i M_j}{D_{ij}^2} \quad (1)$$

Where:

- F_{ij} is the attractive force
- M_i and M_j are the masses
- D_{ij} is the distance between the two objects
- G is a gravitational constant

If these principles are applied to explain FDI in terms of trade it can be written as:

$$FDI_{ij} = A_{ij} \frac{X_i X_j}{Dist_{ij}} \quad (2)$$

Where:

- FDI_{ij} is the flow in FDI from home country i to host country j
- X_i and X_j are the respective export totals of i and j
- $Dist_{ij}$ is the distance between home country i to host country j
- A_{ij} is a constant

When transformed to a linear equation using logs it can be written as follows:

$$\ln FDI_{ij} = \beta_0 + \beta_1 \ln X_i + \beta_2 \ln X_j - \beta_3 \ln Dist_{ij} + \varepsilon_{ij} \quad (3)$$

(With β_0 a simple constant, ε_{ij} the error term, β_1 and β_2 are positive)

The coefficient for the distance term need not be negative. The outcome is reflected in whether distance is a deterrent for FDI or a magnet. $Dist_{ij}$ represents a vector of variables

that represent distance. Theory will also dictate that in the case of resource seeking FDI the imports of the home country will determine FDI rather than exports.

During the estimation process three models are investigated. Each model builds upon and is an extension of the previous one. The strategy entails first modeling data at an aggregate level and then to gradually expand the model to include individual home and host countries. The first model, Model 1, a single equation regression, serves only as a preliminary investigation into the data and is done at an aggregate level. In Model 2, Model 1 is expanded upon to include the export totals of the major trading partners of SADC as separate variables. Model two is also a single equation regression. Both of the first two models give an indication as to the viability and validity of using the adapted gravity approach. With positive results in the first two models a panel regression is carried out at a country level for all SADC members in Model 3. A Granger causality test is also carried out on the stacked FDI inflow and SADC export variables.

3.2 Variables and data

The variables and data used in models 1 to 3 are described in Table 2 below.

Table 2: List of variables used in final estimations

<i>Variables used</i>	<i>Description</i>	<i>Source</i>
<i>Model 1:</i>		
SADCFDI	Total FDI inflows to SADC	UNCTAD FDI online: www.unctad.org (UNCTAD, 2006)
SADCExports	Total trade exports of SADC to the developed world	UNCTAD Handbook of statistics: www.unctad.org (UNCTAD, 2006)
MajorExports	Total trade of the major developed countries to the rest of the world	UNCTAD Handbook of statistics: www.unctad.org (UNCTAD, 2006)
MajorExportstoAfrica	Total trade of the major developed countries to Africa	UNCTAD Handbook of statistics: www.unctad.org (UNCTAD, 2006)
Distance	Distance from South Africa to the UK is used because in the aggregate data single equation distance is a constant.	Distances were calculated with the www.infoseek.com distance calculator. It uses coordinates from the US Geological survey to calculate distance between two points on the surface of a sphere (ball of the earth).
Dummy90	Dummy variable with values of 1 in 1979, 1985, 1990 and 1994; otherwise 0. These years were years in which SADC experienced political turmoil.	Own calculations
<i>Model 2:</i>		
SADCFDI	Total FDI inflows to SADC	UNCTAD FDI online: www.unctad.org (UNCTAD, 2006)
SADCExports	Total trade exports of SADC to the developed world	UNCTAD Handbook of statistics: www.unctad.org (UNCTAD, 2006)
USExports, UKExports, JapanExports	Total trade of the major individual trading partners, the USA, UK and Japan, to Africa	UNCTAD Handbook of statistics: www.unctad.org (UNCTAD, 2006)
Distance	Distance from South Africa to the UK is used because in the aggregate data single equation distance is a constant.	Distances were calculated with the www.infoseek.com distance calculator. It uses coordinates from the US Geological survey to calculate distance between two points on the surface of a sphere (ball of the earth).
Dummy76	Dummy Variable with values of 1 in 1976, 1979, 1985, 1990 and 1994; otherwise 0. These years were years in which SADC experienced political turmoil.	Own calculations

TABLE 2 : CONTINUED
Model 3:

FDIinflows	Stacked variable of the FDI inflows to the respective SADC countries	UNCTAD FDI online: www.unctad.org (UNCTAD, 2006)
ExportsSADC	Stacked variable of the value of merchandise exports of the respective SADC countries	UNCTAD Handbook of statistics: www.unctad.org (UNCTAD, 2006)
ExportsUS, ExportsUK, ExportsGermany, ExportsFrance, ExportsItaly, ExportsJapan	Total trade of the individual trading partners to Africa	UNCTAD Handbook of statistics: www.unctad.org (UNCTAD, 2006)
DistanceUS, DistanceUK, DistanceGermany, DistanceFrance, DistanceItaly, DistanceJapan	A stacked variable of distance from the respective SADC countries to their individual trading partners the USA, UK, Germany, France, Italy and Japan.	Distances were calculated with the www.infoseek.com distance calculator. It uses coordinates from the US Geological survey to calculate distance between two points on the surface of a sphere (ball of the earth) .
Dummypol	Stacked dummy variable that represents political instability and natural disasters in the respective SADC countries.	Crudely constructed by using the brief historical overviews of the individual SADC countries and years of instability as given in the CIA Factbook (CIA, 2006) and the Encyclopaedia Britannica (Britannica, 2006).

Other variables were also tested but proved to be not significant or limited the estimation to a too few degrees of freedom and they therefore could not be used. They included the Transparency international corruption perception index (www.transparency.org) (Transparency International, 2006); the World Bank good governance indicators (www.worldbank.org) (World Bank, 2006); trade balances, current account balances, various trade variables, tourist arrivals, number of commodities traded on debts owed from the UNCTAD Handbook of statistics (www.unctad.org) (UNCTAD, 2006); IMF exchange rates (www.imf.org) (IMF, 2006); and internet connectivity figures from the World Bank development indicators (www.worldbank.org) (World Bank, 2006).

The equations are estimated for SADC, consisting of Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe (SADC, 2006). Six more countries could conceivably included into SADC in the long term. They are Burundi,

Comoros, Kenya, Rwanda, Seychelles and Uganda. For the purposes of this study they are included as their trade and geographic locations are completely intertwined to SADC.

4. Empirical Results

In this section the results of the empirical analysis are presented, discussed and interpreted. The results were obtained as outlined in the previous section and consist of the individual results of the three specified models.

4.1 Model 1

Table 3 shows the final results of Model 1. Total exports of the developed world are limited to their exports to Africa only. A dummy variable (Dummy90) is introduced. Dummy90 is zero except for 1979, 1985, 1990 and 1994 where it is one. These years were of great consequence for the SADC region as it represents the end of the Rhodesian conflict in 1979 the debt freeze of South Africa 1985, significant political changes announced in South Africa, Tanzania, Mozambique and Kenya in 1990; and the changes in South Africa in 1994. It explains why the variable is significant at the five percent level. . The explanatory variables are “lagged” for one period and finally an AR(2) term proves to be highly significant at the five and one percent level. All these changes bring about significant change in the estimation results. The “Total exports of the developed world” variable is the only variable that is insignificant even at the ten percent level.

Table 3: Model 1 – Final results

Dependent Variable: LOG(SADCFDI)			
Method: Least Squares		Sample: 1973 2004	
Variable	Coefficient	t-Statistic	Prob.
LOG(SADCExports(Lag1))	3.972	5.064	0.000*
LOG(MajorExportstoAfrica(Lag1))	-1.353	-1.482	0.151
LOG(Distance)	-1.867	-2.023	0.053*
Dummy90	-0.543	-2.486	0.020*
AR(2)	0.635	5.641	0.000*
R-squared			0.837
Adjusted R-squared			0.811
Akaike info criterion			2.043
Schwarz criterion			2.276
Durbin-Watson stat			1.604

Because Model 1 is only a preliminary investigation no further investigation or a more in-depth statistical analysis is carried out. The fact that the SADC export variable is significant at the one percent level and the distance variable is also significant at the ten percent level, clearly indicates that relationships as set out in the adapted gravity model does exist within the data. This warrants a further investigation.

4.2 Model 2

In Table 4 the final results are shown for Model 2. Total export of the trading partners is limited to exports to Africa only as suggested by Model 1. A dummy variable that is an expansion of dumm1990 from Model 1 is also included. The years of 1977 and 1983 are added as having a value of one to 1979, 1985, 1990 and 1994 to take into account the Angolan and Rhodesian conflicts of 1977, the aftermath of the Soweto riots of 1976 and the severe droughts and food shortages that occurred in the region in 1983. All variables except EU exports and distance, which once again forms the constant term, are

significant at the one percent level. Due some missing values the sample size is reduced to 1974 to 2004.

Table 4: Model 2 – Final results

Dependent Variable: LOG(SADCFDI)			
Method: Least Squares		Sample: 1974 2004	
Variable	Coefficient	t-Statistic	Prob.
LOG(SADCExports)	2.702	7.601	0.000*
LOG(USexports)	3.096	5.531	0.000*
LOG(UKexports)	-2.402	-2.541	0.018*
LOG(Japanexports)	-2.483	-6.502	0.000*
LOG(Distance)	0.056	0.179	0.860
Dummy76	-1.003	-14.324	0.000*
R-squared			0.965*
Adjusted R-squared			0.958*
Akaike info criterion			0.528*
Schwarz criterion			0.808*
Durbin-Watson stat			1.607

All test results indicate a satisfactory fit but due to fears of multicollinearity and unit roots further investigation into the accuracy of the equation is needed. The total exports variables are all subject to concurrent global economic trends and could lead to multicollinearity and also unit roots in the residuals that could bias the estimation results. Table 5 gives the test results for the model and its residuals. It should be noted that all tests confirms a good fit.

Table 5: Model 2 – Summary of test results on final regression

Summary of test results		
Ramsey RESET test:	F-statistic	0.048
	Log likelihood ratio	0.063
White heteroskedasticity test:	F-statistic	0.912
	Obs*R-squared	20.085
Breusch-Godfrey Serial Correlation LM test:	F-statistic	0.062
	Obs*R-squared	0.168
ARCH test:	F-statistic	0.893
	Obs*R-squared	0.929
Normality tests:	Jarque-Bera	0.781
	Jarque-Bera probability	0.677
	Skewness	0.080
	Kurtosis	2.226
Unit root tests:	Augmented Dickey-Fuller test statistic	-4.844
	Augmented Dickey-Fuller test probability	0.001
	Phillips-Perron test statistic	-4.844
	Phillips-Perron test probability	0.001
Forecast tests:	Mean Absolute Error	0.268
	Mean Absolute Percentage Error	4.360

Model 2 concludes the preliminary investigation of the data. It shows a significant relationship between FDI inflows to SADC and exports in the gravity specification. The near null coefficient for distance also shows its insignificance as a constant value. The model represents neither country specific effects nor the differences in scale economies or significant differences in FDI inflows between SADC members.

A further problem is the negative coefficients of the total exports of the EU and Japan. In the light of the other results especially Model 3 this indicated that FDI and trade for SADC and its major partners in the one direction are mostly substitution and complimentary in the other direction. Trade from the SADC to its trading partners is

positive towards FDI but in trade from the EU and Japan there is a negative relationship to FDI. It is however difficult to accept such a conclusion as this could also be the result of the aggregation of the variables to achieve aggregate data.

As mentioned in previous sections there are some questions as to whether trade causes FDI or whether FDI causes trade. Most evidence for developed countries suggests that FDI causes trade with little FDI being caused by trade. Therefore it is pertinent to examine the causality between trade and FDI in SADC before doing the panel estimations. Table 6 shows the results of a Granger causality test that was done on the stacked series of FDI inflows to the individual SADC countries and the stacked value of merchandise exports.

Table 6: Causality test 1 for FDI and trade in SADC

Pairwise Granger Causality Tests		Sample: 1970 2005	
Lags: 1		Obs	523
<i>Null Hypothesis:</i>		F-Statistic	Probability
LOG(ExportsSADC) does not Granger Cause LOG(FDIinflows)		37.199	0.000
LOG(FDIinflows) does not Granger Cause LOG(ExportsSADC)		1.530	0.217

The test was repeated with various lagged options but always gave the same result. The test indicates that in the specific case of the twenty countries included in the study, that trade causes FDI.

4.3 Model 3

Model 3 consists of six panel estimations using the gravity specification. Estimations were done for a different trading partner while the panel represents the variables for the twenty SADC countries. Table 7 shows the final estimation results for the panel estimations of the twenty SADC countries with the six major trading partners.

In the case of the USA and UK all variables are significant at the one percent level except the total trade of the USA / UK with Africa. This is also the only two equations where the constant was significant. For France and Germany all variables were significant at the one percent level. For France however an AR (1) term was also significant. Italy mostly shares results with France and Germany but the total export of Italy variable is only just not significant at the ten percent level. In the equation for Japan only the SADC exports and the political stability dummy variable. This is the only equation where the specification totally fails for the trading partner.

Table 7: Model 3 – Final results

Dependent Variable: LOG(FDIinflows)						
Method: Panel GMM EGLS (Cross-section weights) Sample: 1989 2004						
Variable	Coefficient (t-Statistic)					
	*USA	*UK	*Germany	*France	*Italy	*Japan
Constant	58.59 (3.55)	36.67 (2.2)				
LOG(ExportsSADC)	0.88 (11.04)	0.96 (8.66)	0.91 (17.47)	0.88 (12.57)	0.92 (14.66)	0.91 (12.35)
LOG(Export*)	-0.13 (-0.20)	-0.82 (-0.69)	1.12 (2.59)	1.36 (2.37)	0.93 (1.65)	-0.45 (-0.65)
LOG(Distance*)	-6.21 (-4.26)	-3.45 (-3.67)	-1.32 (-3.04)	-1.62 (-2.66)	-1.16 (-2.04)	0.25 (0.38)
Dummypol	-3.77 (-6.47)	-4.22 (-4.79)	-3.39 (-11.96)	-3.2 (-7.3)	-2.63 (-7.7)	-3.24 (-5.65)
AR 1 Term	0.27 (3.63)	0.315 (4.27)		0.33 (6.14)	0.36 (5.11)	0.36 (5.09)
Weighted Statistics						
R-squared	0.599	0.453	0.625	0.720	0.854	0.712
Adjusted R-squared	0.591	0.443	0.621	0.716	0.852	0.707
Durbin-Watson stat	1.936	1.951	1.329	1.976	2.029	1.975
J-statistic	0.076	0.000	6.584	3.032	3.382	0.618
Unweighted Statistics						
R-squared	0.529	0.327	0.571	0.698	na	0.687
Sum sqd. residual	696.427	976.573	632.501	463.594	na	481.931
Durbin-Watson stat	1.859	1.869	1.232	1.977	na	1.951

SADC exports are significant throughout the estimations and this confirms the result of the Granger causality test. It should be noted that coefficient of SADC exports for all the estimations is nearly on a one to one basis. This implies that for every one percent increase in SADC exports there is an almost 1 percent increase in FDI.

The large negative coefficients of distance and “Dummypol” for most equations are very significant results on their own. This can be interpreted as follows: No matter how strong the economic environment of the SADC countries are, they are geographically very distant to their trading partners and firms of in the trading partners will not invest in countries that are perceived as political unstable. The overall measures of fit indicate are mixed and fluctuates from rather mediocre fits for the USA and the UK to an overall good fits for Germany, France and Italy. Panel unit root tests indicate that no unit root is present but normality tests indicate that normality cannot be assumed for the residuals. This is attributed to the severe fluctuations in the data which coincides with periods of political instability.

In periods of substantial fluctuations there is constant over or under estimation of the actual value. This is more significant for the figures of Burundi than for the other countries. This problem could be addressed by amending the dummy variable. It is however not advisable because the fluctuations should be seen as the inability of the gravity specification to capture all the relevant variables that explains FDI inflows or the inability of a dummy variable to completely explain the effects of political instability. Other variables outside the scope of the gravity specification might be effective in explaining the fluctuation observed in the residuals. Country specific evaluation might deliver other results because they are not obtained as the overall error that includes the joint series of country residuals. In future research the specification can be opened up to include other variables that might explain the fluctuations more clearly. In a country specific evaluation other results might also be obtained. Both of these suggestions fall outside the scope of the present paper.

The final conclusion on the panel estimation of the FDI inflows of SADC and its trading partners are that the general trend in FDI inflows is significantly explained in the estimation by SADC exports and distance. The insignificance of the USA and UK export figure can also be interpreted as FDI inflows which do not depend on the level of imports from the USA and UK by SADC countries but on the level of exports to the USA and UK. This is significant from the perspective that these countries are net importers of

goods and services. Therefore this finding could be seen as a confirmation that the USA and UK will invest in industries abroad that will lead to exports to them primarily rather than seeking market share. There is a clear complementary process in the trade and FDI between the trading partners Germany, France and Italy which is a significant departure from the SADC USA and SADC UK relationships. In the case of Japan the assumptions of gravity and trade do not hold true.

5. Summary and Conclusions

In a recent assessment of policies needed to lift African countries out of their poverty trap, Sachs *et al* (2004:150) placed a high priority on regional integration, stating that “*Regional integration will raise the interest of potential foreign investors by increasing the scope of the market*”. In this paper we focused on the Southern African Development Community (SADC) and asked whether there exist in these countries a relationship between trade and foreign direct investment (FDI). In doing so the contribution of this paper was threefold. Firstly, we contributed to the relatively small, but growing literature on FDI in Africa. Secondly, we contributed towards understanding the relationship between trade and FDI in Africa, which has so far been neglected in the literature. Thirdly, our results are of interest to countries in Africa considering regional integration as a strategy to raise economic growth through greater openness to trade.

Using an adapted gravity model, we found that there is indeed a significant causal and positive relationship between FDI inflows to SADC and SADC exports. Distance and political instability are also significant determinants with a negative relation to FDI. The export variables for home countries left mixed results with the USA and UK having insignificant and negative coefficients. Germany, France and Italy had positive significant coefficients but insignificant constant values. The results for these mainland European countries indicate a complementary role between home exports and host FDI inflows. The results for Japan were inconclusive which is in line with UNCTAD (2005) findings.

Political instability was the most significant variable in the estimation process and also had the largest coefficient. This reflects the fact that the region might face negative international perceptions. The fact that the dummy which coincides with times of political instability is also significant could however imply that negative perceptions of the region may not be unfounded.

From these results the following policy recommendation can be made. First, SADC will need to focus on attracting investment from countries that provide for complementary FDI and trade. Second, SADC need to engage in efforts to further regional integration given that trade was found to be important for FDI, as well as the significance of distance. In the latter regard regional integration may be especially important to the landlocked countries in SADC, and membership of SADC could also be beneficial to landlocked countries such as Burundi, Rwanda and Uganda that are currently not members. Finally, regional integration in SADC need to be deepened and a greater regional cohesion established, given that our panel estimation results suggested that the different countries are still functioning largely independently of one another.

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