



Determinants of Foreign Direct Investment: Empirical Evidence from Southern Africa Customs Union (SACU) Countries

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ABSTRACT

This study examines the determinants of Foreign Direct Investment (FDI) in Southern Africa Custom Union (SACU) countries. The study employed panel data from the period 1990–2010 and used Pooled OLS as the main estimation method. The findings reveal that market size, natural resource availability and trade openness are positive and significant determinants of FDI for the SACU member countries. Therefore, these countries should undertake more agreements in trade partnership and should reform investment policy to attract more foreign inflow into SACU countries in the long run.

Keywords: foreign direct investment, determinants, panel analysis, Africa

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Any remaining errors or omissions rest solely with the author(s) of this paper.

INTRODUCTION

FDI has played—and continues to play—an important role in stimulating economic growth in developing countries in the past three decades. Most policymakers believed that FDI could positively affect their country. However, in the initial years after independence in the 1960s, most African countries were doubtful about the merits of free trade and investment. In the 1970s and 1980s, most of these countries adopted centralized economies that restricted importation and imposed capital control as part of policy to protect local industries. In the 1990s, however, most African countries recognized FDI as an important stimulus of economic growth and development. Additionally, most of these countries did not have enough capital for investment due to lower domestic saving. Thus, they opened their markets to investors and introduced policies to attract FDI. As widely claimed by policymakers in the region, national and international FDI is an alternative method of boosting economic growth in the region. Some countries introduce policy measures to promote foreign investment by lowering corporate taxes or improving their general investment policy environment. According to the UNCTAD annual survey in 2006, 40 African Countries introduced 57 new measures affecting FDI, of which 49 encouraged inward FDI.

In recent years, most developing countries have implemented various economic reforms to restructure their economies in order to achieve higher economic growth and development. These reforms include the opening up and liberalisation of the economy to allow free inflow of foreign capital, especially from developed countries. This has resulted in a dramatic increase of FDI inflow into developing countries, in general, and into African countries, in particular. However, these inflows have been unevenly distributed among developing countries, with Asian countries receiving the lion's share of FDI inflows, compared to African countries. Among the African countries, the southern region which consists of SACU member countries has received 55 percent more FDI than other regions in Africa. Northern, Middle, Western and Eastern Africa have received 22 percent, 10 percent, 9 percent and 4 percent, respectively, of the FDI share in Africa (UNCTAD, 2010). Among the SACU member countries, South Africa is the one that receives more FDI compared to other member countries. This development raises the questions of why FDI inflows are quite uneven among the developing countries, and why African region are only able to attract relatively smaller share of the total FDI flowing to developing countries as a whole.

Numerous theoretical and empirical studies have been conducted on the determinants of FDI using time series and panel data setting on developing countries. Nevertheless, the findings are still inconclusive on the factors that determine the

inflow of FDI. Moreover, studies on African region, in general, and its economic bloc groupings, specifically, are still limited. Previous studies have highlighted numerous determinants that have influenced FDI inflow into developing countries, which includes the level of human capital; institutional quality, rule of law, market size, the quality of infrastructures, macroeconomic stability, availability of natural resources, labour cost, wage and political instability. Hence, in this study, some of these determinants would be incorporated to investigate the significance of its influences on FDI inflow to the SACU member countries. SACU countries have been selected for the purpose of this study due to the fact that, in the recent years, the Southern region has been receiving more FDI inflows compared to other regions in Africa. Moreover, South Africa, which is a member country in SACU, has been the top FDI recipient in the continent over the past years and also one of the countries included in BRICS association.

This paper is organized as follows: Section 2 discusses briefly the economic background and FDI trends of the SACU member countries. Section 3 provides a review of related literature. Section 4 discusses the empirical methodology, which includes model specification, data sources and estimation methods. Section 5 discusses the empirical results. The final section concludes with some policy implications.

BACKGROUND OF THE STUDY

Southern African Customs Union (SACU) is one of the oldest custom unions in Africa, formed in 1910 among five countries, namely; Botswana, Lesotho, Namibia, South Africa and Swaziland. The main objective of the union was to allow free movement of goods and services between the countries, enhancing the economic stability and development and to enhance the investment and trade in the world economy.¹ Historically, SACU member countries have been characterized by severe differences in political and economic aspects such as policies, levels of economic development, political systems, and administrative capacity (Kirk and Stern, 2003). Nevertheless, the countries managed to maintain virtually free internal trade behind a high common external tariff, while allowing for large revenue payments to the smaller members (Kirk and Stern, 2003).

¹ See SACU website at <http://www.sacu.int/>

Table 1 SACU Member Countries' Average GDP Growth (%), 1980-2014

	1980– 1984	1985– 1989	1990– 1994	1995– 1999	2000– 2004	2005– 2009	2010– 2014
Botswana	11.0	11.9	4.5	6.3	3.1	4.0	6.6
Lesotho	1.6	4.4	5.1	2.7	3.4	4.2	4.7
Namibia	–0.4	2.3	3.5	3.6	5.2	3.8	5.2
South Africa	3.0	1.5	0.2	2.6	3.6	3.6	2.4
Swaziland	7.1	10.0	6.3	3.5	2.0	2.6	2.2

Source: World Development Indicators, Online Database, 2015

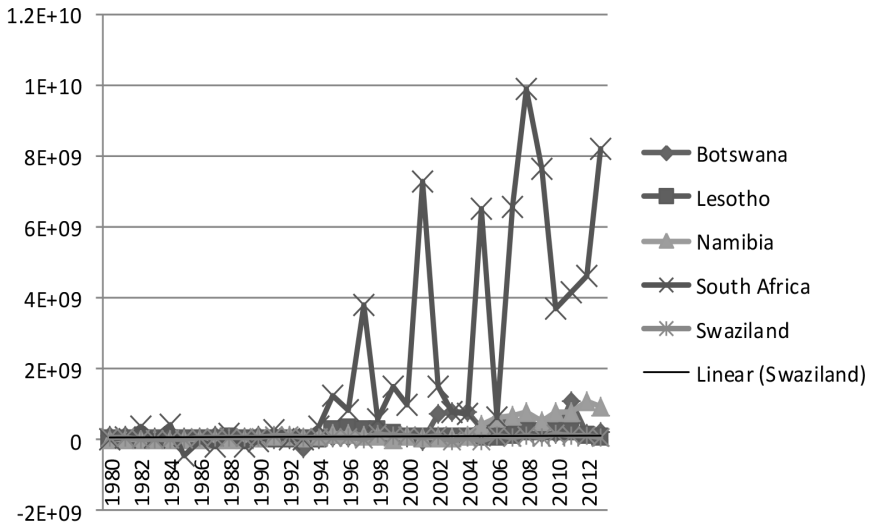
Throughout the past three decades, the SACU member countries have experienced tremendous changes in terms of political and economic dimensions. SACU economies are mainly driven by export-led industries like manufacturing and mining, particularly in commodities like diamonds, gold, and platinum. The defining characteristic of the SACU is the economic dominance of South Africa in contrast to the size of the other four members. The BLNS (Botswana, Lesotho, Namibia and Swaziland) depends heavily on South Africa for a significant proportion of their trade, investment and in some cases (migrant) employment (SACU, 2013). Among the five countries, Botswana has experienced much higher growth rates than all other member countries due to its effective exploitation of the diamond reserves. As a matter of fact, the mining industry dominates Botswana economy by accounting for over 30 per cent of GDP (SACU, 2013). On the other hand, Swaziland is predominantly an agricultural economy, whereby about 60% of the population are employed in this sector. Sugar production and processing is the largest single industry. Other export commodities include coal, asbestos, cotton and diamonds. Namibia, despite being large in terms of size, much of the country is desert and inappropriate for agricultural activities. The economy is largely dominated by mining, fishing and ranching, in which diamonds constitute almost half of the country's total exports. The South African economy is also based on the extraction and beneficiation of natural resources, but is much more diversified than other SACU member countries. Manufacturing sector represents more than 60% of GDP and its exports are largely dominated by mineral, metal and agriculture products. Agriculture constitutes a relatively small share of total GDP (SACU, 2013).

As a whole, the growth performances of the SACU member countries over the past three decades have been quite uneven and volatile (Table 1). Despite being smaller economies compared to South Africa, Botswana and Swaziland registered a much higher growth rate in the 1980s. Botswana had the best economic performance in the 1980s with an average growth rate of 10% in 1980-1985 and 11% in 1986-

1989. In the early 1990s, Botswana, Lesotho and Swaziland still registered highest growth despite facing a dramatic decreasing growth rate compared to the preceding decade. This is due to political instability that hit these countries. Meanwhile, in the second half of 1990s, only Botswana managed to increase its growth pace positively because of its economic reformation and stability in the political front. In the 2000s, most of the countries recorded an average growth between 2% to 5%. This is due to the changes in the world demand, declining commodity prices and also financial crisis. In recent years, even though the SACU member countries made economic recovery aftermath the global financial crisis, but some of the countries only managed to registered low and moderate growth rate. Swaziland and South Africa's economic growth was the lowest, whilst Botswana and Namibia's economy depicted relatively higher growth.

Notwithstanding the positive outlook, the main challenge confronting SACU countries is the translation of economic growth to inclusive growth and job creation. Another challenge is the ability to improve and sustain domestic revenue especially in the case of Botswana, Lesotho, Namibia and Swaziland (SACU, 2013). In line with these concern and challenges, SACU member countries, in particular, and African countries, generally, have acknowledged the importance of attracting FDI into this region. It is a widely known fact that FDI is one of the most dynamic international resource flows to developing countries. Empirical evidence has highlighted that FDI can affect growth and development by complementing domestic investment, facilitating trade, and transfer of knowledge and technology (Holger and Greenaway, 2004). African countries generally are endowed with natural resources such as oil, diamond, gold, copper, zinc, aluminium, uranium, coal and iron. However, most of these countries have lower financial capital and technology to extract the minerals. Therefore, the countries largely needed FDI to fill the saving and foreign exchange gaps and leap itself to sustainable growth levels.

Although recent trend shows that there is a gradual increase in the FDI inflows into the African countries, comparatively, the amount is still low compared to other developing and emerging economies. The flows of foreign direct investment into the SACU member countries are quite asymmetrical and unstable as reflected in Figure 1. South Africa is the highest recipient of FDI compared to the other member countries and most of the foreign investment goes to the telecommunication and banking industries. Since early 1990s, South Africa has been receiving more FDI, which accounted for approximately US\$ 719 million. However, the rest of the member countries (Swaziland, Botswana, Namibia and Lesotho) received the lowest inflow compared to South Africa. There is slight increase in the FDI flows in most of the SACU countries since mid-1990s due to the reformation of the economic structure, better agricultural performances and increases in commodity prices in



Source: World Development Indicators, Online Database, 2015

Figure 1 Foreign Direct Inflow in SACU countries (current US\$), 1980-2014

the world market. In the recent decade, SACU countries still experienced slight increase in FDI flows but quite unstable due to the uncertainty in domestic market and external shocks in the global economy (World Investment Report, 2007).

In the present globalization era, attracting FDI increasingly depends on the ability to provide a favourable FDI regime and competitive factors of production since today's investor has a wide choice of developing country locations. The investors desires those locations or countries that are capable of enforcing competition, providing stable and transparent rules for private business and, over time, improving the quality of their local productive factors (Pigato, 2001). While there have been significant improvements in the policy regime for FDI in most African countries, they have not been significant enough to attract FDI in larger shares. Given the importance attached to FDI in terms of its spillover effects, African countries generally must learn how to attract greater volumes of this important 'potential' resource. Thus, this paper intends to identify the determinants of FDI in the case of SACU member countries and provide some insights on what could the SACU countries do to improve the environment to attract more FDI flows.

REVIEW OF LITERATURE

Many empirical studies have been conducted on the determinants of FDI, covering various scopes. Scholars have used different sample countries, methods, period and variables in examining the factors that boost FDI. Nevertheless, the empirical findings are generally inconclusive. Wide-range of theories on FDI or multinational corporations (MNCs) have been developed by prominent scholars, such as Vernon's (1966) theory of the product cycle, Hymer's (1978) industrialization theory, Kojima's (1973) dynamic comparative advantage, Dunning's (1973; 1980) eclectic paradigm theory, Rugman's (1981) internationalisation theory, and Markusen's (1997) knowledge and capital theory. The theoretical discussions on FDI are to some extent linked to classical international trade theory, such as the Ricardian model and the Hecksher-Ohlin model as well. However, the first theoretical model on the determinants of FDI or MNCs was developed by Dunning (1973; 1980) which is known as eclectic paradigm or OLI framework. OLI framework emphasises three advantages, namely, ownership advantage, location advantage and internalization advantage in explaining why MNCs expand their business to other countries.

Additionally, the expansion of MNCs or FDI could also be explained based on three types of motives, namely; market-seeking, resource seeking and efficiency seeking FDI. The market seeking FDI is generally could be illuminated based on the OLI framework in which MNCs or FDI is expected to go to those host countries that has large market size, market growth and high per capita income. On the other hand, resource-seeking FDI relates to the availability of natural resources. Investors may move businesses abroad due to the availability of raw materials, cheap labours and energy sources. The main objective of resource-seeking FDI is to reduce the cost of production by capitalizing on the relatively cheaper resources in the host country. Since most investors are interested in profit maximization, efficiency-seeking or capability-seeking FDI is more likely to bring in technology and knowhow that is well matched to the host country's level of development, enabling local suppliers and competitors to benefit from adaptation and imitation.

Since the introduction of Dunning's OLI framework, numerous empirical studies have been undertaken to investigate the determinants of FDI, especially in the case of developing countries. Beside the three advantages highlighted by Dunning, earlier studies have focused on factors like country size, exchange rate, labour cost and political factors, including political instability (e.g. Aggarwal, 1980; Schneider and Frey, 1985). Some studies have also emphasized on the role of tax policy, trade policy and foreign investment policy in explaining FDI inflow to host country. For instance, Tsai (1994) examine the determinants of FDI by including variables such as market size, economic growth, trade balance and wage

rate. Using the stimulation equation approach, the estimation reveals that market size and economic growth are positively related to FDI inflow.

In addition, Morisset (2000), estimated the determinants of direct foreign investment flow using both a panel and cross-sectional analysis. The study used panel data from 29 Sub-Saharan countries for the period 1990–1997. The independent variables were GDP growth, illiteracy rate, trade, infrastructure and the ratio of urban to total population. The results show that FDI flow is positively related to trade and economic growth. Illiteracy rate, infrastructure and the ratio of urban to total population, however, are negatively related to FDI flow. The author stressed that African countries can successfully attract FDI inflow even without the availability of natural resources and large market size.

Bende-Nabende (2002) investigates the macro locational determinants of FDI in the case of 19 Sub-Saharan African countries. The study covers the period 1970–2000 and uses both panel and time series analyses. The findings suggest that market growth, trade openness, liberal FDI policies, real effective exchange rates and market size have a positive co-integration with FDI. Thus, the author concludes that FDI inflows can be improved in the long run by strengthening the macroeconomic management, expanding the export base and liberalizing FDI regimes. Similarly, Asiedu (2002) analysed the determinants of FDI in Sub-Saharan African (SSA) and non-Sub-Saharan African countries. The aim of the study was to do a comparative analysis of the determinants of FDI, or investigate whether the determinants of FDI for developing countries are applicable in the case of Sub-Saharan African countries. The study used OLS in the estimation for 71 developing countries from the period 1980–2000. The explanatory variables included in the model were the availability of natural resources, market size, political risk, corruption and rule of law, trade, telephone line and inflation rate. The findings suggest that market size, natural resources, policy environment, institutions and political stability are significant factors in attracting FDI.

Onyeiwu and Shrestha (2004) analysed the impact of macroeconomic and institutional determinants for 29 African countries, based on panel data using fixed and random effects models over the period 1975–1999. The endogenous variables included in the model were economic growth, inflation, openness of the economy, international reserves, natural resource availability, interest rate, external debt, taxes, wisdom, political rights and infrastructure. The results suggested that economic growth, openness of the economy, inflation, natural resources and international reserves are important determinants of FDI. Infrastructure and political rights, however, were found to have no impact on FDI flows to Africa.

Compared to the previous studies, Yasin (2005) included official development assistance (ODAs) as one of the determinants of FDI in an analysis of 11 Sub-

Saharan African countries for the period 1990–2003. The results show that bilateral ODA, trade openness, labour force growth rate and exchange rates have a positive and significant impact on FDI flows. On the other hand, multilateral development assistance, growth rate in GDP per capita, country risk level, and political freedom and civil liberties are found to be insignificant. The findings imply that the types of FDI that goes into SSA countries are mostly resource seeking and/or efficiency seeking.

Asiedu (2006) employed panel estimation for 22 countries over the period 1984–2000 to analyse the influence of market size, political instability, inflation, legal system, infrastructure and education level on FDI flows. The results confirmed that natural resources, market size, good infrastructure, lower inflation, higher education, population rate, openness to FDI, political stability, lower corruption and a reliable legal system attract FDI inflows. The author suggested that countries that have lower market size and a shortage of natural resources could still attract FDI by improving the policy environment and institutional quality. In a recent study, Ismail (2009) examined the determinants of FDI in the case of ASEAN countries by employing the semi-gravity model. The results revealed that market size of the host and source countries, short distance, common language, border and extended market relative to distance attract more foreign investors. Other macroeconomic factors such as lower inflation rate, exchange rate and good management of the government budget are among other key factors that attract FDI. In addition to economic factors, social factors such as good telecommunication and infrastructure, and non-economic factors such as transparency and trade policy also encouraged foreign investors to ASEAN region.

In a recent study, Vijayakumar, Sridharan and Rao (2010) examined the factors determining FDI inflows into BRICs countries using the annual dataset from the period 1975–2007. They found that market size, labour cost, infrastructure, currency value and gross capital formation were the main factors of FDI inflows into BRICs countries, while economic stability and trade were insignificant determinants of FDI. Similarly, Ranjan and Agrawal (2011) also studied the same issue on BRICs countries for the period of 1975–2009. They also obtained quite similar results as Vijayakumar *et al.* (2010) in which market size, trade openness, labour cost, infrastructure, macroeconomic stability and growth prospects were found to significant whereas gross capital formation and labour forces were insignificant factors to FDI inflows.

Furthermore, Wadhwa and Reddy (2011) examined the determinants of FDI by focusing on the three motives of investment in ten Asian countries. These factors can be categorized into three types: market-seeking factors (including economic growth and population growth), resource seeking factors (including

imports and infrastructure) and efficiency seeking factors (including inflation). The panel estimation concludes that all these factors positively affect FDI inflow into the selected Asian countries. In a recent study, Jadhav (2012) categorized the determinants into economical, political and institutional factors and used BRICS countries as sample. Findings from multiple regressions concluded that trade openness, rule of law, market size, voice and accountability are positively related to FDI inflow. The result also shows that natural resource has a negative effect on FDI inflow in BRICS countries. The author concluded that the nature of FDI flows to BRICS countries are of market seeking and efficiency seeking.

It is evident from the empirical review that numerous factors influence the inflows of FDI into host countries. Despite the huge number of studies carried out in developing countries, there is no consensus on any particular factor consistently affecting FDI inflow. Mixed results are obtained from different empirical studies. The variables measured include growth, skills, labour, market size, openness, infrastructure, foreign aid, financial development, human capital, transport cost, total factor productivity, exchange rate, tax, market stock and international interest rates. Other broad factors include national policy frameworks and government incentive policies. The empirical review established that the importance of each of these factors varies across regions, countries, time and methodology. In this regard, studies pertaining to the African region or group of countries specifically belonging to economic blocs in the African region are very few (Ericsson and Irandoust, 2010). Thus, the present study intends to complement the existing literature by examining the factors that attract FDI inflows into SACU countries.

DATA AND METHODOLOGY

Theoretical Framework

Various theoretical models have been used to identify the determinants of FDI, such as the Heckscher-Ohlin model neoclassical trade theory, which explains factor endowment and factor intensity, the new trade theory and the FDI theory, which is based on market imperfection and ownership advantage that results in investors' market power through the monopoly system. Some scholars view ownership advantage as one of the key determinants of FDI (Buckley and Casson, 1976; Hymer, 1976; Krugman, 1980). According to the OLI framework, the determinants of FDI are a combination of three components: ownership, location and internalization advantages (Dunning, 1980). Later, Dunning (1993) states that motives associated with FDI inflow are market seeking, resource seeking or efficiency seeking. Krugman (1983) and Helpman (1984) also introduced FDI models, known as horizontal and vertical FDI models. Markusen (1997) then combined these vertical

and horizontal FDI models to create a knowledge capital model, which then became an important model for FDI entry into a foreign country, supporting the view of factor endowments and transport costs. Grossman and Helpman (2000) later introduced the FDI determinants model based on risk diversification. According to this model, foreign investors tend to be sensitive to market risks, which include interest rate, exchange rate and inflation risk. High interest rate uncertainty may affect investment returns and reduce the inflow of foreign investments. Similarly, persistent exchange rate appreciation increases the cost of the investment, thereby constraining ability to invest profitably. Instability in price, characterized by high inflation rates, also increases the cost of production, consequently hindering FDI flow. From the review of the different studies, there is no specific theory that can precisely point to factors influencing FDI, nor can FDI be determined by a single factor. Each model differs in its approach, but they all explain the same phenomena.

Model Specification

As mentioned earlier, this study intends to identify the determinants of FDI in the SACU region. Following the theoretical and empirical framework of Ranjan *et al.* (2011), the model can be specified as follows:

$$LFDI_{it} = \alpha + \beta_1 LMAR_{it} + \beta_2 LGCF_{it} + \beta_3 LTRD_{it} + \beta_4 LINF_{it} + \beta_5 LNAT_{it} + \beta_6 LINFR_{it} + \beta_7 LLABC_{it} + \varepsilon_{it} \quad (1)$$

- $LFDI_{it}$ = log of net inflow of FDI in current US\$ to the ratio of GDP for country i at time t.
- $LMAR_{it}$ = market size (log of GDP per capita of country i at time t)
- $LTRD_{it}$ = trade openness (the sum of export and import to the ratio of GDP for each country i at time t).
- $LINF_{it}$ = inflation rate (annual percentage as proxy of economic stability in country i at time t)
- $LINFR_{it}$ = infrastructure (number of main telephone lines per 1000 people in a country i at time t).
- $LGCF_{it}$ = gross capital formation to the percentage of GDP in each country i at time t.
- $LNAT_{it}$ = natural resource (mining produced in each country i at time t)
- $LLABC_{it}$ = labour cost (the work remittance and compensation of employees received in US\$ for country i at time t represented by the log of wage)
- ε_{it} = the error term

Variables Descriptions

(a) Market size (MAR)

Market size is the one of key determinant that is widely used in most of the empirical studies. Investors are normally attracted to countries where market size is large compared to countries with low market size. So, the higher the market size, the higher the investment flow. Generally the market size is measured in terms of GDP per capita. It is expected to have a positive and significant influence on FDI inflows (Yasin; 2005, Razafimahefa *et al.* 2005, Krugell, 2005; Sidiropoulos *et al.*, 2010).

(b) Macroeconomic stability (INFL)

Macroeconomic stability is very important for attracting investment especially when the interest of foreign investors is concerned. Unstable economic environment, which is characterized by high inflation and interest rates will raise the cost of investment and affect the return of FDI in a negative way (De Mello, 1997). On the other hand, lower inflation would results in higher FDI inflows (Aseidu, 2006; and Ismail, 2006). Therefore, inflation rate is used as a proxy for macroeconomic stability and is expected to have negative sign.

(c) Infrastructure (INFR)

Infrastructure has been widely acknowledged as one of the key factors that could influence the flow of FDI into the host country. A country that is well equipped with infrastructures such as airports, water supply, power supply, roads, telephone, and internet would be able to minimize the cost of doing business for the investors and allow them to maximize the rate of return on their investments. Therefore, countries that are very well equipped with efficient infrastructure would receive higher FDI. For the purpose of the present study, the number of telephone line per 1000 people was used as the proxy for infrastructure and it is expected to have a positive sign (Onyeiwu *et al.*, 2004; Asiedu, 2002 and 2004).

(d) Natural resources (NAT)

The inflow of FDI in most of the African countries is in natural resources, especially in oil and minerals (Morisset, 2000). The inflow takes place in order to get a cheaper supply of inputs such as raw materials and factors of production. Therefore, the higher the availability of natural resources, the higher will be

the FDI inflow. Most of the empirical studies have used fuel export as the proxy for natural resources (Morisset, 2000; Asiedu, 2002; Bende-Nabende, 2002 and Onyeiwu *et al.*, 2004). As Swaziland did not have the data for its fuel export, the share of minerals in total merchandise exports was used as a proxy for natural resource instead (Asiedu and Lien, 2011). It was expected to have a positive impact towards FDI inflows.

(e) Trade openness (TRD)

Previous literatures have considered trade openness as a key determinant of FDI. The openness eases the movement of capital in and out of the country. The countries that implement relatively restricted trade policies will eventually discourage FDI inflow compared with those countries that practices free trade policies. Trade openness is represented by the ratio of export plus import divided by GDP. Trade openness is expected to have a positive impact towards FDI (Keyou *et al.*, 2009; Wafure *et al.*, 2010; and Rajan *et al.*, 2011).

(f) Gross capital formation (GCF)

Changes in economic structure may improve the investment climate which may result in higher capital formation. Higher capital formations will in turn results in higher economic performance and higher inflow of FDI. The results is expected to be positive since gross capital formation stimulates the FDI inflow (Vijayakumar *et al.*, 2010; Rajan *et al.*, 2011)

(g) Labour cost (LABC)

According to previous research, labour cost is a factor that attracts foreign investors into African countries. This is mainly because of the lower wage in most African countries. Lower labour costs would decrease the production cost and maximize the profit, making the country desirable for most investors. This eventually would result in a higher inflow of FDI. Labour cost is measured using work remittance and compensation of employees and the result is expected to be negative (Yasin, 2005; Vijayakumar, 2010; Rajan *et al.*, 2011).

Data

The study focused on Botswana, Lesotho, Namibia, South Africa and Swaziland (SACU members). The analysis used secondary data from the World Development Indicators database and UNCTAD statistical database of 2010. The selection of variables in the estimation model was based on theoretical and empirical justification

and the availability of data. The data used to analyse the determinants of FDI covers the period 1990–2010. Table 1 provides a summary of the variables used in the estimation model.

Table 1 Summary of the variables and expected sign

Variable	Description	Source	Expected sign	
			Positive	Negative
FDI	FDI inflows (US\$)	UNCTAD		
Market size (MAR)	GDP per capita	WDI	✓	
Macroeconomic stability (INFL)	Annual inflation rate	WDI		✓
Trade openness (TRD)	Export + import / GDP	WDI	✓	
Natural resources (NAT)	Natural resource	WDI	✓	
Infrastructure (INFR)	Telephone line per 1000 people	WDI	✓	
Gross capital formation (GCF)	Gross capital formation to the percentage growth	WDI	✓	
Labour cost (LABC)	Work remittance and compensation of employees received in US\$	WDI		✓

Empirical Methodology

The objective of the study is to examine the determinants of FDI in SACU member countries. The main method used for estimating the model are static linear panel analysis (pooled OLS, fixed and random effect), meanwhile dynamic ordinary least square (DOLS)² was used for robustness check. Panel data technique consists of three methods, namely; fixed effect, random effect and pooled effects. Fixed and

² The application of DOLS consists of three stages. Firstly, panel unit root tests (Levin, Lin and Chu, 2002; Im, Pesaran and Shin, 2003 and Fisher Chi-square) are conducted to check whether the variables are stationary. Secondly, if the variables are stationary after the first difference, the next stage is to test for co-integration. The method used is the Pedroni panel co-integration test (1999). Pedroni panel co-integration consists of two dimensions: (i) within-dimension based statistics [containing four test: panel v-statistics, panel p-statistics, panel t-statistics (non-parametric) and panel t-statistics (parametric)]; (ii) between-dimension [referred to as group mean panel co-integration statistics, with three tests: group p-statistics, group t-statistics (non-parametric) and group t-statistics (parametric)]. Finally, if the variables are co-integrated, the panel DOLS is employed to examine the determinants of FDI. In this paper, we used different numbers of leads and lags in order to get robust results consistent with the theory and empirical review.

random effects model are homogenous in the slope and each unit (i) is represented by different intercept. If the data are homogenous in intercept and the slope across both time and cross section, this type of data represent pooled model. We can write pooled OLS model as

$$y_{it} = \alpha + \beta X_{it} + v_{it} \quad (2)$$

Where i represent $1 \dots N$ and t represent $1 \dots T$

Where y_{it} the dependent is variable, X_{it} is the independent variable and v_{it} is the stand error term. Random effect model has homogenous slopes although the intercepts are not the same both in time and cross section. The panel effect model can be represented by the following.

$$y_{it} = \alpha + \beta X_{it} + v_{it} \quad (3)$$

$$v_{it} = \lambda_{it} + \mu_{it} \quad (4)$$

$$y_{it} = \alpha + \beta X_{it} + \lambda_{it} + \mu_{it} \quad (5)$$

Where i represents $1 \dots N$ and t represent $1 \dots T$, $\lambda_{it} \text{NIID} \sim (0, \sigma_\lambda^2)$, $\mu_{it} \text{NIID} \sim (0, \sigma_\mu^2)$. In the model, idiosyncratic error (v_{it}) is formulated by two items; unobserved effect of λ_{it} and statistical error term μ_{it} . The λ_{it} is assumed to be independent of idiosyncratic error term and explanatory variable where as idiosyncratic and explanatory are also independent of each other at time from cross section (i) and time (t). This means that $E(X_{it}, \lambda_{it}) = 0$.

The random effect model can be estimated using Generalized Least Square (GLS) method (Wooldridge, 2002) which can be presented statistically as:

$$\hat{\beta}_{re} = \left[\sum_{i=1}^N (X_i' \Omega^{-1} X_i) \right]^{-1} \sum_{i=1}^N X_i' \Omega^{-1} Y_i \quad (6)$$

Where, Ω is represent as

$$\Omega \Omega^{-1/2} = 1/\sigma_\mu [I_T - \theta / T i i'] \quad \text{Where } \theta = 1 - \sigma_\mu / \sqrt{T \sigma^2 + \sigma_\mu^2}$$

As for the fixed effect model, the intercept varies while the slopes are homogeneous in both i and t . There exists marked difference within cross section in this model and the dummy variables are used to represent each country. The fixed effect model can be in this form,

$$y_{it} = \alpha + \beta X_{it} + v_{it} \quad (7)$$

Where $i = 1 \dots N$ and $t = 1 \dots T$

$$v_{it} = \lambda_{it} + \mu_{it} \quad (8)$$

Where $\mu_{it} \text{ NIID} \sim (0, \sigma_\mu^2)$, λ_{it} represent a cross section specific effect and μ_{it} is idiosyncratic error term (Hsiao, 2002). In this model the unobserved effect λ_{it} and explanatory variable (X_{it}) are correlated, this means that $E(X_{it}, \lambda_{it}) \neq 0$ neither OLS nor GLS provide consistent estimator (Wooldridge, 2002). The fixed effect method will proceed by removing the λ_{it} as the source of the problem and then OLS will be used to run the regression. The estimates of the fixed effects model are categorized into three 1) within group fixed effect, 2) First difference fixed effect and 3) least squares dummy variable (LSDV) fixed effect. To understand which model is appropriate in estimating determinants of FDI tests such as Breusch and Pagan Langrangian Multiplier (LM) and Hausman is employed (Wooldridge, 2002). LM test was proposed by Breussch and Pagan (1980) to estimate which model, between Pool and Random, is suitable for the estimation. If the computed χ^2 is higher than the critical value, the conclusion is to reject the hypothesis (Ho). On the other hand, Hausman test is conducted to decide between Fixed and Random Effects Model. The aim of this test is to determine any significant correlation between independent variable (X_{it}) and unobserved specific effect (λ_{it}). If there were correlation, which means $\text{Cov}(X_{it}, \lambda_{it}) \neq 0$ and one of the classical assumptions is violated, fixed model will be the choice for estimation. The test uses χ_k^2 in making the decision on the estimated parameter, where k is the number of regress. χ_k^2 is compared with the critical value of χ^2 . If the value of chi-squared exceeds the critical value of chi- squared, hypothesis (Ho) is then rejected. The conclusion is fixed effect is more appropriate.

FINDINGS AND DISCUSSION

This section presents the empirical findings on the determinants of FDI in SACU member countries. Tables 2 and 3 present the descriptive statistics and correlations matrix. There are 105 observations for each of the variables. The market size (MAR) has the highest mean and labour cost (LABC) has the highest standard deviation of 56.84 and 20.505 respectively. The gross capital formation (LGCF) has a

Table 2 Descriptive statistics

	Obs	Mean	Std. deviation	Min	Max
LFDI	105	4.716	3.176	3.80	0.00014
LMAR	105	56.840	4.259	49.159	65234
LGCF	105	22.240	15.178	6.226	76.306
LTRD	105	6.126	7.296	1.50	0.00029
LINFL	105	16.452	5.390	1	37.499
LNAT	105	33.319	10.260	11.33	53.59
LINFR	105	5.200	3.246	0.669	12.796
LLABC	105	11.358	20.505	0.069	79.122

Table 3 Correlation matrix

	LFDI	LMAR	LGCF	LTRD	LINFL	LNAT	LINFR	LLABC
LFDI	1							
LMAR	0.123	1						
LGCF	0.137	-0.038	1					
LTRD	-0.404	0.164	0.396	1				
LINFL	-0.043	0.314	-0.015	0.026	1			
LNAT	0.174	0.028	-0.515	-0.184	-0.042	1		
LINFR	-0.223	-0.146	0.521	-0.841	-0.109	0.462	1	
LLABC	0.209	0.106	0.497	0.794	0.031	-0.373	-0.921	1

higher mean, while trade openness (LTRD) has a higher standard deviation. Trade openness (LTRD) is highly correlated with infrastructure (LINFR) and labour cost (LLABC). The infrastructure (LINFR) variable is also highly correlated with labour cost (LLABC). The presence of high correlation between the variables indicates a multicollinearity problem. Even though there is a higher correlation between the variables, we could still consider these variables because panel data estimation has an advantage in overcoming the problem of multicollinearity.

Firstly, the model was estimated using pooled OLS, random and fixed effect. The Breusch Pagan test and the Hausman test were adopted to specify the robust method for the estimation. The statistical estimation of the Breusch Pagan test indicates that the pool estimation technique was appropriate. Table 4 presents the results of the estimations based on pooled OLS and DOLS. The estimation results show significant positive correlation in market size, trade and natural resource with FDI. One per cent increase in market size, trade openness and natural resources

resulted in a 0.28%, 0.35 % and 1.02 increases in FDI, respectively. It is observed that market size is positive and significant at 5%, implying that an increase in market size would result in an increase in foreign capital in the region. The result is consistent with Dunning's OLI framework, which asserts that market size attracts FDI inflow from MNCs to a particular location or country. The finding concurs with the finding by Dunning (1980), Schneider *et al.* (1985), Tsai (1994), Ang (2008), Keyou *et al.* (2009) and Ismail (2009). The positive relationship also indicates that the FDI inflows to SACU member countries are highly market seeking in nature.

Similarly, a positive and significant relationship was established in the case of trade openness as well. This indicates that an expansion of trade or adoption of more liberal trade policies would result in an increase in FDI inflow in the SACU member countries. The positive sign of trade openness was due to the trade liberalization policy adopted by SACU member countries in the mid-1990s, which provided a conducive environment for FDI inflow (Morisset, 2000). The higher capital inflow, which was mostly based on the technology, was also benefiting mining and services sector such as banking and telecommunication. From the results, it is believed that trade openness and attractive investment condition attracts more foreign investors into SACU countries. The results are consistent with Morisset, (2000); Chakrabati (2001), Bende- Nebende (2002), Thomas *et al.* (2001), Fedderke *et al.* (2006) and Setanah *et al.* (2011).

The result also confirms the role of natural resources in attracting FDI inflow into the SACU member countries. It is consistent with the theory of dynamic comparative advantage which argued that investment will take place in a country that has comparative advantage where home country lacks. The high coefficient for natural resources also indicates a particularly strong pull factor for foreign investors into SACU countries. The result is consistent with the findings of Asiedu (2002, 2006), Onyeiwu *et al.* (2004) Yasin (2005), Ismail (2009), and Mohamed *et al.* (2010). On the other hand, gross capital formation, infrastructure and labour cost were positive but insignificant while inflation was negative and insignificant. These results were different from what was expected.

Additionally, in recent decades, scholars have come to believe that FDI flow has a dynamic dimension, due to the volatile and unstable trends following various macroeconomic shocks, such as the recent 2008–2010 global financial crisis. Therefore, to incorporate this dynamic dimension, we extended the analysis by estimating the model using DOLS. This was done to capture the long-run effects and as robustness check. The model used various leads and lags to check for the robustness of the model. Table 4 shows the results for two models with different

lags and leads. In the first model, we used one lag and one lead (DOLS 1, 1). In the second model, the estimation utilized two lags and two leads (DOLS 2, 2). The results in Table 4 for the first and second models confirm that there is a long-run relationship between the selected independent variables and FDI flow; however the finding is slightly different than what was obtained based on pooled OLS. Market size and trade openness which was significant in the previous estimation are now seems to be insignificant. Only natural resources variables recorded consistent results in both estimation methods, in which we could conclude that the inflow of FDI into SACU countries are highly determined by its natural resources endowment. DOLS estimation shows that capital formation, natural resources and infrastructures have a positive and significant relationship with FDI at the 5 and 10 percent levels, respectively. The results confirm that good infrastructure, natural resources and capital formation would result in an increase in FDI flow. However, inflation which is proxy for macroeconomic stability has a negative and significant relationship with FDI at the 5 percent significance level, thus, indicating that a lower inflation rate would increase FDI inflows in the long run (Ismail, 2006).

CONCLUSION

This paper examines FDI determinants in the context of SACU member countries. Using pooled OLS as the main method, the estimation results shows that market size, trade openness and the availability of the natural resources are positive and significant. Meanwhile, gross capital formation, infrastructure and labour cost are positive but insignificant, while inflation is negative and insignificant. This implies that the types of FDI flowing into the SACU region are more of market seeking and resource seeking in nature. Based on the findings, a number of policies can be targeted and amended by the governments of SACU countries. According to the results, a bigger market size can attract higher FDI inflow. However, to increase market size means that the governments need to boost their population without pulling down on its per capita income. The easiest and fastest way for to do this is to open up their borders among themselves in SACU region so that goods and services could travel from one country to another smoothly. This could be achieved by forming trade agreement that eases the movement of their goods and services and between themselves. By this, investors would able to see the region as one country with a bigger market. The SACU countries also should reduce trade and investment barriers among themselves which would in turn reduce transportation costs and facilitate free movements of goods, services and capitals.

Table 4 Estimation results based on pooled OLS and DOLS³

Independent variables	Corrected Pooled OLS	DOLS	
	Coefficient	Model 1 DOLS (1,1)	Model 2 DOLS (2,2)
Constant	-13.103*** (-7.68)		
LMAR	0.285** (3.30)	-1.223 (-0.56)	-1.224 (-0.56)
LGCF	0.435 (1.38)	0.563** (1.42)	-0.563** (1.42)
LTRD	0.347** (3.02)	0.395 (0.73)	0.396 (0.73)
LINFL	-0.181 (-0.76)	-1.254** (-4.53)	-1.254** (-4.53)
LNAT	1.019** (2.93)	1.396* (1.51)	1.396* (1.51)
LINFR	0.118 (0.14)	1.673** (2.70)	1.673** (2.70)
LLABC	-0.111 (-0.75)	-0.452 (-0.12)	-0.042 (-0.12)
Adj R2	0.26		
Breusch-Pagan test	0.123		

Note: ***, **, * denotes significance at 1%, 5% and 10% levels, respectively. Numbers in parentheses () indicate t-statistics.

³ The results of the ADF, LLC and IPS at a constant level indicate that all the variables are non-stationary. After first differencing, all the variables were found stationary in order (1) in constant and constant with the trend, thus implying that the variables are integrated in the order I (1). Since the variables were found to be integrated in the same order of I (1), panel cointegration tests using Pedroni's (1999, 2001 and 2004) method was carried out. The results indicate that there is cointegration. The statistical results show panel PP, panel ADF, group PP and group ADF statistics is significant at the 1 percent level, allowing for the null hypothesis of no cointegration to be rejected in both constant and constant with the trend. On the other hand the results reveal that panel v, panel rho, group rho are not cointegrated, (p-value > 0.05) in both constant and constant with trend. Since, there is significance in some statistical test it is convincing enough to say that the variables in the FDI determinants model are cointegrated with each other.

Additionally, more investment friendly policies should be formulated to attract FDI into SACU countries, especially investment relating to extractive industries since most of the countries are highly endowed with natural resources especially oil and minerals. However, the government must make sure that the benefits of the investment are mutual between the host and the home countries. Since natural resources are hard to come by and are expensive and lucrative in some countries, policies that allow the transfer of mining technologies that could accelerate the pace of the extracting activities would be beneficial. Investors should be lured into operating the mines effectively without losing the countries ownership of those natural resources.

Trade openness also plays a key role in attracting FDI inflow in the region. As higher export is associated with positive net trade, governments should move their countries towards industrialization that are based on export promotion strategy. In recent decades, it is observed that many developing countries started to emphasize on industrialization and trade liberalizations to push their economies forward. Such a move would create a variety of employment opportunities that could help increase per capita income and domestic savings. With respect to this study, it is clear that SACU countries, specifically, should make a concerted effort to attract FDI in various sectors in the economy, not limited to extractive industries. It is important for these countries to improve their economic performance and address pressing socioeconomic problems such as poverty and income inequality.

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