

An Empirical Investigation into the Impact of FDI on Domestic Investments in East, Central and Southern Africa Region

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Abstract

This study examines the impacts of FDI inflows on domestic investments for the East, Central and Southern Africa region. The main study problem is whether FDI inflows into the region leads to a crowding-out or a crowding-in impact on domestic investments and the mechanisms through which such impacts happens. The data was obtained from the World Development Indicators, World Bank, International Monetary Fund and Heritage Foundation for the period 1995 to 2021. Initially, the study targeted all the 25 member countries affiliated to the East, Central and Southern Africa region. However, the final sample dropped to 12 countries due to lack of data. The main empirical estimation model for the study is the fixed effects regression model that is applied for the panel data. From the main findings, the study concludes that: one, there exists a crowding-out effect on domestic investments as a result of FDI inflows into the East, Central and Southern Africa region; and two, the impacts seems to be happening through the real market as opposed to the financial market channels. Notably, the study finds the natural resource curse to be an important factor for FDI impacts for the region. Based on the foregoing conclusions, the policy implications are that reform interventions that prioritize real market may sustain benefits of FDI as the region works towards financial market reforms. Further, the region may consider prioritizing joint reform initiatives as well as national level reforms to become competitive in attracting FDI. Enhancing member states absorptive capacity, addressing problem of human capital flight and increasing investments in technology may accelerate FDI benefits innumerable for the region. Finally, there were limitations on data for some of the countries. That notwithstanding, the 12 countries analyzed offer a sufficient panel data for a credible and robust estimation results.

Key words: foreign direct investments, crowding-out or crowding-in, domestic investments, mechanisms

1. Introduction

1.1 Overview of the Problem

In the modern economic systems, the effect of globalization can never be overemphasized. There has been huge capital flows across geographical boundaries in the 20th century, especially from the 1960s. Foreign Direct Investment (FDI) has therefore made significant contributions towards globalization (Whalley & Xin, 2009; Mohamed & Sidiropoulos, 2010).

The United Nations Conference on Trade and Development (UNCTAD) characterizes FDI to be a speculation made for revenue generation by forces that work outside of the economy of the financial backer (UNCTAD, 2014). Thus, while growth rates may change across countries and regions, the patterns do not change much.

Historically, African nations are not significant beneficiaries of FDI flows. In recent years however, there has been a notable increase in FDI inflows into the continent (Agrawal & Khan, 2011; Ozturk, 2007). In 2021, FDI inflows into the African countries were estimated at US\$83 billion, accounting for a paltry 5.2 per cent of the global FDI. This is however an improvement from a 4.1 per cent recorded in 2020 (UNCTAD, 2022).

That notwithstanding, inward FDI flows within emerging economies are on the rise over the past 20 years, with an undeniable expansion for African firms (UNCTAD, 2015). For instance, indigenous firms in countries like South Africa, Nigeria, Togo, and Kenya have established ventures in multiple countries in the Sub-Saharan region (Anyanwu & Yameogo, 2015; UNCTAD, 2015). The increase in cross-border investments for African firms has

opened a good opportunity to explore the impacts of FDI inflows among these countries (Agrawal & Khan, 2011; Aregbesola, 2014; UNCTAD, 2013).

1.2 Background on Capital Flows

In its most no technical assumption, FDI capital flow is expected to act as a complement to domestic savings. It is therefore anticipated that it would be facilitative to finance local development projects in the recipient country (Jude, 2018). In reality however, the exact impact of FDI flows into the domestic economy may not be as obvious. Jude argues that while the FDI may contribute to the enhancement of existing capital stock of the recipient country, there is equally a real possibility that it may indirectly alter the existing capital structure itself.

The behaviour of domestic investors, for example, following the entry of foreign investors will determine the exact nature of the impact of the FDI injection into the recipient economy. If they respond by investing less in response to the entry of competition, they this may lead to a substitution effect, technically referred to as a crowd-out effect. On the other hand, if they respond by investing more this results into a complementary or crowd-in effect.

Thus, the behaviour of domestic investors in response to the entry of foreign investors into the local economy is of significant policy relevance to decision makers. If such entry causes a substitution effect through less investments from domestic sources, then the intended benefits of FDI may be lost for the recipient developing countries (Jude, 2018). There would be however two main channels through which the interaction between foreign and domestic investments would interact. The first interaction happens on the demand side if the foreign firms targets a share of the local market currently served by domestic firms. The driving forces for this effect would be increase in competition for consumers and sourcing of supplies.

The second interaction would happen on the supply side if foreign firms entry increases liquidity in the domestic markets or loosens financial constraints for domestic firms to access capital. The interactions of the market may extend to other variables like human capital, technology and improvements in the local financial system.

This study explores the primary effects of FDI inflows into the domestic economy. Specifically, they study examines whether it leads to a substitution or complementary effect to domestic economies of the recipient countries and the potential channels through which such substitutions happens. While Sub-Saharan Africa (SSA) region receives a very low share of the global FDI flows overall, the distribution vary widely across sub-regions, economic blocs or among individual countries. In the current analysis for instance, figure 1 presents the distribution of FDI net inflows into 12 countries analysed in the study for the period 1995 -2021.

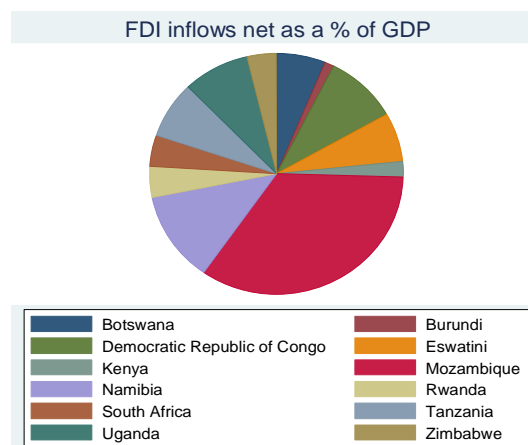


Figure 1. FDI net inflows as a % of GDP

Source: Own plot from World Bank data on FDI net inflows for the period 1995-2021.

From a general observation of the distribution of the FDI inflows into the selected 12 countries, it is evident there are disparities for individual countries. For instance, the highest share of the flows went to Mozambique in the Southern Africa region. The least FDI flows over the period were to Burundi in the Central Africa region. Within the East Africa region, Kenya received the least flows and second least overall over the period.

1.3 Description of the Study Area

The selected area for the current study constitute three regional economic blocs as classified under the various

political, economic and trade protocols. The largest economic bloc in the region based on the number of countries is the Southern Africa region with 10 members states. These includes Angola, South Africa, Losotho, Botswana, Mozambique, Kingdom of Eswati, Malawi, Zambia, Namibia and Zimbabwe. For the purpose of analysis in this study, Angola, Losotho, Malawi and Zambia are dropped due to lack of sufficient data on key variables for the period under study of 1995-2021. This leaves only six countries into the sample for this economic bloc. Overall, the region has the highest number of participating countries in the study sample.

The Central Africa region has the second largest number of countries including Burundi, Central Africa Republic, Cameroon, Democratic Republic of Congo, Chad, Congo, Gabon, Equatorial Guinea and Sao Tome & Príncipe. For purpose of analysis, the region's member states lacked data for the period under study except for Burundi and Democratic Republic of Congo which are the only countries included in the final sample for data analysis. It would be important to note most of the member state from this region have suffered political instability and internal armed conflicts over the past three decades. Gabon had an active political conflict at the time of this study.

Finally, the East Africa economic bloc has six member states including Tanzania, Uganda, Kenya, Rwanda, Burundi and South Sudan. For purpose of analysis, South Sudan was dropped for lack of data with Burundi already accounted for under the Central Africa bloc ECOWAS. All the other member states are included in the final sample. Overall, 12 out of the 25 countries initially targeted for this study based on their membership to the relevant economic blocs will be analysed. Even then, there were some missing data for some countries for key variables that will be described in the next section on the methodology used for data analysis.

For purpose of understanding the balance of economic power for the region, figure 2 presents the regional GDP growth rates for the various sub-regions for the period between 2008 - 2020. However, there would be expected differences in terms of policies, political orientations and socio-economic aspects on the regions. However, except for the countries that have been formally expelled from the African Union due to political instability or internally instigated armed conflicts, all countries in the sample are part of the AU. This brings a convergence of key policies on economic management, trade and governance. However, individually the economic blocs and individual member states are in stiff competition for attraction of FDI.

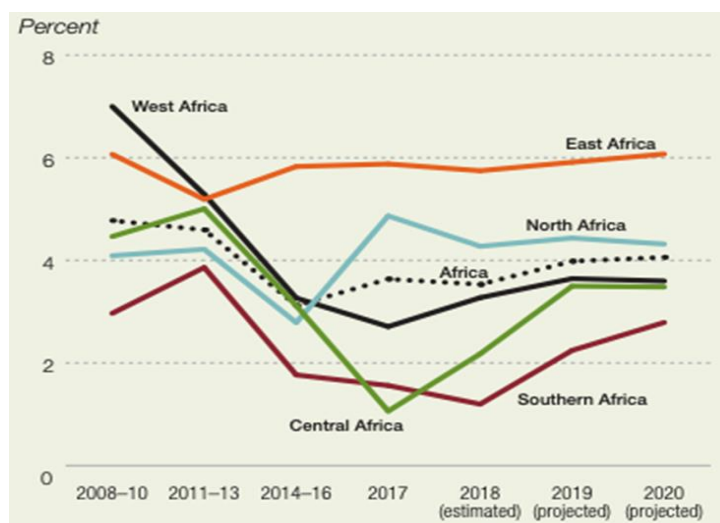


Figure 2. GDP growth rate by region in SSA

Source: African Development Bank statistics.

The next section explores key empirical studies on the subject area to establish the problem under investigation and the research gaps that this study seeks to fill.

1.4 Problem Identification

Solow (1956), a neoclassical economist opined that economic growth is mainly driven by accumulation of capital up to a given optimal level per worker. However, it is possible to find some convergence over a longer period of time. In general macroeconomic theory, investments are empirically determined to be among the key drivers of growth in the economy. Therefore, it may be in the best interest for policy makers to not only accumulate adequate capital stock domestically, but also to attract it from external sources.

Therefore, when a country receives FDI from outside the national boundaries, it is expected to complement that which is available domestically. Furthermore, FDI inflows serve as means to transfer new technology, promote technological advancement and contribute productivity spillovers to the recipient countries (Carkovic & Levine, 2005; De Mello, 1997; Liu, 2008; Jude, 2016). However, Agosin and Machado (2005); Markusen and Venables (1999); Cardoso and Dornbusch (1989); and Harrison et al. (2004) found that FDI may in reality lead to unintended outcomes that results into a substitution effect by crowding out domestic investors.

This arises when foreign investors drive increase in competition to the detriment of already planned investment projects by local investors. Additionally, foreign investors may bring in more advanced technology easing the production costs, enhance productivity, enjoy economies of scale or leverage from their existing global supply chains for comparative advantage. In other instances, domestic investors may simply lack the capacity to absorb the new technologies that come with the capital inflows.

On the complementing forces, foreign investors may drive demand addressed by domestic firms like is the case for technology based innovations that are opening new frontiers of business in developing countries like those within the sample of this study. Take for instance the multi-billion dollar demand for tech based services, monetisation of digital content and social media opportunities opened by the entry of investment by multinational companies into the regions in our study group. In other instances, FDI promotes the development of financial and capital markets that enhances domestic liquidity and loosens financial constraints for domestic investors.

For instance, it is common for multinational financial institutions, venture capitals and commercial banks to follow their customers into foreign markets that they go into. As they seek to serve their customers from abroad, they not only open access for domestic customers but bring in new products and innovations into the domestic market as they leverage from their global supply and distribution networks.

From the foregoing discussion, the exact nature of impact of the entry of foreign investors through FDI into any country remains an open question for study. There are varied evidences across developed regions, developing countries and individual studies. For examples, in a study to investigate the impacts of FDI in developing economies, Agosin and Mayer (2000) find mixed evidence for Asia, Africa and Latin America regions. For Asia, they find a significant crowd-in effect, less significant crowd-in for African countries and a significant crowd-out effect for Latin American countries.

Seetanah, Matadeen, Fauzel, and Kheshansing (2018) examines dynamism and endogeneity on domestic investments to find positive long run crowd-in effects for 20 African Countries. Acar, Eriş, and Tekçe (2012) finds FDI crowds-out domestic investments in 13 MENA countries as well as in the oil-rich and oil-poor countries. The mechanisms for such crowding-out are however complex depending on the structure of the industry, government controls and market forces. Sucubasi, Trenovski, Imeri, and Merdzan (2021) finds inward FDI positively affect domestic investments for the Western Balkans countries.

The current study adds to this wide literature with a specific focus on the 12 country data from East, Central and Southern Africa. The specific research question under investigation is whether FDI inflows lead to a crowd-in or crowd-out effect on domestic investments among the member states within the East, Central and Southern Africa region.

1.5 Objective and Research question of the Study

1.5.1 Objective

The objective of the study is to examine whether FDI leads to a crowding-in or crowding-out effects on domestic investments within the East, Central and Southern Africa region.

1.5.2 Research Question

The research question under investigation is whether FDI inflows leads to a crowding-in or crowding-out effect on domestic investments among the member states within the East, Central and Southern Africa region.

1.6 Justification of the Study

This study seeks to adduce additional evidence into the complex field of study as to the exact nature and impact of FDI inflows on domestic investments with data from the East, Central and Southern Africa regions. Through the study, it is expected that policy makers will understand how entry of foreign investors affects domestic investment and come up with the appropriate policy responses.

Secondly, the study contributes to the body of knowledge available in the area under study even as it contributes towards the achievements of the expectations of academic award for the researcher(s). This is partially with the expectation towards an award of a doctoral degree from the Central University of Finance and Economics (CUFE).

Thirdly, the growing competition for accumulation of capital to drive economic growth obligates the body of academia to generate empirical evidence that can assist countries and society in general to understand the phenomena. By adducing such evidence for the regions covered in the scope of the study contributes in some way to the improvement of societal welfare. By developing evidence-based policy interventions, government are better placed to improve livelihoods of their citizens.

Finally, this study opens further the doors to future scholarly exploits as it is not expected to be an end on itself. Hopefully, students of economics will find new insights from the study to advance their own research to address gaps that this study may not fill alone.

The remainder of the study is organized into five sections. Section two discusses the relevant literature to demonstrate the existing gaps and tease out the rationale for the current study. Section three discusses the research design and data, while section four presents the empirical approach and discusses the main findings. Section five makes the conclusions and draws the policy implications. The acknowledgements and list of references are presented last.

2. Relevant Literature

2.1 Empirical Evidence

Over the years, several studies have been undertaken to explore the influence of FDI inflows on domestic investments and economic growth. Overall, the available evidence can best be described as mixed. The FDI-growth relationship is empirically supported by most neoclassical and endogenous models of growth (Ozturk, 2007; Solow, 1956).

For the neoclassicals, financial development may arise from two primary sources. This includes factor accumulation and total factor productivity (TFP) growth (Felipe, 1997). The net effect is to enhance the host country's bargaining power for resources that it can offer to investors in order to attract FDI. Such resources may include human capital, market size, geographic locational advantage and infrastructure (Fedderke & Romm, 2005). Fedderke and Romm concludes that FDI inflows is significantly impacted by the risk profile and net rate of return for FDI liabilities.

In recent years, much of the empirical literature has focused on development of factor inputs. The main challenge that inhibits wider studies on TFP growth mostly are due to lack of proper and adequate data. Others are as a results of a general absence of suitable econometric modelling methods (Johnson, 2006; Madsen, 2007). In consideration of the limited contributions from the neoclassical development hypothesis, endogenous development literature argues that FDI is not just an adds on to financial development through technology transfers and capital formation (Lucas, 1988; Merican, 2009; Blomstrom et al., 1996); but also a central augmentation to levels of knowledge arising from skills acquisition and labour based training (De-Mello, 1999; Solow, 1956).

Empirical evidence to establish the relations between FDI inflows and domestic investment behaviour for beneficiary country has been demonstrated as mixed. In a study to establish if crowding-out effects of FDI on domestic investment in China exists, Li-jun and Hong-qin (2006) find the impacts on economic growth not certain. It was established that it was dependent as to whether the FDI crowds-out or crowds-in domestic investment partially or in its entirety. Their findings show twin evidence of a potentially simultaneous crowding-in and crowding-out effects of FDI on Chinese domestic investment. Collectively however, the evidence tends towards net crowding-in effect.

In their study, Tang et al. (2008) applies a multivariate VAR system with an error correction model (ECM) and innovation accounting (variance decomposition and impulse response function analysis) method to establish if there exists causal relations among FDI, domestic investment, and financial development in China for the period 1988 to 2003. In their findings, they observe a bi-directional causality for FDI to domestic investment and monetary development; and a one-way directional causality for FDI to domestic investment and financial development. FDI is found to have a positive spillover impact on domestic investments.

On their part, endogenous growth models identifies three main channels through which FDI inflows can impact economic growth. One, FDI inflows may lead to capital aggregation for the host country through educement of new data sources and technologies (Dunning, 1993); two, FDI may enhance levels of skills and knowledge for the host country by preparing (training) existing or new labour force (De-Mello, 1999); and three, FDI may expand the levels of competition in the host country by decreasing sectional boundaries and eating into the market force of existing firms (Johnson, 2006). These mechanisms form important channels through which FDI may lead to a crowding-in or a crowding-out effect on domestic investments, and hence positive or negative accumulation of capital stock.

Alternative theories by David Ricardo (comparative advantage), Heckscher-Ohlin's (factor proportions), and Porter's competitive advantage have established the practical inevitability of FDI, as an important foundation under which a country's economic growth and prosperity can be built (Aregbesola, 2014). However, several empirical studies have analyzed the relations between private domestic investment and FDI, and have returned ambiguous outcomes.

Moreover, different studies on the impact of FDI on domestic investment have found both positive and negative evidence. Thus, the exact nature of impact of FDI on domestic investment still remains a controversial and ongoing issue in the debate on international capital flows literature. Part of the literature argues for a positive relation, another part for a negative relation while others finds a neutral impact of FDI on domestic investment. The literature is scanty for Sub-Saharan Africa as compared to the advanced economies of the west and the emerging ones of Asia, Europe and the Americas. How the FDI inflows into the East, Central and Southern Africa have impacted domestic capital investments is the subject of this study.

Fry (1993) study finds FDI discourages domestic investments in the host country. Agosin and Mayer, 2000; Kim and Seo, 2003; Xu and Wang, 2007 finds it stimulates domestic investment rates. These studies have all sought to establish whether foreign investments crowds-in or crowds-out domestic investments. Few studies that have focused in Africa generally finds that the effect is mostly neutral (Agosin & Machado, 2005; UNCTAD, 2003; UNECA, 2006).

Agosin and Mayer (2000) investigates the extent to which FDI crowds-in or crowds-out domestic investment in developing countries. They use panel data for the period 1970-1996. They adduce evidence that FDI leads to a crowding-out effect most of Latin America while a crowding-in effect exists for Asia (and weaker in Africa).

Ying-Jun (2006) examines the influence of FDI on Chinese domestic investment and finds a significant crowding-effect of FDI on domestic investment as a whole. On extending the analysis further to a regional disaggregation, the study finds FDI effect varies across the Chinese regions. In East part of China, there was both a crowding-in and crowding-out effects. Positive externalities were limited or insignificant or uncertain in Central China. In the Western parts of China, FDI impact was muted in many areas or uneven and thus outcompeting domestic investments in certain regions.

Misun and Tomsik (2002) extends the similar investigations of a crowding-in or crowding-out effects on domestic investment in the Czech Republic, Hungary, and Poland during the 1990s. They observe that there exists evidence on a crowd-out impact in Poland (1990 to 2000), crowd-in impact in Hungary (1990 to 2000) and the Czech Republic (1993 to 2000). Lipsey (2000) observes a negative coefficient for inward FDI flow ratios of the preceding five-year period of capital formation ratios in developed countries (OECD countries except for Greece, Turkey, Iceland, and Ireland) on examining FDI effects for the period 1970 to 1995.

Apergis et al. (2006) analyzes on the linkages between FDI and domestic investment from among 30 countries in America, Asia, Europe, and Africa for the period 1992-2002. The study establishes a two-way causality between FDI and domestic investment. Based on a bivariate model, they find evidence in favor of a positive long-run relationship for Asian and African countries. The same was not evident for American and European countries using a multivariate model. Overall, this suggests that a crowding-out effect became dominant when American and European countries were considered.

These findings are similar to those of De Mello (1999) for a group of developed countries and of Lipsey (2000) and Agosin and Mayer (2000) for Latin America as referenced previously. There are several individual country studies that relates to this topic. By examining firm entry and exit behavior in Belgian manufacturing industries for the period 1990-1995, Backer and Sleuwaegen (2003) finds that import competition and FDI discourages entry and stimulates exit of domestic entrepreneurs. However, they postulate that through interventions like learning, demonstration, networking and linkages among foreign and domestic firms, the crowding-out effect may be weakened, or even reversed in the long run. This presumes that FDI will consequently have positive effects on investments for domestic entrepreneurs in the long-run.

Harrison and McMillan (2003) finds evidence that FDI crowds-out domestic investment. This is because foreign firms finance their investment by borrowing in the host country. Consequently, this increased the host country's interest rate in Côte d'Ivoire. Kim and Seo (2003) finds no evidence that FDI crowds-out domestic investment in Korea. Interestingly, an increase in domestic investment appears to crowd-out the inflow of FDI for Korea. Titarenko (2006) undertook an econometric analysis of the total investment function in Latvia for the period 1995 to 2004. He found evidence that FDI crowds-out domestic investment for Latvia.

2.2 Motives and Drivers of Foreign Direct Investments

Dunning (1993) discusses four motives for FDI. These includes resource seeking in order to access raw materials, labor force, and physical infrastructure resources; market seeking that follows an horizontal strategy in order to access local markets; efficiency-seeking that follows a vertical strategy in order to take advantage of lower labor costs, especially in developing countries; and strategic-asset seeking that is geared towards access for research and development, innovation, and advanced technology.

Literature on the forces that drive FDI has established both policy and non-policy factors (Fedderke & Romm, 2006). Policy factors may include openness, product-market regulation, labor market arrangements, corporate tax rates, direct FDI restrictions, trade barriers, and infrastructure. On the other hand, non-policy factors may include market size of the host country, distance/transport costs, factor proportions/endowments and political and economic stability (Mateev, 2009).

Other factors referred to as pull or domestic factors includes economic, socio-political and structural conditions like uncertainty. The opposite of the pull factors are push factors that includes cyclical and structural conditions, irreversibility and herding (Fernández-Arias, 1996; Fernández-Arias & Montiel, 1996; Gottschalk, 2001). Fernández-Arias (1996), Fernández-Arias and Montiel (1996), Gottschalk (2001) and Calvo et al. (1996) argues for a two-factor classification of the factors that influence FDI flows as “push” (those that are external to the recipients of FDI) or “pull” factors (that are internal to the recipient country).

Similar classification have been advanced by Tsai (1994), Ning and Reed (1995), and Lall et al. (2003). These studies group the factors as (i) “supply-side” that includes skilled labor, research and development, and infrastructure) or (ii) “demand-side” that includes host country economic and social variables or pull factors such as interest rates, tax, tariffs, market size and potential, wage rates, income distribution, human capital, cost differentials, exchange rates, fiscal policies, trade policies, physical and cultural distance, among others (Karakaplan et al., 2005); or (iii) “institutional factors” that includes culture, intellectual property rights, transaction costs, political risk, corruption and bureaucracy.

Sekkat and Veganzones-Varoudakis (2007) classifies factors determining inward flows of FDI into three categories. These are basic economic factors, trade and exchange market policies, and other aspects of the investment climate. Basic economic factors may include differences in rate of return on capital across countries, portfolio diversification strategy of investors, and market size of the host country. Trade and foreign exchange policy considerations relates to trade liberalization and exchange rate movements and their volatility (Froot & Stein, 1991).

Wheeler and Mody (1992) address business climate factors that relates to infrastructure, labor costs, availability of skilled labor/education, incentive factors, political risk, economic factors (per capita GDP, GDP growth rate, economic integration, importance of transport, commerce, and communication), social factors (degree of urbanization), political stability (the number of constitutional changes in government leadership), the role of institutions (in terms of commitments to and enforcement of rules) (Schneider & Frey, 1985), the stability of basic macroeconomic policies (fiscal, monetary, and social) (Baniak et al, 2005), and catalyzing effect of foreign aid (Harms & Lutz, 2006; Kimura & Todo, 2010).

This vast empirical evidence focuses mostly on the advanced economies of the west and emerging economies in Asia, Europe and Latin America further demonstrating a lack of extensive study for Sub-Saharan Africa. As shall be discussed in the next section of the data selection, part of the reasons why these region is least studied have been limitation on data. For most countries in SSA, the data is either too short or missing for key variables required to model the effects of FDI.

This study, however, was able to generate adequate data, especially with the advantage of recent improvements with documentation of data at country level and harmonization of the same by the Multilateral agencies. Despite that, data was still missing for key variables modeled from at least 13 of the 25 initially targeted countries. Thus, the study analyses data for 12 countries as shall be described in the methodology.

2.3 Impact of FDI on Domestic Investment in Emerging Markets

Research has intensified for emerging markets in recent years. Prasanna (2010) examined the direct and indirect impact of FDI on domestic investments in India. The study establishes the existence of a positive impact of FDI on domestic investments in the short run. In the long run, there was a neutral indirect impact after factoring in time-bound effects. A plausible reason for the crowding-in effect may be explained by the existence of a vast domestic market and cheap labour in India.

Ahmed et al. (2015) studies whether FDI harms sector level domestic investments or the overall economy in

Uganda. The study targets nine sectors including Agriculture, Community, Construction, Electricity, Finance, Manufacture, Mining, transport, and wholesale. They find a crowding-out impact in agriculture, community, construction, and finance sectors. A crowding-in impact was established in mining and wholesale sectors. The impact was neutral in Electricity, Manufacturing and Transport.

In Western Africa, Harrison and McMillan (2003) examines if FDI constrains credit for domestic firms or whether borrowing by foreign firms aggravates domestic firm credit in Ivory Coast. They find evidence that private domestic firms suffered credit constraints that led to a crowding-out impact of FDI, albeit via product markets.

In a study to explore the developmental impacts of foreign investment in SSA, Ndikumana and Verick (2008) finds that a key mechanism or channel of the impact is through its impacts on domestic factor markets. This is especially so on domestic investments and employment from a sample of 38 SSA countries. In analysing data from selected MENA countries, Acar, Eris, and Tekce (2012) finds impact of FDI on domestic investment for the period 1980-2008. There was a negative impact of FDI on domestic investment in the 13 MENA countries as a group.

Al-Sadig (2013) employs panel data from 91 developing host countries to examines the effects of FDI on private domestic investment for the period 1970 to 2000. He finds FDI displayed a spill-over impact on domestic investment as opposed to a crowding-out impact. On extending the analysis by splitting host countries into three groups based on their level of income, he finds FDI to have a positive impact on private domestic investment for middle and high-income developing countries. There was a spillover impact of FDI on private domestic investment in low-income developing countries that depended on the availability of human capital. The study found no evidence that FDI strongly and positively supports private domestic investment when the host country is open to trade. Neither did the financial development level of the recipient country.

Lautier and Moreaub (2012) explores the impact of domestic investment on FDI in developing countries. The study finds lagged domestic investment has a strong influence on inward FDI. This suggests that domestic investment is a strong catalytic agent for FDI to the recipient country. The inflows were strong for countries with existing MNC investment and country stability. Political and economic risk were confirmed to have a negative correlation with FDI because FDI is an irreversible sunk cost.

Kamaly (2014) explores if FDI crowds-in or out domestic investment in 16 emerging economies. He finds FDI impacts domestic investment in quite varied was among the countries. In the short-run inward FDI has positive effects on investments in 13 countries. For Mexico and Thailand, the evidence shows a significant negative effect of FDI on domestic investment. In 12 out of the 16 countries (Argentina, Chile, China, Columbia, Egypt, Indonesia, India, South Korea, Malaysia, Philippines, South Africa, and Thailand) there was a neutral effect between FDI and domestic investment. A crowding-out effect of FDI on domestic investment was found for Israel, Mexico, and Peru whereas a positive spillover of FDI on domestic investment was established for Morocco.

Ramirez's (2006) uses panel data for the period 1981 to 2000 to investigate the complementarity hypothesis between domestic private investment and FDI. Data from nine major economies of Latin America namely Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Peru, and Uruguay was used for this study. The findings adduce evidence that there exists a lags on real GDP growth rate, ratio of gross FDI to GDP, ratio of public investment to real GDP, and a credit variable with a positive and significant effect on private capital formation.

From the foregoing country and specific region studies, the evidence seems to suggest that empirical findings have not provided a conclusive relation between FDI and domestic investment. The evidence points to the fact that foreign investments may crowd-in, crowd -out, or may have no impact depending on the type of the economy and domestic policies that are in place for the host country.

More specifically however, there has been no or very little studies that have focused on the three regions identified for this study directly either as individual regions or collectively together. There also seems to be little country specific studies from the selected region further demonstrating the research gaps that this study seeks to fill. Even where such studies exist, they are relatively older studies necessitating the need to use more recent data and longer durations of data to assure empirically robust results.

From the foregoing literature, the next section discusses the research design and data for the study.

3. Methodology and Data

3.1 Research Design

The study utilizes a descriptive research design based on a cross-sectional data collected for the selected countries over a 26 year period. Descriptive studies aim to gather information in order to describe a phenomenon, situation or population of interest. More importantly, such a design helps to answer the what, when, where and

how questions as opposed to the why. Unlike in experimental types of research, the researcher does not try to control or manipulate the variables. Instead, the variables are only identified, observed and measured (www.Voxco.com). For purpose of this study, data on the variables of interest were obtained from credible sources that are mainly multilateral agencies.

3.2 Research Method

The study utilizes the Fixed Effect model to analyze the data. The fixed effect model is a statistical model that represents observed quantities in form of explanatory variables that are treated as if the quantities were non-random. This method of analysis is contrasted from the random effects regression model that presupposes the group means are a random sample from the population while the fixed effect regressions group means are fixed or non-random. For fixed effects model, the only source of uncertainty is the within study (sampling or estimation error). In random effects regressions, there is some source of uncertainty with an additional source called the between-studies variance.

To make a choice between the random and fixed effects model for this study, the Hausman test was carried out between the two models. The test assumes the null hypothesis that the preferred model is random effects while the alternative is the fixed effect. If the p-values are significant at a given significance level, say $p < 0.05$, then we reject the null in favour of the alternative. The results of the test are presented in table 1.

Table 1. Hausman test for random vs fixed effect models

Variable	Co-efficient				S.E
	(b) fe	(B) re	(b-B) Diff		
Lag GCF	0.558	0.789	-0.240	0.025	
Real GDP	0.131	0.143	-0.011	0.022	
Real Interest Rates	0.030	0.014	0.016	-	
FDI net inflows	0.223	0.169	0.544	0.031	
Av. CPI	0.002	0.001	0.001	-	
T. Resources	-2.793	-1.458	-1.335	0.595	
Exp + Imp	0.071	-0.001	0.072	0.013	

b = consistent under Ho and Ha;
 B = inconsistent under Ha, efficient under Ho;
 Test Ho = difference in coefficient not systematic
 $Chi2(7) = (b-B)'[(v_b - v_B)^{-1}](b-B)$
 =106.96
 Prob. >chi2 =0.000
 (v_b_B is not positive definite)

From table 1, the Hausman test is significant at the p-value < 0.05 and therefore we reject the null in favour of the alternative. Thus, the study adopts the fixed effects regression model.

The fixed effects regression model is formally expressed as:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \dots + \mu_{it} \quad (1)$$

Where:

Y_{it} = dependent variable (outcome)

$X_{2it}, X_{3it}, X_{4it}$ = time – invariant variables

μ_{it} = error term

A fixed effect model removes the time-invariant independent variables and replaces them with a term for time-invariant variable for each individual unit or value. This is presented in equation 2.

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \dots + \alpha_i + \mu_{it} \quad (2)$$

Where:

α_i = time invariant term

This time invariant term is the one referred to as the fixed effect or the individual effect. The time varying independent variables remain in the equation.

Further, a time-specific intercept in the outcome Y that vary across time and not individual variables is included

in fixed effect regression models as show in equation 3.

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \dots + \alpha_i + \delta_t + \mu_{it} \quad (3)$$

Where:

δ_t = time specific intercept

For the purpose of this study, the within-group fixed effects are estimated. This demeans the dependent and independent variables with each unit (or group) to estimate the model. By demeaning, the model eliminates the fixed effect terms. This is presented in equation (4) and (5).

$$\bar{Y}_i = \beta_1 + \beta_2 \bar{X}_{2i} + \dots + \alpha_i + \bar{\delta}_t + \bar{\mu}_i \quad (4)$$

$$(Y_{it} - \bar{Y}_i) = \beta_2 (X_{2it} - \bar{X}_{2i}) + \dots + (\delta_t - \bar{\delta}_t) + (\mu_{it} - \bar{\mu}_i) \quad (5)$$

To achieve unbiased results, the fixed effects regression model is based on four key assumptions:

1) The error term is uncorrelated with all observations of the variable X for the country i over time. If this assumption is violated, then there is a potential omitted variable bias. This is expressed in equation 6.

i. The error term, μ_{it} has conditional mean zero, i.e.

$$E(\mu_{it} | X_{i1}, X_{i2}, \dots, X_{iT} = 0) \quad (6)$$

2) $(X_{i1}, X_{i2}, \dots, X_{iT}, \mu_{i1}, \dots, \mu_{iT}), i = 1, \dots, n$ are i. i. d. draws from their joint distributions This ensure that variables i.i.d. across countries $i=1, \dots, n$. This does not however require the observations to be uncorrelated within the country.

3) Large outliers are unlikely, that is, (X_{it}, μ_{it}) have zero none finite moments. The X_{it} are allowed to be autocorrelated within the country. The same is allowed for the error terms, μ_{it} . Stock and Watson offers plausible explanation for autocorrelation in panel applications.

4) There is no perfect multicollinearity.

3.3 Population and Sample

The population of the study is all the 25 member states of the EAC, ECCAS and SADC. The study initially sought to undertake a survey for all the 25 countries for data analysis. However, the final sample analyzed are 12 member states for whom the data was available for key variables used for analysis. Countries that had membership in more than one economic bloc were grouped into the region where they were mostly closely associated geographically. The final sample includes four countries from EAC including Kenya, Tanzania, Uganda and Rwanda; two countries from ECCAS including Burundi and Democratic Republic of Congo; and six countries from SADC including Botswana, Mozambique, Namibia, Kingdom of Eswatini, South Africa and Zimbabwe. The data was collected for the period between 1995 to 2021.

3.4 Data and Data Sources

Table 2. Definition of variables and data sources

No	Variable Name	Code	Description	Source
1	Capital Stock	GFCF	Gross fixed Capital Formation (% of GDP)	IMF/WDI
2	Lagged Capital Stock	Lag GFCF	Lag computed from the gross fixed capital formation (% of GDP)	Generated
3	Gross Domestic Capital	G	Gross Domestic Growth (annual %)	IMF/WDI
4	Foreign Direct Investment	FDI	Foreign direct investment, net inflows (% of GDP)	World Bank
5	Inflation rate	IF	Inflation rate, average consumer prices (Annual percent change)	IMF
6	Electric Power Efficiency	PE	Electric power transmission and distribution losses (% of output)	WDI
7	Exports	ETO	Exports of goods and services (% of GDP)	WDI
8	Imports	ITO	Imports of goods and services (% of GDP)	WDI
9	Interest rates	I	Real interest rate (%)	WDI
10	Natural Resources	NR	Total natural resource rents (% of GDP) (includes mineral, oil & other rents)	WDI
11	STRources	SNR	Dummy if total natural resource rents are at least 10% of GDP	Dummy
12	Exchange rates	Ex	Real effective exchange rate index (2010 = 100)	WDI
12	Economic Freedom	EF	Average score of property rights; Judicial effectiveness; government integrity; tax burden; government spending; fiscal health; business, labor, monetary, trade, investment & Financial freedoms	The Heritage Foundation
14	Regional Dummy	RD	Dummy generated for the 3 economic blocs	Dummy
15	Financial Crisis	Crisis	Dummy generated for Asian and Global Financial crises; COVID 19	Dummy

Key: WDI =World Development Indicators.

The study relied on secondary data collected from credible sources from multilateral organizations including the World Bank, IMF and the Heritage group. The data was checked from completeness and harmonized for the 26 year study period from 1995 to 2021 for each country. Data was obtained for key variables and sources as defined in table 2.

3.5 Descriptive Statistics and Unit Root Tests

The summary statistics of the data are presented in table 3.

Table 3. Summary statistics of data

Variable	Mean	Std. Deviation	Min	Max	Obs
GFCF	18.911	7.433	2.000	42.630	324
Lag GFCF	18.888	7.433	2.000	42.630	323
G	5.175	3.250	0.034	21.450	324
FDI	3.225	5.017	0.000	39.460	324
IF	20.060	69.617	0.200	617	324
PE	17.069	7.526	2.432	72.060	324
TO	63.433	30.256	20.964	170.800	324
I	9.836	8.366	0.001	81.130	324
TNR	8.883	8.255	0.533	40.490	324
STNR	0.315	0.465	0.000	1	324
Ex	116.666	32.306	70.674	511.1	324
EF	52.796	16.164	0.000	72	324

From table 3, the average GFCF for the period for selected countries was 18.911 with a standard deviation of 7.433. The minimum was 2 and a maximum 42.63. The lagged GFCF was not significantly different on the mean and standard deviation. The real GDP growth was 5.175 with a standard deviation of 3.25. The minimum was 0.034 and a maximum of 21.45. For the FDI net inflows, the mean was 3.225, a standard deviation of 5.017, a minimum of zero and maximum of 39.46. The annual average inflation as measured by the change in consumer price index was 20.06 with a standard deviation of 69.617. The minimum was 0.2 and a maximum of 617.

The real interest rates averaged 9.836 with a standard deviation 8.366, a minimum of 0.001 and a maximum of 81.13. On the total natural resource, the average was 8.883 with a mean of 8.225. The minimum was 0.533 and a maximum of 40.49. The electricity power transmission and distribution losses averaged 17.069 with a standard deviation of 7.526. For the exports plus imports, the average was 63.433 with a standard deviation of 30.256, a minimum of 20.064 and 170.8. The exchange rate averaged 116.667 with a standard deviation of 32.356, a minimum of 70.674 and a maximum of 511.1. Finally, the economic freedom indicator had an average of 52.746 with a standard deviation of 16.164, a minimum of zero and a maximum of 72. The total observation were 324.

To address the gaps arising from the missing data, a mean imputation was performed to compute the means for each variable and fill the gaps. The variable with the largest number of missing data was real exchange rates, with data missing completely for at least three of the twelve countries. This variable has been omitted during the analysis. The second variable with large missing variables was the electric power transmission and distribution losses that is modeled in channels of FDI flows as a proxy for quality of infrastructure. Of the 324 observations, about one third of the variables used the mean average for the country. Thus, the findings and interpretation of the effects of quality of infrastructure on domestic investments should be interpreted with this in mind. While it does not provide perfect results, the study considers the insights emerging from this analysis as worthwhile despite the gaps in data for the specific variable.

Overall, the mean imputation ensured the panel data is balanced for purpose of analysis. This mitigates to some extent the problem of bias in the estimation results that may arise from missing variables. The fixed effect model approach further addresses any majority of the other biases that may arise due to variable or factors that the study may not be able to measure for modeling.

The next problem that may arise in the estimation process are the complexities of the existence of unit roots in the data. Arguably, presence of unit roots when investigating relationships between multiple unit root variables is that it may result in spurious regressions. That is, the plims of regression coefficients that do not tend to zero and diverging t-ratios even if there is no relationship (Bauwens & Lubrano, 1999). The presence of unit root or not will also affect the choice of the exact fixed effect estimation to use between demean and difference in difference estimation.

For the purpose of this study, the Harris-Tsavalis unit root tests were undertaken for each variable, factoring the variable means. This approach was suitable given that it requires a strongly balanced panel. The Harris-Tsavalis test is based on the null (H_0) that the panels contain unit roots. The alternative (H_a) is the panels are stationary. We reject the null in favour of the alternatives if the p-values are significant at given degrees of confidence level, say $p < 0.05$. The outcomes of the test are presented in table 4.

Table 4. Harris-Tsavalis unit root test results

Variable	Statistics	Z	p-value
GFCF	0.756	-4.239	0.000
G	0.253	-19.852	0.000
FDI	0.795	-3.021	0.001
IF	0.570	-10.016	0.000
PE	0.608	-8.850	0.000
TO	0.829	-1.992	0.023
I	0.514	-11.738	0.001
NR	0.604	-8.966	0.000
SNR	0.599	-9.106	0.000
Ex	0.748	-4.506	0.000
EF	0.727	-5.149	0.000

H₀: The panel contains unit roots
H_a: The panel is stationary

From the foregoing analysis, the test indicates we reject the null and conclude that the variables are stationary. Based on this conclusion, then the demeaned fixed effects with dummy variable for the shocks due to financial crisis are estimated.

In section four, we now present the empirical approach and the main findings based on the estimation results.

4. Empirical Approach and Main Findings

4.1 Empirical Approach to Crowding-In or Crowding-Out Effects

The estimations for this study follows the empirical methodology adopted by Jude (2018) to estimate the effect of FDI on domestic investments. This approach uses a specification of an augmented investment function to estimate if FDI crowds-in or out domestic investments. The estimation considers investment to be a partial adjustment process between existing and desired capital stock within the constraints of liquidity and time adjustment components. The expectation is that as a structural component of the economy, the investment rate will show high persistence that corresponds to an autoregressive behaviour.

The model specification utilizes GFCF as the dependent variable or the outcome of the estimation. Jude (2018) argues that the choice of this dependent variable is not non trivial. This is because GFCF represents a national accounts aggregate, measuring net additions to fixed assets, and comprises both foreign and domestic investments. Further, Jude discusses that when total investment is used as the dependent variable (instead of the domestic component of investment), a positive coefficient of FDI only shows total investment increases with FDI. As a consequence, this does not provide sufficient indication as to the investment behavior of domestic firms. If crowd-out effects takes place, then investment should grow less than increases in FDI. On the contra side, if a crowd-in effect takes place, the increase in investment should be higher than the increase in FDI.

Therefore, when assessing the impact of FDI on domestic investments, the focus will be on the beta coefficient (β_3) that is associated with FDI in equation (7). Other than the sign, the value of the coefficient is of high importance: a crowd-out effect would correspond to a beta (β_3) coefficient less than 1, while a crowd-in effect will correspond to a (β_3) coefficient larger than 1.

As a measure of the main determinants of investment, the model includes economic growth and cost of capital. As Jude (2018) argued, the inclusion of a lagged real GDP growth, as a proxy for the accelerator effect, is justified by expectation, adjustment, and hysteresis phenomena in economic variables. The real interest proxy's the cost of capital. Based on the analysis adopted by Jude, the model specification does not include measures of liquidity for the same reasons as postulated by Jude's study. From several tests, Jude finds the M2 money aggregate, its deviation from its three year moving average, and credit provided to the private sector as insignificant in explaining investments. This is because probably their impact is already accounted for in the real

interest rates. This study finds no reason to deviate from this view given the nature of the African economies under study and their relative lower levels of development compared to the transition economies included in Jude's study.

The study includes the total natural resources as a percentage of GDP into the analysis. The country's under study here like most of other African countries have huge mineral deposits that would be expected to drive FDI inflows. Musabeh and Zouaoui (2020) test for total natural resources larger than ten per cent of the GDP to determine if they affect FDI flows in Northern Africa Countries. While they find them not significant, they find positive effect. More fundamentally, there is the economic dilemma of the perceived curse of mineral for most of the African countries.

Instead of been an impetus to economic growth, most African countries with huge mineral deposits have been embroiled in long standing armed conflicts over their mineral deposits. In fact, many of the countries for which this study found no data may partially be explained by internal conflicts over extended periods of time. The Democratic Republic of Congo, included in this study itself has had continued conflicts over resources for several decades. Including this measure in the estimations tests for the perceived curse of resources, that the study believes may impact both foreign and domestic investments.

The study controls for inflation and financial crisis dummy. The crisis dummy is for the 1999 and 2000 (to account for the Asia crisis); 2009 and 2010 years for the global financial crisis; and 2020 and 2021 for the COVID-19 health pandemic. As Jude (2018) argues, the global financial crisis affected all economies of the world, with a lag for transition and developing economies for which the countries under study are classified. The Asia financial crisis would be expected to have had impact, again lagged, for the developing economies of Africa due to the relative presence of Asia countries in the economic activities in Africa. The COVID-19 health pandemic had a worldwide negative impact on capital flows across the world. This is not expected to be lagged given the policy interventions taken by all economies right from the onset of the pandemic.

The actual estimation model specification is presented in equation 7.

$$GF_{CF_{it}} = \alpha GF_{CF_{it-1}} + \beta_1 G_{it-1} + \beta_2 I_{it} + \beta_3 FDI_{it} + \beta_4 SNR_{it} + \beta_5 IF_{it} + \beta_6 Crisis + \delta_i + \varepsilon_{it}$$

Where:

$GF_{CF_{it}}$ = gross capital formation as a share of GDP

G_{it} = real GDP growth rate

I_{it} = real interest rates, proxy for cost of capital

FDI_{it} = foreign direct investment, net inflows as a share of GDP

SNR_{it} = total natural resources at least 10 per cent as a share of GDP

IF_{it} = annual change of inflation as measured by consumer price index (%)

Crisis = financial crisis dummies & COVID-19 pandemic shocks

δ_i = country specific fixed effects

ε_{it} = the error term, uncorrelated over time and across countries.

The estimation results at different permutations of the variables are presented in table 5.

Table 5. FE estimation results

FE Estimation Results				
Dependent Variable	(1)	(2)	(3)	(4)
GFCF				
GFCF (t-1)	0.614*** (15.38)	0.573*** (6.65)	0.572*** (6.77)	0.576*** (6.69)
Growth (t-1)	0.149*** (2.05)	0.152 (0.67)	0.154 (1.73)	0.136 (1.54)
Interest rate	0.03 (1.07)	0.02 (0.73)	0.02 (0.73)	0.019 (0.74)
FDI	0.336*** (5.6)	0.300*** (4.56)	0.301*** (4.65)	0.264*** (4.46)
Natural resources	-2.307*** (-2.81)	-1.863*** (-2.58)	-1.915*** (-2.85)	

Inflation rate	0.001 (0.23)	0.002 (0.38)	0.002 (0.40)	0.002 (0.41)
Crisis dummy			-0.196 (-0.5)	-0.021 (-0.05)
Country specific effects		0.095 (1.74)	0.096 (1.79)	0.105 (1.84)
Constant	5.932*** (6.26)	-183.467 (-1.69)	-186.322 (-1.73)	-204.846 (-1.75)
Obs	323	323	323	323
R-sq: Within	0.557	0.573	0.573	0.566
Between	0.9	0.906	0.905	0.907
Overall	0.716	0.717	0.717	0.703
Cross-sectional independence (Pesaran)	1.194	-0.16	-0.275	-0.069
Pr	0.233	0.873	0.783	0.945
heteroskedasticity (Wald) -chi2	275.89	567.79	573.13	645.93
Prob >chi2	0.000	0.000	0.000	0.000
Serial correlation (Wooldridge) (F1, 11)			28.772	
Prob >F			0.0002	

From fixed effect estimation, the results indicates that the lagged gross capital formation is positive and significant at the one percent degree of confidence levels. This alludes to a general increase in the stock of capital for the 26 years modeled in the study. The growth impact is positive and significant before we factor in the dummy for country specific effects. This means that FDI inflows at that level positively affects the gross domestic product. However, once we factor in the country specific effects, the growth remains positive, but not significant.

As discussed in the empirical methodology, the crowd-out or crowding-in effect of FDI on domestic investments would be inferred from the beta coefficient β_3 . If a crowd-out effect has occurred, then the coefficient will be smaller than one, while if a crowd-in effect has occurred, then it would be larger than 1. From the estimation results, the beta coefficient β_3 for FDI was 0.336, 0.300, 0.301 respective before factoring dummy for country fixed effect and crisis respectively. They were all statistically significant at the one per degree of confidence levels. Following Jude (2018) prognosis, this implies that there is a crowd-out effect on domestic investment following FDI net inflows into the East, Central and Sothern Africa region.

This is an interesting finding given earlier studies have found inconclusive impacts for the African region countries. However, these findings are consistent with those of Ahmed et al. (2015) who finds a crowd-out effect for key sectors for Ivory Cost; Harrison and MacMillan (2003) for selected African countries; Titarenko (2006) for Latvia; and Misun and Tomsik (2002) for selected economies in Europe like Poland. Besides, Acar, Eris and Tech (2012) finds a crowd-out effect for MENA countries and Ndikumana et al. (2008) concludes on the need for policies to incentivize domestic investors to avoid a crowd-out effect for west African countries.

Intuitively, there would be plausible reasons why this findings would not be surprising from an understanding of the region understudy. Many of the countries, especially within the Central Africa bloc have suffered extend political instability and armed conflicts over a long period. This would not only be expected to have a negative impact of FDI but also domestic investments. Further, the economies under study remain relatively underdeveloped meaning they may lack the absorptive capacity to experience the positive effects of FDI inflows.

Their financial markets, as shall be analyzed in the subsequent sub-section remain lowly developed that means they may lack access to capital from domestic sources for them to counter competition from foreign investors. Furthermore, many of the country's under study operate primarily on the raw materials side of production, meaning they lack the necessary technology to respond to external competition from entry of foreign investors. They may also face stiff competition for raw materials for production from the entry of foreign investors.

A second notable finding from the estimation results is the negative and significant impact of natural resources. This should not be entirely surprising however, given the well acknowledged and accepted curse for mineral resources. For many countries in this study, like the rest of the African region, have suffered from political instabilities and armed conflicts owing to their huge deposits of minerals.

The Democratic Republic of Congo, modeled in this study is one such a country. As at the time of this study, the country is still dealing with armed conflicts in certain mineral-rich parts of the country. In effect, this would be expected not only to dampen FDI inflows but also domestic investments. In permutation (4) of the estimation, the

study drops the variable for natural resources to observe if overall this was the reason for the crowd-out effect. Even then, the FDI coefficient remains below one at 0.264 and statistically significant. This means that other than the negative effects of the curse of minerals, there still is a general crowd-out effect for the region studied.

The cost of capital and inflation were found to be positive but statistically insignificant across the different permutations of estimations. The crisis dummy, as expected was found to have had a negative effect on gross fixed capital formation but statistically insignificant. This would however not be surprising given the low levels of integration of the economies under study with the rest of the world economy. In any case, the FDI flows into the region remain insignificant against the global capital flows.

The within estimate (R-squared) was about 56 per cent, implying the independent variables explained 56 per cent of the changes in the gross fixed capital formation from the model. This was the robust estimate of the FE.

Finally, estimates were done to check on cross-sectional independence, heteroskedasticity and presence of serial correlation. The Pesaran test for weak cross sectional independence fails to reject the null, meaning that there exists weak cross-sectional independence and thus the estimation results are consistent and unbiased. On heteroskedasticity, the Wald tests shows we cannot reject the null and thus no heteroskedasticity allowing us to interpret the results as unbiased. On the test for serial correlation, we fail to reject the null under Wooldridge test indicating presence of serial correlation. While serial correlation does not necessarily lead to biased estimations, a clustering of the error was done. Literature indicates that the clustering helps deal with any problems that may arise from serial correlations.

Thus, the estimation results for the study would confidently be presumed to be consistent and unbiased. In the next sub-section, we test on the potential channels through which FDI flows into the region.

4.2 Empirical Estimation on Channels of FDI Flows

Jude (2018) points that the interaction of FDI and domestic investors may occur either in the real market or in the financial markets with differing implications. The policy implications will be different for each case. The identification of the mechanism through which the crowding-out (as was the case for the region under study as evidenced in previous sub-section) is essential to establish the appropriate policy response. If the crowding-out is in the real market, then some local firms would be displaced due to higher efficiency of FDI. This may however not negatively affect overall national wealth as only the most efficient firms remain that generate higher value add. Required policy intervention in this scenario would be those that target to alleviate potential risk to denationalization of certain industries and creation of foreign enclaves (UNCTAD, 2000).

On the other hand, Jude (2018) suggests that if the crowding-out happens in the financial markets, the increased demand for loans could result in higher interest rates and commercial bank's preferences for foreign firms may restrict access to finance for domestic firms. In this case, the net effect would be a decrease in national wealth. Policy intervention should therefore target facilitation of domestic firm's access to credit. Similar to the approach taken in Jude (2018) this study fails to pursue an analysis of the two mechanisms for the same reasons as proposed by Jude and further for lack of data for several key variables that would be necessary to model this interactions.

Instead, this study explores the adjustments in the FDI coefficient when the financial development indicator is introduced into the FE estimates and the coefficient of the indicator itself. The only attempt to get insights as to which side of the crowding-out effect has happened is to assess the significance of the trade openness proxy, that uses export and import data. Import and exports happens in the real market. Thus, assuming the same conservative approach adopted by Jude (2018) on interpretation of this analysis, the behaviors of the coefficient only demonstrates the additional effect that FDI brings on domestic investments as a result of financial development.

The general estimation equation is presented in equation 9.

$$GFCE_{it} = \alpha GFCE_{it-1} + \beta_1 G_{it-1} + \beta_2 I_{it} + \beta_3 FDI_{it} + \beta_4 SNR_{it} + \beta_5 IF_{it} + \beta_6 PC_{it} + \beta_7 TO_{it} + \beta_8 EF_{it} + \beta_9 PE_{it} + \beta_{10} Crisis + \delta_i + \varepsilon_{it}$$

Where:

PC_{it} = private credit stock as a share of GDP

TO_{it} = trade openness (exports + imports) as a share of GDP

EF_{it} = economic freedom indicator

PE_{it} = electricity power transmission and distribution loss percentage

All other variables remain the same as defined in the previous sub-section..

On the estimation, each of the channels is introduced into the estimation regression equation one at a time and the results are presented in table 6.

Table 6. FE mechanisms estimation results

Dependent Variable	FE Estimation Results				
	1	2 (PC)	3 (TO)	4 (EF)	5 (PE)
GFCF					
GFCF (t-1)	0.572*** (6.77)	0.573*** (6.65)	0.490*** (4.72)	0.486*** (4.29)	0.483*** (4.21)
Growth (t-1)	0.154 1.73	0.152* (1.79)	0.129 (1.55)	0.133 (1.56)	0.129 (1.60)
Interest rate	0.02 0.73	0.007 (0.18)	0.001 (0.03)	-0.000 (-0.00)	-0.000 (-0.00)
FDI	0.301*** 4.65	0.311*** (4.44)	0.176*** (2.67)	0.180*** (2.61)	0.182*** (2.58)
Natural resources	-1.915*** -2.85	-1.612*** (-3.69)	-1.982*** (-2.53)	-1.920*** (-2.39)	-1.967*** (-2.54)
Inflation rate	0.002 (0.40)	0.004 (0.60)	0.006 (0.78)	0.006 (0.78)	0.006 (0.77)
Private credit		-0.071 (-1.07)	-0.081 (-1.08)	-0.082 (-1.07)	-0.080 (-1.06)
Trade openness			0.087*** (2.93)	0.086*** (3.07)	0.086*** (3.07)
Economic freedom				0.010 (0.33)	0.010 (0.33)
Power efficiency					0.014 (0.45)
Crisis dummy	-0.196 -0.5	-0.233 (-0.65)	-1.26 (-0.39)	-1.15 (-0.54)	-0.160 (-0.59)
Country specific effects	0.096 1.79	0.132** (2.02)	0.169** (2.13)	0.166** (2.13)	0.165** (2.14)
Constant	-186.322 -1.73	-256.817** (-1.98)	-334.558** (-2.11)	-329.393** (-2.11)	-327.374** (-2.11)
Obs	323	323	323	323	323
R-sq: Within	0.573	0.576	0.618	0.619	0.619
Between	0.905	0.838	0.522	0.535	0.534
Overall	0.717	0.693	0.568	0.575	0.574

From table 6, the investment remains highly path dependent with a consistent structure component since the autoregressive term is strongly significant in all the estimates. The value of the coefficient remains between 0.57 - 0.48. However, with the introduction of the indicator of trade openness, economic freedom and quality of infrastructure proxy, the coefficient declines with marginal proportions. The fact that it remains below one indicates a lack of unit roots as was confirmed under the stationarity tests done in the previous subsection. The coefficient for economic growth rate remains positive but mostly insignificant except for the estimation with the private equity that was significant at the 10 per cent degrees of freedom.

The real interest rates remains insignificant for all estimation permutations similar to the findings obtained in previous sub-section. Thus, the effect of the cost of capital on FDI remains inconclusive for the region. This is similar to other studies by Mody and Murshid (2005); Agrawal (2005); and Wang (2010). They contradict the findings by Jude (2018) who finds cost of capital significant for the transition economies of Europe. However, with the introduction of the economic freedom and quality of infrastructure indicator, the coefficient turns negative though still insignificant.

The FDI coefficient remained positive as expected and below one for all estimations and remained highly significant. However, in other estimation that included trade openness, economic freedom and quality of

infrastructure, the coefficient declined, moving further away from one. In line with the theory discussed under sub-section 4.1, the crowding-out effect continued and seems to be accelerated through the factors of trade openness, economic freedom and quality of infrastructure. Without implying direct causal implications, this behavior of the coefficient for FDI may suggest that the channel of crowding-out for domestic investments may be happening in the real market as opposed to the financial markets (as discussed earlier).

The total natural resources coefficient remained negative and highly significant as before, further confirming the resource curse for the region. Inflation remained similar to earlier estimates, being positive but insignificant throughout the estimates. The private credit (proxy for financial development) coefficient was negative but insignificant for all the estimations. This would imply the financial development component is not important for the East, Central and Southern Africa region. This would not be unexpected given the financial sector for the region still remains highly undeveloped as indicated by lack of data for stock market capitalization. Furthermore, there are very few large multinational banks that can support huge investments except for South Africa that has some considerable big banks that have presence in most of the other countries in the region.

Trade openness indicator is positive and highly significant for all the estimates with the coefficient remaining at about 0.09. This implies that trade is an important determinant for FDI flows in the region and its significance could further confirm the assertion of FDI inflows impacting domestic investments through the real market channel. The small size of the coefficient may suggest that the gains from trade do not outweigh the crowding-out effect as a result of the entry of foreign investors. The economic freedom and power efficiency indicators remained positive but insignificant implying they may not be important factors in determining FDI inflows for the East, Central and Southern Africa region. The crisis dummy remained negative but insignificant, while the country specific effects remained positive but now significant with the introduction of the mechanism indicators into the estimations. This would imply that there are country specific policies that impact FDI flows differently among the member states in the region.

The within estimator increased marginally with the introduction of the channels indicators from about 0.57 to 0.61. The overall estimator however declined marginally from 0.7 to about 0.57. From the foregoing therefore, the overall study finds an overall positive contribution to capital formation as expected since the coefficient remained relatively stable for all estimations. This is consistent with Jude (2018) findings for the transition economies of Europe.

Thus, a one percentage of GDP increase in FDI inflows leads to an increase of investment rate by about 0.3 percentage points. The values obtained were significantly smaller than one (1), thus indicating that investment increased less than the increase in FDI inflows. This corresponds to the crowding-out effect of domestic investments for the East, Central Africa and Southern Africa region. As discussed earlier in subsection 4.1, the overall findings are consistent with other findings that have found a crowd-out effect for other parts of SSA and other developing economies.

5. Conclusions

This study sought to investigate whether FDI inflows into the East, Central and Southern African region lead to a crowding-out or crowding-in effect on domestic investments and the channels through which such effects happens. The specific research question was: Does FDI inflows into the East, Central and African region lead to crowd-out or crowd-in effect on domestic investments?

The study utilized data for 12 of the 25 member states in the relevant economic blocs within the East, Central and African region for the period 1995 to 2021. 13 of the countries were dropped from the sample for lack of relevant data for key variables under estimations. The study adopted the methodology proposed by Jude (2018) to derive the estimation equation. The Fixed Effect regression model was utilized to estimate the results of the study. Various tests for the underlying assumptions were undertaken to ensure the estimates were consistent and unbiased.

From this estimates, the study finds and concludes that there is a crowding-out effect of FDI inflows on domestic investments within the East, Central and Southern Africa region. The results are positive but less than one, indicating gross fixed capital formation grows at a lower rate with entry of foreign investors. These findings are consistent with other studies undertaken in other parts of the SSA and among other developing economies.

Through intuition, the findings may imply either a lack of absorptive capacity for the domestic economies in the region or potentially domestic firms being competed out for markets or supplies with the entry of foreign firms into the domestic economies of the region. In any case, the region is still heavily reliant on raw material exports as opposed to industrial advancements that implies low levels of technology. The human capital component still remains low overall with high levels of brain drain owing to political instabilities and armed internal conflicts.

The second key finding is the obvious presence of the mineral curse that negatively impact FDI inflows and domestic investments. This would be expected to negatively impact domestic investments especially if FDI flows majorly to the mining sector. It is not uncommon to find countries within the East, Central and Southern Africa region heavily reliant on mineral at the expense of the development of other sectors of the economy. Thus, the net overall impact of the FDI inflows may result into the crowding-out of domestic investments into other sectors of the economy.

The third finding is on the mechanisms of FDI. The financial development indicator was insignificant for all estimations indicating that this is not an important channel for determining FDI inflows for the region. Trade openness as proxied by the exports plus imports indicators is an important channel of FDI impacts for domestic investments. The economic freedom and quality of infrastructure were not important channels for the region. While not outrightly implying causal effects given the conservative view adopted in this analysis, it would imply that the real market channels may be the ones important for FDI to impact domestic investment for the East, Central and Southern Africa region.

Overall, this findings bring important insights into the academia world by adducing new evidence into the ever growing field of FDI inflows vis-à-vis domestic investments. It offers a robust evidence with specific and more recent data for the East, Central and Southern Africa region. The study brings key innovations for data, long time panels, examining the impact of natural resources and introducing crisis dummy to factor in economic shocks that would be expected to negatively impact capital flows across borders.

These conclusions should however be interpreted with the necessary precaution given the data limitation for the region to undertake more complex tests on the interaction of both the financial and real market channels in impacting FDI inflows into the region. Nonetheless, these findings add to the available little empirical evidence for FDI impacts in the Sub-Saharan Africa region.

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Competing Interest

The authors wish to declare that they have no known financial interests or other personal relationships that may have influenced or impaired the quality the research outputs reported in this study.

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