"Effect of foreign direct investment on domestic investment in BRICS"

AUTHORS	Kunofiwa Tsaurai (iD)

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
44	2	5

BUSINESS PERSPECTIVES

businessperspectives.org

BUSINESS PERSPECTIVES

Kunofiwa Tsaurai, Ph.D., Full Professor, Economic and Management Sciences Faculty, Finance, Risk Management and Banking Department, University of South Africa, South Africa.

Kunofiwa Tsaurai (South Africa)

EFFECT OF FOREIGN DIRECT INVESTMENT ON DOMESTIC INVESTMENT IN BRICS

Abstract

This study investigated the effect of FDI on domestic investment in BRICS using pooled ordinary least squares (pooled OLS), fixed effects, and fully modified ordinary least squares (FMOLS). Panel data spanning from 1988 to 2020 were used in this study. Mixed results, conflicting findings and divergent views on the FDI-domestic investment nexus prompted the paper to contribute to the existing literature on the subject. The study produced results that show that domestic investment was significantly enhanced by the inflow of FDI. The positive effect of savings on domestic investment was also noted to be positively significant. Results on personal remittances-domestic investment were mixed, (1) significantly positive under the pooled OLS (models 1, 2 and 3) and FMOLS approaches (model 1) and (2) non-significantly positive under the fixed effects (models 1, 2 and 3) and FMOLS (models 2, 3). The complementarity between savings and FDI had a significant positive influence on domestic investment, whilst the positive impact of a combination of FDI and personal remittances on domestic investment was not significant. BRICS nations are therefore encouraged to implement FDI inflow enhancing measures, strategies and policies to increase individual country's domestic investment levels.

Keywords   foreign investment, panel data, remittances, savings, BRICS

JEL Classification   C33, E22, F21

INTRODUCTION

FDI contributes to economic growth through its ability to bring with it physical capital, management expertise and skills, technology (Swan, 1956). Mamatkulov (2020) noted that FDI spurs economic growth through its ability to transfer knowledge and technology into the host country, to link domestic and foreign markets, and to promote the introduction of new products and services. These resources brought in by foreign direct investors spur domestic investment and long-term economic growth (Sucubasi et al., 2021). Although FDI enhances growth through domestic investment as espoused by Sucubasi et al. (2021), empirical studies that focused on investigating the direct influence of FDI on domestic investment are scant.

Several empirical studies on the influence of FDI on domestic investment produced results, which are mixed, inconclusive and far from attaining a consensus. For example, the results from the existing empirical studies on the subject are grouped into four categories. Firstly, FDI was found to enhance domestic investment. Secondly, domestic investment was found to have been crowded out by FDI. Thirdly, the two variables were found to have a bi-directional relationship. Fourthly, FDI and domestic investment's relationship was noted to be very insignificant and of no consequence. These contradictions, mixed and inconclusive results mean that the influence of FDI on domestic investment is not yet a settled matter in finance and economics.

These empirical studies on the FDI-domestic investment nexus also are characterized by some few methodological deficiencies. Firstly, they wrongly assumed that the relationship between FDI and domestic investment is linear in nature. Secondly, the data they used are outdated now. Thirdly, they did not investigate the channels through which domestic investment is influenced by FDI. Fourthly, majority of them focused on single country analysis unlike this study that involved a panel of countries (BRICS). Fifthly, none of these empirical studies used BRICS as a focal point. This study is the first of its kind to use BRICS in a study of the FDI-domestic investment nexus. The current study filled in all these gaps that exist in the literature.

1. LITERATURE REVIEW

Theoretical literature also observed five ways in which FDI influences domestic investment. Nath (2005) argued that total factor productivity is enhanced by capital accumulation from FDIs rises in the host country. According to Swan (1956), foreign direct investors end up investing onto the capital markets of the host country, which generally increases the level of domestic investment. Resources, which are necessary ingredients for domestic investment and technological progress to occur, are normally brought into the host country by FDIs and these are technology, labor training, technical know-how and managerial skills (Romer, 1986). In agreement, Kumar and Pradhan (2002) mentioned that market access, organizational skills, capital, technology and education flow with FDI into the host country. Lucas (1988) weighed in by suggesting that the resources are a vital cog in enhancing FDI's positive influence on domestic investment and long-run economic growth.

There are also three channels through which domestic investment is enhanced by the inflow of FDI (Mamatkulov, 2020). The study argued that it happens through (1) FDI's ability to transfer knowledge and technology, (2) the ability of FDI to cultivate the productive links between domestic and foreign firms, and (3) the ability of foreign investment to introduce into the host country, new services and products. On the other hand, Mamatkulov (2020) noted that domestic investment might also be negatively affected by the inflow of FDI, especially when this leads to real exchange rate and domestic interest rates going up.

Empirical literature on the impact of FDI on domestic investment falls into five categories, namely the positive influence, negative effect, feedback effect, insignificant or non-existent view, and finally, the absorption capacity perspective. The positive influence of FDI on domestic investment was observed by Woraewaa (2017), Sucubasi et al. (2021), Nwanna (1986), Loungani and Razin (2001), Mamatkulov (2020), Amighini et al. (2017), Ndikumana and Verick (2008), Mileva (2008), Kamaly (2014), Ha (2021), Makki and Somwaru (2006), Yahia et al. (2018), Rashid et al. (2013), Kargbo (2017), and Onaji-Benson (2015).

Using the system generalized methods of moments approach, Woraewaa (2017) investigated how domestic investment is influenced by FDI in Sub-Saharan Africa (SSA) with panel data ranging from 1980 to 2014. The study noted that domestic investment was enhanced by the inflow of FDI into the SSA. The financial sector and development of human capital were also observed to have reduced FDI's crowding out influence on domestic investment. This study captured the fact that the relationship between FDI and domestic investment does not follow a straight line and can be affected by other factors known as absorption capacities. A similar study was done by Sucubasi et al. (2021) using panel data analysis (2007–2018) in the context of Western Balkans. The study revealed that domestic investments were enhanced by FDI inflow and economic growth. Their study did not consider the effects of omitted variable bias.

Nwanna (1986) examined FDI effect on domestic investment in Nigeria using two-stage least square regression approach and quarterly time series data ranging from 1960 to 1980. The study observed that FDI complemented domestic investment in Nigeria in the long run. Loungani and Razin (2001) explored the benefits of FDI in developing countries using descriptive statistics. Their study observed that the beneficial influence of FDI was felt in terms of enhancing growth and domestic

investment in developing countries. In the context of developing countries, Mamatkulov (2020) examined the influence of FDI on domestic investment using the two-step system generalized methods of moments. The study noted that FDI had a more enhancing effect on domestic investment in the long run than in the short run. Absorption capacities were not factored in their empirical research work, in contradiction with Chitambara (2021) and Aigheyisi (2017).

Ndikumana and Verick (2008) explored the domestic investment influence of FDI in SSA using panel data framework analysis. Domestic investment was enhanced by the inflow of FDI in SSA. The interrelationship between capital flows into transitional economies and domestic investment was explored by Mileva (2008), who noted that the former spurred the latter across all economic sectors. Using 16 emerging markets as a unit of analysis, Kamaly (2014) studied the crowding out effect between domestic investment and FDI. The study noted that domestic investment was enhanced by the inflow of FDI in emerging markets. Using time series data analysis (1980–1990), Ha (2021) explored the causality between domestic firms and FDI in the context of Vietnam. The positive influence of FDI on domestic firms' investment was supported in this study. Using cross sectional data, Makki and Somwaru (2006) studied the nexus between FDI, growth, trade and domestic investment in developing economies. Domestic investment was found to have been stimulated by FDI inflows. Apart from using up to date data (1988–2020), the current study contributes towards literature by (1) considering the non-linearity aspect of the relationship between domestic investment and FDI and (2) addressing the omitted variable bias.

Using error correction model with data (1976–2016) of a time series nature, Yahia et al. (2018) investigated the FDI-domestic investment nexus in Sudan. The study noted that domestic investment was enhanced by FDI, macroeconomic stability, real exchange rates, trade openness and natural resources endowment in the context of Sudan. Rashid et al. (2013) employed the Vector Error Correction Model (1970–2008) to study the FDI-growth-domestic investment nexus in Malaysia. It was found out that domestic investment was positively affected by FDI in Malaysia. Amighini

et al. (2017) studied the interrelationship between capital formation and FDI in developing countries using the industry level data analysis. FDI linked to manufacturing sector was found to have positively affected not only domestic investment but all forms of investment in the context of developing nations.

Kargbo (2017) studied the nexus between growth and FDI in Africa using panel data (1996–2011). The study also estimated the role of domestic savings in enabling FDI to influence employment, domestic investment and growth. Apart from enhancing growth, FDI's effect on savings, employment and domestic investment was found to be significantly positive. Using panel data analysis, Onaji-Benson (2015) investigated the causality between FDI and domestic investment in SSA nations. Domestic investment was found to have been enhanced by FDI in SSA group of countries. Using GMM (dynamic) method with annual data (1970–2017), Ijirshar et al. (2019) explored the relationship between domestic investment and FDI in the African context. FDI was observed to have crowded in domestic investment in Africa. The complementarity variable (domestic investment x FDI) enhanced growth in Africa. What is common in empirical research that supported the positive view is that they assumed FDI has a direct influence on domestic investment, the absorption capacities in the FDI-domestic investment nexus are irrelevant and that they did not address the omitted variable bias. The current study took all these gaps into consideration.

Empirical studies noting the negative impact of FDI on domestic investment include Chitambara (2021), Szkorupova (2015), Ijirshar et al. (2019), Ha et al. (2021), Wang (2010), Anaman (2018), and Igor (2015). Chitambara (2021) explored the linkage between FDI and domestic investment in Africa using two-step system generalized methods of moments and fixed effects methods with data spanning from 1980 to 2016. FDI had a significant deleterious impact on domestic linked investment in Africa. Using annual panel data (1993–2012), Szkorupova (2015) studied FDI's effect on domestic investment in Central and Eastern European selected countries and found out that the latter was crowded out by the former. Ha et al. (2021) studied the nexus between domestic entrepre-

neurship and greenfield investment in 110 nations using panel data analysis (2001–2018). The inflow of greenfield investment into host countries was found to have a detrimental influence on domestic entrepreneurship and total factor productivity.

Employing 50 countries as a focal point, Wang (2010) investigated FDI and domestic investment linkages using data (1970–2004) of a panel framework nature. The study observed that the contemporaneous influence of FDI inflows on domestic investment was of a negative nature. Using pooled OLS annual data (time series) spanning from 1972 to 2011, Anaman (2018) studied the implication of FDI on domestic investment in South Africa and Kenya. In the short run, FDI crowded out domestic investment in the context of South Africa. Igor (2015) explored the domestic investment-FDI nexus in Croatia using the vector autoregressive model with quarterly data (time series) from 2001 to 2014. Domestic investment was negatively influenced by the inflow of FDI in Croatia. A study done by Nwanna (1986) observed that FDI reduced domestic investment in Nigeria in the short run only. The common factor among these empirical studies is that they did not consider that FDI affects domestic investment indirectly through other channels. The current study fills in that gap.

Osabuohien et al. (2017) Younsi et al. (2021), and Ullah et al. (2014) are the empirical researchers who observed that FDI and domestic investment had a feedback relationship. Osabuohien et al. (2017) revealed that FDI and domestic investment enhanced each other in the process of enhancing growth in Nigeria. Using African nations as a focal point, Younsi et al. (2021) studied the interrelationship between domestic investment, foreign aid, economic growth and FDI using system GMM and fixed effects methods. Domestic investment, foreign aid and FDI were found to have a bi-directional relationship in enhancing growth in Africa. Ullah et al. (2014) explored the relationship between economic growth, domestic investment and FDI using the Toda-Yamamoto approach (1976–2010). They found that there was a feedback relationship between FDI and domestic investment. The omitted variable bias and the absorption capacity view were not captured in these empirical studies. The current study addressed these concerns.

Diallo et al. (2021) and Aigheyisi (2017) are the two empirical researchers who produced results that show a non-significant or non-existent relationship between FDI and domestic investment. Using panel data analysis, Diallo et al. (2021) explored the effect of FDI on domestic private investment in SSA with data ranging from 1980 to 2017. The impact of FDI on domestic private investment in the short run was found to be insignificant, whilst a significant enhancing effect of FDI on private domestic investment was observed in SSA in the long run. The dynamic ordinary least squares approach was used by Aigheyisi (2017) to study the role of financial and human capital development in the FDI-domestic investment nexus in Nigeria. Data of a time series nature used ranges from 1990 to 2014. Short-run results indicate that the causality between domestic investment and FDI was non-existent yet in the long run, a positive but insignificant relationship was observed between the two variables. An empirical study by Anaman (2018) noted that FDI's influence on domestic investment in the long and short run was non-existent in Kenya. These empirical studies did not capture the non-linearity aspect of the relationship between FDI and domestic investment.

The absorption capacity perspective was supported by Aigheyisi (2017) and Chitambara (2021). Their studies revealed that domestic investment was enhanced by a combination between financial sector development and FDI in Nigeria. On the other hand, the study also noted that a combination between FDI and school enrolment negatively influenced domestic investment in Nigeria. A study by Chitambara (2021) revealed that trade openness and quality institutions improved the positive influence of FDI on domestic investment in the African context. The current study is like the one done by Aigheyisi (2017) but differs in the following ways. Firstly, it does not focus on a single country but on an economic grouping called BRICS. Secondly, it made use of panel data analysis methods. Thirdly, it used most recent data (1988–2020). Fourthly, it investigated whether savings and/or personal remittances are the channels through which domestic investment is influenced by FDI.

The first group of empirical literature noted that FDI enhances domestic investment. The crowding out of domestic investment by FDI in the host

country was observed by the second group. The third group observed that there is no relationship between the two variables whilst the fourth group of empirical researchers noted that certain conditions must exist in the host country before FDI enhances domestic investment significantly. These contradictions, mixed and inconclusive results are the reasons why the paper aimed to fill the gap in the BRICS context by evaluating the impact of FDI on domestic investment.

2. METHODS

The data from 1988 to 2020 of a panel nature were used. This study explored the influence of FDI on domestic investment in BRICS. These countries include Brazil, India, Russia, South Africa, and China. The secondary data extracted from the United Nations Development Programme and World Development Indicators were used. The dependability, completeness and openness of these databases enhance the reliability of the results and the policy implications prescribed by this study.

Consistent with earlier empirical research done by Woraewaa (2017), Mamatkulov (2020), Amighini et al. (2017), Diallo et al. (2021), Sucubasi et al. (2021), Szkorupova (2015), Chitambara (2021), and Osabuohien et al. (2017), the following equation (1) is the general model specification of this study:

$$DINVEST = f\left(FDI, SAV, REMIT, INFR, OPEN, GROWTH, FIN, HCD\right), \quad (1)$$

where *DINVEST* stands for domestic investment; *FDI* is FDI; SAV is the savings; *REMIT* stands for personal remittances inflow whilst; *INFR* means infrastructural development. Trade openness is represented by *OPEN*; economic growth is shown by *GROWTH* whereas *FIN* stands for financial development. *HCD* is human capital development.

Domestic investment (DINVEST) is measured by gross capital formation as a ratio of GDP, FDI is proxied by net FDI as a ratio of GDP, whilst savings is measured by domestic savings (% of GDP). Personal remittances received (% of GDP) is the proxy of personal remittances used, infrastructural development (INFR) was measured by subscriptions of fixed telephone (per 100 people), whereas

total trade as a ratio of GDP is the proxy of trade openness (OPEN) used in this study. Economic growth (GROWTH) was proxied by gross domestic product (GDP) per capita, whilst financial sector development (FIN) was measured by private sector linked domestic credit as a ratio of GDP. Development of human capital (HCD) was measured by human capital development index in this study. The choice of these proxies of the variables used in this study is in line with the existing studies by Ijirshar et al. (2019), Younsi et al. (2021), Kamaly (2014), Anaman (2018), Igor (2015), Aigheyisi (2017), Kargbo (2017), Yahia et al. (2018), Rashid et al. (2013), Onaji-Benson (2015), and Ha et al. (2021).

The following two equations are the econometric versions of the general model specification presented in equation (1). However, these two equations, (2) and (3), also introduce the complementarity variables ($FDI_{it} \cdot SAV_{it}$) and ($FD_{it} \cdot REMIT_{it}$), consistent with prior empirical research on the subject (Kargbo, 2017; Chitambara, 2021). These empirical studies noted that conditions such as quality institutions, savings, financial development and trade openness must exist in the host country to trigger a significant positive effect of FDI on domestic investment. This study, as shown in equations (2) and (3) examined whether personal remittances and domestic savings enhance FDI's effect on domestic investments in BRICS.

$$DINVEST_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 SAV_{it} + \\ + \beta_3(FDI_{it} \cdot SAV_{it}) + \beta_4 REMIT_{it} + \\ + \beta_5 INFR_{it} + \beta_6 OPEN_{it} + \beta_7 GROWTH_{it} + \\ + \beta_8 FIN_{it} + \beta_9 HCD_{it} + \mu + \varepsilon, \quad (2)$$

$$DINVEST_{it} = \beta_0 + \beta_1 FDI_{it} + \\ + \beta_2 REMIT_{it} + \beta_3(FDI_{it} \cdot REMIT_{it}) + \\ + \beta_4 SAV_{it} + \beta_5 INFR_{it} + \beta_6 OPEN_{it} + \\ + \beta_7 GROWTH_{it} + \beta_8 FIN_{it} + \\ + \beta_9 HCD_{it} + \mu + \varepsilon. \quad (3)$$

The complementarity variable ($FDI_{it} \cdot SAV_{it}$) and/or ($FD_{it} \cdot REMIT_{it}$) can only be said to have enhanced domestic investment if the co-efficient β_3 in equations (3) and (4) is positive and significant. Pooled OLS, FMOLS, and fixed effects are the

three econometric estimation approaches used to interpret equations (2) and (3).

Seven explanatory variables of the domestic investment function such as development of financial sector, savings, growth, personal remittances, infrastructural development, trade openness and human capital development are discussed next. Domestic savings placed in banking accounts are normally transformed into investment products by the banking institutions to get the enough return to offer to the bank depositors, consistent with Feldstein and Horioka (1980). The study expects domestic investment to be enhanced by savings.

According to Dash (2020), personal remittances inflow is normally directed towards domestic investment in education, small business start-ups, housing and consumption expenditure. The view was supported by other empirical research done by Aggarwal et al. (2011) and Mundaca (2009). The expectation is that domestic investment is enhanced by personal remittances.

Consistent with Ansar et al. (2016), a developed infrastructure creates a conducive environment for domestic investment in human capital development, financial development, small businesses and housing to take place. The same study noted that a developed infrastructure reduces the costs of doing business thereby enhancing and quickening the rate of domestic investment. The study expects a positive relationship running from infrastructural development towards domestic investment.

According to Bibi et al. (2012), higher levels of trade openness lead to more outflow of capital from economy, thus negatively influencing domestic investment. The study anticipates domestic investment to be negatively affected by trade openness.

High levels of economic growth provide a favorable macroeconomic environment that ensures more small businesses emerge and big businesses generate more revenue. These domestic businesses invest more and more domestically as the economy stabilizes and grows, consistent with Khatib et al. (2012). The influence of economic growth on domestic investment is expected to be positive.

According to Dutta and Roy (2009), financial markets promote domestic investments through the following. Firstly, financial markets reduce the costs incurred in undertaking investment projects through its ability to avail information at low prices. Secondly, financial markets are very efficient in choosing the investment projects associated with high return. Thirdly, financial markets increase the physical accumulation of capital, increases savings mobilization and channeling these savings to capital producing technologies. The study therefore expects financial development to positively affect domestic investment.

According to Khatib et al. (2012), developed human capital, skilled and educated personnel, is more capable of (1) structuring efficient investment allocation, (2) evaluating projects or projects appraisal, (3) general investments management, and (4) nurturing small businesses. The net effect is that human capital development plays a crucial role in enhancing domestic investment.

Stock market capitalization (% of GDP), domestic credit to private sector (% of GDP), and outstanding domestic public debt securities (% of GDP) are the proxies of financial sector development used, whilst FDI inflows' proxy employed is the net FDI inflows (% of GDP), in support of empirical research done by Ozili et al. (2020), Kaur et al. (2013), Hajilee and Nasser (2015), Kamasa et al. (2020), Pham et al. (2022), Sghaier and Abida (2013), Korgaonkar (2012), Adigwe et al. (2018), Sahin and Ege (2015), Acquah and Ibrahim (2019), Sasmaz and Gumus (2018), and Ayouni et al. (2014), among others. Apart from available empirical research work, the availability of data informed the choice of the proxies of the variables used.

3. RESULTS

The presentation and discussion of FDI and domestic investment trends for BRICS is done in Figures 1 and 2, respectively.

According to Figure 1, net FDI for Brazil decreased from 1.08% of GDP in 1988 to 0.35% of GDP in 1993, increased by 2.99 percentage points between 1993 and 1998 before plummet-
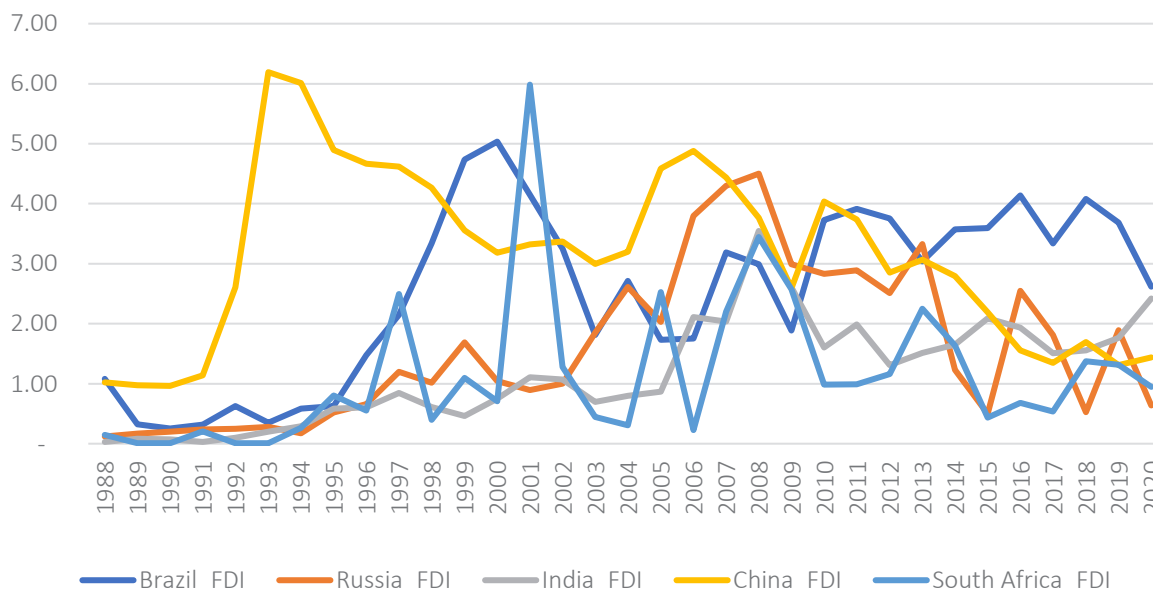
Figure 1. Net FDI (% of GDP) trends for BRICS countries

ing from 3.34% of GDP in 1998 to 1.81% of GDP in 2003. The period between 2003 and 2008 saw a net FDI inflow into Brazil going up by 1.18 percentage points before marginally increasing by 0.05 percentage points during the period, 2008-2013. Net FDI inflow into Brazil went up from 3.04% of GDP in 2013 to 4.08% of GDP in 2018 and then plummeted 1.46 percentage points during the period, 2018 to 2020.

Regarding Russia, its net FDI inflow increased (1) from 0.12% of GDP in 1988 to 0.28% of GDP in 1993, (2) 0.74 percentage points (1993-1998), (3) from 1.02% of GDP in 1998 to 1.85% of GDP in 2003 and (4) 2.65 percentage points (2003-2008). 2008 to 2013 saw Russia's net FDI inflow plummeting from 4.50% of GDP to 3.33% of GDP. It further declined 2.80 percentage points between 2013 and 2018 before recording a growth of 0.11 percentage points (from 0.53% of GDP in 2018 to 0.64% of GDP in 2020.

As for India, its net FDI inflow went up (1) from 0.03% of GDP in 1988 to 0.20% of GDP in 1993, (2) 0.41 percentage points (1993–1998), (3) from 0.61% of GDP in 1998 to 0.70% of GDP in 2003 and (4) by 2.85 percentage points (2003–2008). Five years between 2008 and 2013 saw India's net FDI inflow declining by 2.03 percentage points. India's net FDI inflow then increased from 1.51% of GDP in 2013 to 1.56% of GDP in 2018 whilst the two-year period from 2018

to 2020 is characterized by a positive 0.86 percentage points change in net FDI inflow.

China's net FDI inflow increased from 1.02% of GDP in 1988 to 6.19% of GDP in 1993, declined by 1.92 percentage points, between 1993 and 1998 before declining by 1.27 percentage points (between 1998 and 2003). A growth of 0.77 percentage points in China's net FDI was recorded 2003 and 2008. China net FDI inflow decreased (1) from 3.76% of GDP in 2008 to 3.07% of GDP in 2013, (2) by 1.37 percentage points during the period between 2013 and 2018 and (3) from 1.69% of GDP in 2018 to 1.44% of GDP in 2020.

South Africa's net FDI inflow plummeted from 0.15% of GDP in 1988 to 0.01% of GDP in 1993 before going up (1) by 0.39 percentage points between year 1993 and 1998, (2) from 0.40% of GDP in 1998 to 0.45% of GDP in 2003 and (3) by 3.00 percentage points (2003 to 2008). A period between 2008 and 2013 saw a 1.20 percentage point decrease in net FDI for South Africa. Net inflow of FDI went down from 2.25% of GDP in 2013 to 1.38% of GDP in 2018 before it decreased by 0.43 percentage points, between 2018 and 2020.

Gross capital formation for Brazil declined (1) from 24.34% of GDP in 1988 to 20.85% of GDP in 1993, (2) by 2.68 percentage points during the period between 1993 and 1998, and (3) from 18.16% of
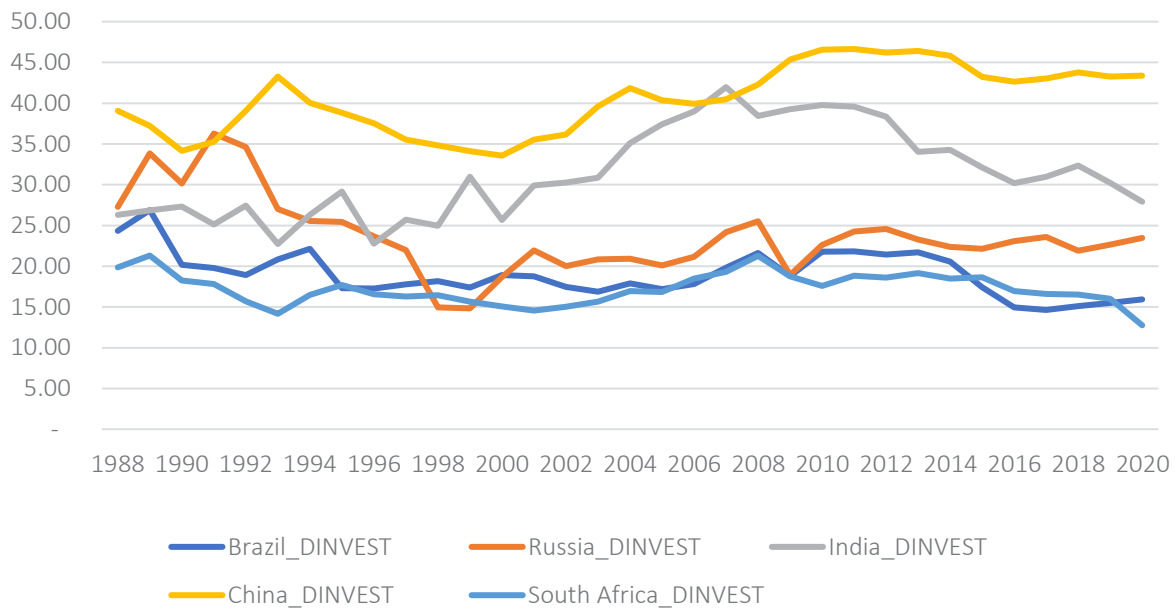
Figure 2. Gross capital formation (% of GDP) trends for BRICS

GDP in 1998 to 16.86% of GDP in 2003. Brazil's gross capital formation increased from 16.86% of GDP in 2003 to 21.62% of GDP in 2008, marginally went up 0.07 percentage, between 2008 and 2013 and then declined by 6.60 percentage points, from 21.69% of GDP to 15.10% of GDP in 2018. The period between 2018 to 2020 saw Brazil's gross capital formation rising by 0.84 percentage points, from 15.10% of GDP in 2018 to 15.93% of GDP in 2020.

Russia's gross capital formation declined from 27.27% of GDP in 1998 to 27.01% of GDP in 1993, massively went down by 12.04 percentage points between 1993 and 1998 and increased from 14.96% of GDP in 1998 to 20.865 of GDP in 2003. The period between 2003 and 2008 saw Russia's gross capital formation increasing by 4.64 percentage points and then a decline in Russia's gross capital formation from 25.50% of GDP in 2008 to 23.27% of GDP in 2013 was observed. Russia's gross capital formation went down 1.35 percentage points, between 2013 and 2018 before growing from 21.92% of GDP in 2018 to 23.48% of GDP in 2020.

Gross capital formation for India declined from 26.28% of GDP in 1988 to 22.72% of GDP in 1993, increased (1) by 2.26 percentage points between 1993 and 1998, (2) from 24.98% of GDP in 1998 to 30.84% of GDP in 2003 and (3) by 7.58 percentage points during the period between 2003 and 2008.

India's gross capital formation went down (1) from 38.42% of GDP in 2008 to 34.02% of GDP in 2013, (2) by 1.68 percentage points, between 2013 to 2018 and (3) from 32.34% of GDP in 2018 to 27.90% of GDP in 2020.

Regarding China, its gross capital formation increased from 39.08% of GDP in 1988 to 43.28% of GDP in 1993, massively decreased by 8.47 percentage points, between 1993 and 1998 and then increased during the subsequent five years, from 34.81% of GDP in 1998 to 39.62% of GDP in 2003. China's gross capital formation increased by 2.65 percentage points between 2003 and 2008, further went up from 42.27% of GDP in 2008 to 46.40% of GDP in 2013 before declining by 2.61 percentage points during the subsequent five-year period between 2013 and 2018. The two-year period from 2018 to 2020 saw China's gross capital formation marginally declining 0.43 percentage points to reach year end 2020 at 43.37% of GDP.

South Africa's gross capital formation declined from 19.86% of GDP in 1988 to 14.16% of GDP in 1993, increased by 2.27 percentage points, between 1993 and 1998, marginally declined by 0.77 percentage points, from 16.43% of GDP in 1998 to 15.66% of GDP in 2003. The five-year period saw South Africa's gross capital formation increasing by 5.63 percentage points whilst a 2.12 percentage

points decline was observed between 2008 and 2013. Gross capital formation of South Africa decreased from 19.17% of GDP in 2013 to 16.54% of GDP in 2018 before further plummeting 3.80 percentage points between 2018 and 2020.

Table 1 presents the panel stationarity test results, whilst Table 2 contains the panel co-integration findings.

Tables 3 to 5 present results. For each econometric estimation set of results, three models under which final data analysis was done are evident. Model 3 includes the complementarity variable's effect on the dependent variable. Model 2 includes the influence of the complementarity between FDI and savings on domestic investment. Model 1 excludes the complementarity variable.

Table 1. Stationarity panel tests – Individual intercept

Variables	Levin et al. (2002)	Im et al. (2003)	Augmented Dickey-Fuller Fisher Chi-square	Phillips-Perron Fisher Chi-square
Level				
LDINVEST	−1.17	−1.67**	17.20*	10.56
LFDI	−2.29**	−1.78**	16.78*	22.18**
LSAV	−2.24**	−2.93***	26.19***	21.25**
LREMIT	−2.62***	−3.28***	30.00***	34.63***
LINFR	−3.54***	−1.30***	17.13***	14.73**
LOPEN	−2.20**	−1.83**	19.17**	20.55**
LGROWTH	−0.57	1.22	4.57	3.87
LFIN	−1.01	0.70	11.45	18.32**
LHCD	−3.03***	−2.59***	24.59***	32.71***
First difference				
LDINVEST	−7.28***	−7.04***	64.40***	101.35***
LFDI	−6.84***	−8.65***	81.35***	124.80***
LSAV	−3.47***	−6.18***	56.69***	104.83***
LREMIT	−4.19***	−8.25***	77.00***	115.92***
LINFR	−5.28***	−3.82***	51.28***	118***
LOPEN	−4.25***	−5.91***	54.29***	97.32***
LGROWTH	−2.73***	−3.85***	32.97***	46.66***
LFIN	−6.75***	−7.82***	70.00***	76.79***
LHCD	−11.60***	−11.04***	107.23***	132.80***

Table 2. Johansen-Fisher approach to co-integration

Number of co-integrating equations (hypothesized)	Trace test	Probability	Max-eigen test	Probability
None	141.7	0.0000	340.7	0.0000
At most 1	381.5	0.0000	145.6	0.0000
At most 2	194.8	0.0000	109.1	0.0000
At most 3	126.8	0.0000	57.42	0.0000
At most 4	79.59	0.0000	36.48	0.0001
At most 5	49.95	0.0000	19.32	0.0363
At most 6	37.06	0.0001	27.16	0.0025
At most 7	20.14	0.0279	18.52	0.0468
At most 8	13.88	0.1786	13.88	0.1786

Table 3. Fixed effects

Variables	Domestic investment as a dependent variable		
	(1)	**(2)**	**(3)**
FDI	0.01	0.21**	0.004
SAV	0.93***	0.80***	0.78***
REMIT	0.02	0.03	0.02
INFR	−0.05**	−0.02	−0.03*
OPEN	−0.08	−0.04	−0.04
GROWTH	0.05***	0.09***	0.09***
FIN	0.01	0.08**	0.10**
HCD	−0.47***	−0.07	−0.11
FDI*SAV		0.67***	
FDI*REMIT			0.004
Countries	5	5	5
F-statistic	122.16	137.98	132.36
R-squared (Adjusted)	0.89	0.91	0.91
F-statistic probability	0.00	0.00	0.00

Table 4. FMOLS

Source: E-Views.

Variables	Domestic investment – Dependent variable		
	(1)	**(2)**	**(3)**
FDI	0.01	0.22*	0.01
SAV	0.98***	0.89***	0.86***
REMIT	0.03*	0.01	0.01
INFR	−0.05	−0.02	−0.03
OPEN	−0.06	−0.04	−0.04
GROWTH	0.05*	0.09***	0.10***
FIN	0.02	0.03*	0.19**
HCD	−0.52***	−0.13	−0.20
FDI*SAV		0.07***	
FDI*REMIT			0.01
Countries	5	5	5
F-statistic probability	0.00	0.00	0.00
R-squared (Adjusted)	0.89	0.91	0.91

Table 5. Pooled OLS

Variables	Domestic investment – Dependent variable		
	(1)	**(2)**	**(3)**
FDI	0.001	0.19**	0.02
SAV	0.91***	0.92***	0.92***
REMIT	0.02**	0.02**	0.02*
INFR	−0.04**	−0.03*	−0.04**
OPEN	−0.14***	−0.13***	−0.15***
GROWTH	0.04***	0.02	0.04***
FIN	0.10***	0.12***	0.09***
HCD	−0.39***	−0.36***	−0.47***
FDI*SAV		0.29***	
FDI*REMIT			0.01
Countries	5	5	5
F-statistic probability	0.00	0.00	0.00
R-squared (Adjusted)	0.87	0.89	0.88

4. DISCUSSION

Figures 1 and 2 present the trend analysis of domestic and FDI for BRICS for a period spanning from 1988 to 2020. Such trend analysis cannot ascertain whether FDI influenced domestic investment. The precise statistical influence and the directional causality cannot be deduced from such type of analysis. The logarithm format data was used in performing final data analysis to deal away with undesirable characteristics of data such as the multi-collinearity issues, abnormally distributed data and outliers (Aye & Edoja, 2017). Table 1 indicates that the data set used is integrated of order 1, consistent with Odhiambo (2010), meaning the data set was found to be stable at first difference.

Both max-eigen and trace tests indicate that at most 7 co-integrating relationships were observed in Table 2. This set of results confirms the existence of a long-run nature of a relationship between studied variables, hence allowing the next stage of data analysis to happen.

Models 1 and 3 show that FDI had a non-significant enhancing influence on domestic investment in all three econometric estimation methods used in this study. Model 2 in all the three econometric estimation approaches indicates that FDI had a significant enhancing influence on domestic investment. The results mean that domestic investment in BRICS was enhanced by FDI, a finding, which is consistent with Mamatkulov (2020), whose study revealed that domestic investment is enhanced by the inflow of FDI through its ability to transfer knowledge and technology in the host country.

Savings had a significant positive impact on domestic investment in all the three models for fixed effects, FMOLS, and pooled OLS methodologies.

The results resonate with Feldstein and Horioka (1980) who argued that domestic savings placed in banking accounts are normally transformed into investment products by the banking institutions to get the enough return to offer to the bank depositors.

A significant positive influence of personal remittances on domestic investment was observed under the FMOLS approach (model 1) and the pooled OLS methodology (models 1, 2, 3). An insignificant enhancing effect of personal remittances on domestic investment was noted under the fixed effects (models 1, 2 and 3) and FMOLS approach (models 2 and 3). These results show that personal remittances generally enhance domestic investment, consistent with Dash (2020) whose study argued that personal remittances inflow is normally directed towards domestic investment in education, small business start-ups, housing and consumption expenditure.

Across all the three research methodologies employed in this study, the impact of complementarity (savings x FDI) on domestic investment was found to be significantly positive. The results resonate with Chitambara (2021) and Kargbo (2017) who argued that savings, trade openness, quality institutions and financial development are some of the conditions whose adequate availability in the host country promotes and enhances domestic investment.

On the other hand, an insignificant positive relationship from a combination between FDI and personal remittances towards domestic investment was observed across all the three econometric estimation approaches. The results indicate that personal remittances inflow and FDI might have a substitution effect, which is not good for long-term domestic investment growth.

CONCLUSION

Employing panel data (1988–2020) analysis, this study examined the impact of FDI on domestic investment in BRICS. The complementarity between FDI and savings' influence on domestic investment in BRICS was also investigated. The available literature on the relationship between FDI and domestic investment suffers from omitted variable bias. This study resolved such a problem by including savings in the FDI led domestic investment function. The existing literature also produced results that are inconsistent, mixed and do not allow for a consensus on how FDI relates to domestic investment. It is for this

reason that this study decided to examine if FDI has a significant impact on domestic investment. The results show that FDI has significantly increased domestic investment. Domestic investment was significantly improved by savings, whilst the personal remittances-domestic investment nexus produced mixed results. Personal remittances' positive influence on domestic investment was (1) non-significant under FMOLS (model 2 and 3) and fixed effects (models 1, 2 and 3), and (2) positive and significant under FMOLS (model 1) and pooled OLS (models 1, 2 and 3). The interaction between personal remittances and FDI insignificantly improved domestic investment, whilst the complementarity between FDI and savings enhanced domestic investment significantly. FDI and savings enhancement policies should be crafted and implemented by BRICS to promote domestic investment. Future studies should investigate minimum threshold of FDI that triggers significant domestic investment in BRICS.

AUTHOR CONTRIBUTIONS

Conceptualization: Kunofiwa Tsaurai.
Data curation: Kunofiwa Tsaurai.
Formal analysis: Kunofiwa Tsaurai.
Investigation: Kunofiwa Tsaurai.
Methodology: Kunofiwa Tsaurai.
Project administration: Kunofiwa Tsaurai.
Resources: Kunofiwa Tsaurai.
Software: Kunofiwa Tsaurai.
Validation: Kunofiwa Tsaurai.
Writing – original draft: Kunofiwa Tsaurai.
Writing – review & editing: Kunofiwa Tsaurai.

ACKNOWLEDGMENT

REFERENCES

1. Aggarwal, R., Kunt, A. D., & Peria, M. S. M. (2011). Do remittances promote financial development? *Journal of Development Economics, 96*(2), 255-264. https://doi.org/10.1016/j.jdeveco.2010.10.005

2. Aigheyisi, O. S. (2017). The effect of FDI on domestic investment in Nigeria: Any role for financial development and human capital? *Amity Journal of Economics, 2*(2), 1-20.

3. Amighini, A. A., McMillan, M. S., & Sanfilippo, M. (2017). *FDI and capital formation in developing economies: New evidence from industry-level data* (National Bureau of Economic Research Working Paper Number 23049).

4. Anaman, G. (2018). *Investigating the impact of FDI on domestic investment in Sub-Saharan Africa: A case study of Kenya and South Africa* (Unpublished Master's Thesis). Eastern Illinois University.

5. Ansar, A., Flyvbjerg, B., Budzier, A., & Lunn, D. (2016). Does infrastructure investment lead to economic growth or economic fragility? Evidence from China. *Oxford Review of Economic Policy, 32*(3), 360-390. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2834326

6. Aye, G. C., & Edoja, P. E. (2017). Effect of economic growth on C02 emission in developing countries: Evidence from a dynamic panel threshold model. *Cogent Economics and Finance, 5*(1), 1-22. https://doi.org/10.1080/23322039.2017.1379239

7. Bibi, S., Khan, U. A., & Bibi, A. (2012). Determinants of Investment in Pakistan. *Academic Research International, 2*(2), 517-524.

8. Chitambara, P. (2021). FDI and domestic investment in Africa: Evidence on the role of local conditions. *The Journal of Developing Areas, 55*(1), 219-234. https://doi.org/10.1353/jda.2021.0016

9. Dash, R.K. (2020). Impact of remittances on domestic investment: A panel study of six South Asian countries. *South Asia Economic Journal, 21*(1), 7-30. Retrieved from https://journals.sagepub.com/doi/10.1177/1391561420903199

10. Diallo, A., Jacolin, L., & Rabaud, I. (2021). *FDI and domestic private investment in Sub-Saharan African countries: Crowding in or out?*

(Development Policies Working Paper Number 292).

11. Dutta, N., & Roy, S. (2009). The impact of financial development on domestic investment; A quantile regression approach. *Indian Macroeconomics Annual, 6,* 107-130. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2206451

12. Feldstein, M. S., & Horioka, C. Y. (1980). Domestic saving and international capital flows. *Economic Journal, 90,* 314-329. https://doi.org/10.2307/2231790

13. Ha, T. S., Chu, V. T., Nguyen, M. T. T., Nguyen, D. H. T., & Nguyen, A. N. T. (2021). The impact of Greenfield investment on domestic entrepreneurship. *Journal of Innovation and Entrepreneurship, 10*(24), 1-16. Retrieved from https://www.econstor.eu/handle/10419/259642

14. Ha, V. T. C. (2021). *The effects of FDI on domestic firms: The case of Vietnam* (Unpublished Doctoral Thesis). University of Waikato, Hamilton, New Zealand.

15. Igor, I. (2015). *Impact of FDI (FDI) on domestic investment in Republic of Croatia* (Munich Personal RePEc Archive Working Paper Series Number 70076).

16. Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53-74. https://doi.org/10.1016/S0304-4076(03)00092-7

17. Ijirshar, V. U. Anjande, G. Fefa, J., & Mile, B. N. (2019). The growth-differential effects of domestic investment and FDI in Africa. *CBN Journal of Applied Statistics, 10*(2), 139-167. Retrieved from https://www.econstor.eu/handle/10419/219307

18. Kamaly, A. (2014). Does FDI crowd in or out domestic investment? New evidence from emerging economies. *Modern Economy, 5*(4), 391-400. http://dx.doi.org/10.2139/ssrn.2154525

19. Kargbo, S. M. (2017). *FDI and economic growth in Africa.* (Unpublished Doctoral Thesis). School of Economics at University of Cape Town, South Africa.

20. Khatib, H. B. A., Altaleb, G. S., & Alokor, S. M. (2012). Economical determinants of domestic investment. *European Scientific Journal, 8*(7), 1-17. https://doi.org/10.19044/esj.2012.v8n7p%25p

21. Kumar, N., & Pradhan, J. P. (2002). *FDI, externalities and economic growth in developing countries: Some empirical explorations and implications for WTO negotiations on investment* (RIS Discussion Paper No. 27/2002). New Delhi, India.

22. Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics, 108*(1), 1-24. https://doi.org/10.1016/S0304-4076(01)00098-7

23. Loungani, P., & Razin, A. (2001). How beneficial is FDI for developing countries. *Finance and Development, 38*(2), 1-7. Retrieved from https://www.imf.org/external/pubs/ft/fandd/2001/06/loungani.htm

24. Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3-42. https://doi.org/10.1016/0304-3932(88)90168-7

25. Makki, S. S., & Somwaru, A. (2006). *Impact of FDI and trade on economic growth.* Economic Research Service. Washington DC.

26. Mamatkulov, A. (2020). Impact of FDI on domestic investment in developing countries. *Bulletin of Science and Practice, 6*(9), 256-266.

27. Mileva, E. (2008). *The impact of capital flows on domestic investment in transitional economies* (European Central Bank Working Paper Series Number 871).

28. Mundaca, D. (2009). Remittances, financial markets development and economic growth: The case of Latin America and the Caribbean. *Review of Development Economics, 13*(2), 288-303. http://dx.doi.org/10.1111/j.1467-9361.2008.00487.x

29. Nath, H. (2005). *Trade, FDI and growth: Evidence from transition economies* (SHSU Economics and International Business Working Paper Number SHSU-Eco-WP05-04). Huntsville, TX: Sam Houston State University.

30. Ndikumana, L., & Verick, S. (2008). *The linkages between FDI and domestic investment: Unravelling the developmental impact of foreign investment in Sub-Saharan Africa* (IZA discussion Paper Series Number 3296).

31. Odhiambo, N. M. (2010). Is financial development a spur to poverty reduction? Kenya's experience. *Journal of Economic Studies, 37*(3), 343-353. https://doi.org/10.1108/01443581011061311

32. Nwanna, G. I. (1986). The impact of FDI on domestic capital formation in a developing country: Nigeria. *Savings and Development, 10*(3), 265-278.

33. Osabuohien, E. S., Soogun, A. O., & Urhie, E. (2017). Examining the relative roles of domestic and FDIs in Nigeria. *International Journal of Economics and Financial Issues, 7*(4), 365-371. Retrieved from https://www.econjournals.com/index.php/ijefi/article/view/2753

34. Onaji-Benson, T. (2015). An empirical analysis of the effects of FDI on domestic investment in Sub-Saharan Africa: Pre and Post global financial crisis. *The Changing Dynamics of International Business in Africa,* 15-31. http://dx.doi.org/10.1057/9781137516541_2

35. Rashid, M. M., Jit, S. K. S., & Chung-Yee, L. (2013). Impact of FDI and domestic investment on economic growth of Malaysia. *Malaysian Journal of Economic Studies, 50*(1), 21-35.

36. Romer, P. (1986). Increasing returns and long run economic growth. *Journal of Political Economy, 94*(5), 1002-1037.

37. Sucubasi, B., Trenovski, B., Imeri, B., & Merdzan, G. (2021). The effects of FDI on domestic investments in Western Balkans. *Globalization and its Socio-Economic Consequences, 92,* 1-14. https://doi.org/10.1051/shsconf/20219207059

38. Szkorupova, Z. (2015). Relationship between FDI and domestic investment in selected countries of Central and Eastern Europe. *Procedia Economics and Finance, 23,* 1017-1022. https://doi.org/10.1016/S2212-5671(15)00350-0

39. Swan, T. (1956). Economic growth and capital accumulation. *The Economic Record, 32*(2), 334-361. https://doi.org/10.1111/j.1475-4932.1956.tb00434.x

40. Ullah, I., Shah, M., & Khan, F. U. (2014). Domestic investment, FDI and economic growth nexus: A case of Pakistan. *Economics Research International, 24,* 1-6.

41. Wang, M. (2010). FDI and domestic investment in the host country: Evidence from panel study. *Applied Economics, 42,* 3711-3721

42. Woraewaa, A. J. (2017). *Impact of FDI on domestic investment: Evidence from Sub-Saharan Africa* (Unpublished Thesis). University of Lethbridge.

43. Yahia, Y. E., Haiyun, L., Khan, M. A., Shah, S. S. H., & Islam, M. A. (2018). The impact of FDI on domestic investment: Evidence from Sudan. *International Journal of Economics and Financial Issues, 8*(6), 1-10. http://dx.doi.org/10.32479/ijefi.6895

44. Younsi, M., Bechtini, M., & Khemili, H. (2021). The effects of foreign aid, FDI and domestic investment on economic growth in African countries: Non-linearities and complementarities, *African Development Review, 33*(1), 55-66.