Foreign direct investment and domestic private invesment in sub-Saharan African countries: crowding-in or out?[*]

Askandarou Diallo[†], Luc Jacolin[‡] & Isabelle Rabaud[§]

November 10, 2020

Abstract

This paper investigates the relationship between foreign direct investment (FDI) and private investment in Sub-Saharan Africa (SSA), using a sample of 40 countries over 1980-2013. To disentangle short term from long-term dynamics, and take into account possible endogeneity issues, our empirical analysis is based on Pooled Mean Group (PMG), Mean Group (MG) and Dynamic Full Effects (DFE). We find that FDI has little effect on private investment in the short run but significant crowding-in effects : in the long-run, a 1% increase in FDI leads to a 0.3% in private investment in the long run. Our results also show that FDI interacts with public domestic investment to boost these positive effects. Finally, we show that the impact of FDI on domestic private investment is stronger in non-natural resource exporting diversified countries as opposed to undiversified commodity exporters. These results may bring new light to sometimes conflicting results found in the current FDI literature and to how public investment leverages FDI to spur private sector growth, thereby providing useful insights on the design and sequencing of related public policy.

Keywords: Financial development, Domestic investment, Foreign direct Investment, Crowding-in/crowding-out effects.

JEL codes: G11, O11, O16

1 Introduction

Over the last three decades, foreign direct investment (FDI) has grown to be one of the three major sources of external financing in sub-Saharan countries, along with remittances and official development aid (see annex 1). While remittances mostly cover immediate consumption needs (and poverty alleviation), FDI represents a long-run source of capital for investment and economic development, seen by national authorities as essential to alleviate domestic capital accumulation constraints and spur private sector growth. The expected impact of FDI on domestic investment and growth has provided the rationale for FDI promotion policies (investment codes, tax breaks) encouraged by international development institutions, which seek to leverage increasingly constrained official development aid.

However, the positive impact of FDI on investment and growth has proved to be more elusive than expected in the current economic literature. Seminal research establishing the clear link between FDI and growth (Dollar, 1992; Harrison, 1996) have shown the importance of leverage/scale effects (domestic investment acceleration, job creation, financing for public investment). Other studies have emphasized the crucial role played by efficiency gains, as direct investment flows may bring productivity-enhancing new technologies, managerial skills and labor force vocational training acquisition, as posited by endogenous growth theory (Romer, 1986). Other empirical studies focusing on the link between FDI and domestic investment (and growth) in recipient countries have discussed other transmission channels with less desirable impacts. The impact of FDI on domestic investment and growth may also be negative because of crowding-out effects arising from possible exchange rate appreciation (Dutch Disease) induced by FDI inflows. It may also affect the quality of governance and business climate, which may deter private entrepreneurship. Finally, the impact of FDI on growth may be impaired by the low productivity of public spending financed by FDI-generated fiscal revenue. The empirical evidence points to large variations in FDI impact from country to country (and regions) due to differences in national policies, the econometric methodology used, the response of domestic firms, and the type of FDI in the host country.

The purpose of our study is to investigate empirically crowding-out or crowding-in effects of FDI on private domestic investment in sub-Saharan Africa and seeks to contribute to the existing literature in four ways. First, it separates the effect of FDI on private domestic investment from total domestic investment, which has been the focus of the vast majority of studies so far. It is a necessary step in our view to avoid aggregation bias, which may constitute a possible source of variation in the existing literature. Second, it introduces on the dynamic short- and

long-term interactions between foreign direct investment and domestic private investment, as expected benefits from FDI may only appear with time. Third, it uses Pooled Mean Group on Pooled Mean Group (PMG), Mean Group (MG) and Dynamic Full Effects (DFE), as opposed to Ordinary Least Squares (OLS), Fixed Effect (FE) and Random Effect (RE) to better address issues of variable stationarity and endogeneity, a well as temporal dynamics. Finally, it focuses on sub-Saharan countries, a region with high investment needs and diversity of economic structures and development strategies (see annex 1) yet more rarely covered by recent research than developing countries in Asia, Latin America or Eastern Europe.

The study is divided into three main sections.The first reviews the theoretical and empirical literature on the relationship between foreign direct investment and domestic investment. The second section is devoted to the empirical analysis.The last section provides a conclusion and discussion.

2   Literature review

International trade theories provide a conceptual analytical framework to analyse how FDI affects investment and economic growth in an increasingly globalized economy. A traditional view of FDI inflows is that FDI stimulates economic growth either through their direct impact on overall investment or by generating a number of externalities and positive spillovers. These positive effects stem from market entry (or competition) from multinational companies, which favour the spread of new production processes and technologies, new products and management skills. As some multinational firms acquire labour and raw materials locally, they are potentially sources of new demands for local inputs to local firms and the creation of labour income that stimulate local demand and encourages domestic investment. FDI inflows can also be a source of network effects and agglomeration economies, which attract additional foreign investors and create complementarities with domestic firms (Markusen and Venables, 1999; Driffield and Munday; 2000). Domestic firms may respond to FDI inflows by renewing and increasing their capital stock in order to face competition (De Mello, 1999). Massive FDI inflows may also trigger large local or regional investments in infrastructure that increase the profitability of domestic investment (Cardoso and Dornbusch, 1989).

Other literature strings point to possibly negative impacts of FDI on domestic investment and growth. Since foreign firms are generally technologically superior, they may be in a better position to take advantage more rapidly and efficiently of opportunities that were formerly only accessible to domestic investors (Fry, 1992; Agosin and Mayer, 2000). In markets characterized

by imperfect competition, FDI inflows may lead to a reduction of the market share, or market exit, of some domestic firms, particularly in the case of significant technological gap between foreign and domestic firms and lack of skilled workers in the host country (Borensztein et al., 1998). FDI is likely to negatively affect domestic investment and growth because of possible exchange appreciation resulting from these financial flows, or "Dutch disease" associated with FDI in extractive industries (Cordon and Neary, 1982). FDI flows may increase current account imbalances by increasing imports and worsening the terms of trade (Apergis et al., 2006), leading to a loss of the potential domestic productivity advantage, higher prices of capital goods and a reduction in domestic investment. In parallel, the real effective exchange rate appreciation from FDI inflows and associated exports may reduce the competitiveness and investment other tradable goods sectors.

Since the early 2000s, a growing body of empirical literature has tried to disentangle such possible crowding-in or crowding-out effects in recipient countries to assess the dynamic net effect of FDI on domestic investment. First, the empirical evidence remains ambiguous because this net impact may depend on significant host country-specific. Such effects include differences in the quality of governance and local policies to stimulate FDI, the degree of financial development (Alfaro et al, 2004), the size of the technological gap between multinational and domestic firms and the absorptive capacity of local firms (Barrios et al., 2005). Second, the impact of FDI on domestic investment may also depend on sectoral composition and linkage effects which may differ widely between primary, manufacturing and services sectors (World Investment Report UNCTAD, 2018). Primary sector is mainly capital-intensive and the potential linkages between foreign firms and the rest of the economy are often limited or landlocked. FDI flows in the manufacturing sector may have a greater impact on the economy through a wide range of potential linkage-intensive activities. As the service sector includes a wide range of different activities such as wholesale and retail trade, finance, infrastructure, real estate and tourism, FDI in this sector may benefit domestic investment through strong backward linkages. Third, the impact of FDI on domestic investment and growth may be higher and more rapid if it is in the form of greenfield versus mergers and acquisitions (MA). This latter form of FDI does not immediately increase the host country's productive capacity unless it is accompanied by expansion and new investment (Agosin et al; 2005). Finally, FDI flows may have opposite effects on domestic competition, depending on the intensity of domestic competition and competitive behaviour of both multinational and domestic firms. Some empirical literature shows significant crowding-out on domestic firms upon entry of multinational enterprizes (Misun, J; 2002).

The variety of these possible effects on the magnitude, direction and timing of these determinants, may explain the high variability of empirical results found in both developed and developing countries. In the case of OECD countries, research has uncovered a host of sometimes opposite effects of FDI on domestic investment. Desai et al (2005) brought to light possible differences of impact on domestic investment, depending on whether they are market or production-oriented. They found that market-oriented investments have a positive impact, while production-oriented investments may have both positive and negative effects and that FDI has an overall crowing out effect. Driffield and Hughes (2003), Arndt and Mattes (2007) also brought to light a crowding out effect of FDI inflows on manufacturing sectors in the United Kingdom and Germany. This stemmed from low levels of physical and human capital intensity, which was insufficient to assimilate the technological externalities resulting from the incoming investment. Desai et al. (2009) and Herzer and Schrooten (2008) found a crowding-in effect of FDI on domestic investment in the case of the United States.

This variability of results also applies to emerging and developing countries, where studies point to different regional impacts. Agosin and Mayer,(2000) found that crowding-in effects benefited Asian countries, to a lesser extent Africa countries, whereas crowding out effects were dominant in Latin America. Apergis et al (2006) also finds a crowd in effect for Asian and African countries, deriving from improvements in competition and technology induced by FDI entry and enhanced domestic entrepreneurship. Eregha (2012) finds crowding-in effects for Economic Community of West African States (ECOWAS) countries over the period 1970-2008. Similarly, Merican (2009) found crowding out effects of FDI on domestic investment and growth in four ASEAN members, namely Thailand, Malaysia, Indonesia and the Philippines. Examining the dynamic linkages between FDI, public investment and private investment, Ang (2009) points out that both FDI and public investment are complementary to domestic private investment in Malaysia.

Other cross sectional studies uncovered crowding out effects, mostly reflecting these countries' low level of development, institutional weaknesses and related market distorsions. Fry (1992) found that FDI crowds out domestic investment because of domestic market distortions in developing countries. Udomkerdmongkol and Morrissey (2008) underline that the improvements in institutional quality may result in a crowding-in of domestic investment, because of improved business climate and more competitive foreign firms over les productive private firms.Finally, the impact of FDI on domestic investment in different countries appears strongly correlated with national FDI promotion policies, particularly filtering policies designed to minimize crowding-out effects that displaces domestic firms or favour new technologies or products that generate

crowding-in effects.

The variety of empirical results found in cross-sectional empirical studies may also stem from the endogeneity of FDI flows (Choe, 2003, Kamaly, 2002), reflecting possible double causality with domestic investment (Ndikumana and Verick, 2008). In their study on the impact of domestic investment on foreign direct investment in developing countries, Marc et al (2012) also found that lagged domestic investment had a strong influence on FDI inflows into the host economy because it acts as a signal of high return on capital for international investors.

The main observation emerging from these studies is that they use total investment as the explained variable. Investment is represented by total gross fixed capital formation which contains both public and private investment. The distinction between the two is important since the impact of FDI on domestic investment may differ for private and public domestic investment (Saglam et al, 2011; Rath et al, 2014), which may follow a different set of determinants, and because interactions between, private, public and international investors are multi-faceted. First, FDI may generate substantial fiscal revenue and improve domestic revenue mobilization either through taxation of the international sector (oil and mining, telecomunications) or revenue generated by infrastructure (Le et al, 2005). Second, the net impact of FDI on public investment may be affected by cooperative or competitive choices by FDI investors and state-owned enterprizes, whith possible strong substitution effects with the private sector. Finally, fiscal policy may affect FDI substancially either through the fiscal costs of FDI promotion policies or business opportunities of large public projects launched by sub-Saharan governements. Infrastructure projects (transport, telecommunications, electricity, civil navigation etc) in particular tend to be intensive in in imports and FDI flows. In this particular case, FDI can also potentially create a crowd-in effect by facilitating public investment (Ang, 2009).

To disentangle the various, and sometimes contradictory effects of FDI on domestic private investment, it may be necessary to disentangle short-term and long-term effects . This is premised on the fact that FDI cycles, especially greenfield but not only, may be implemented over several years and their effects on domestic investment, output and structure may be long-run. Specific crowding-in or -out effects may affect both FDI and private investment in the short-run, if anything, the international or local business cycles, exchange rate instability, changes in investment policy and exchange rate variations and political instability, as demonstrated by the large literature on investment determinants (Bosworth and Collins, 1999; Jude ,2015). The possibility of opposite short and long-run effects of FDI on private investment cannot be excluded.

3 Empirical methodology

3.1 Econometric model

In this section, we present the empirical strategy to be used to answer our research question. The estimation will be made on panel data from 40 sub-Saharan African countries over the period 1980-2013. Using panel data model to examine the relationship between FDI and domestic private investments has several advantages in term of empirical research. First, panel data permit to recover the time dimension unused in the cross-section methodology. It becomes possible to allow each country or group of countries to differ from the others. Traditional panel econometrics usually relies on microeconomic data that typically include thousands of households or hundreds of enterprises (large N), which are surveyed over a few survey rounds (small T). However, this study uses macroeconomic variables that are collected for several African countries over a significant number of years. The use of panel datasets with these characteristics (large N and large T) presents new challenges.

To this end, the study uses error-correction estimators on panel data developed by Pesaran and Smith (1995) and Pesaran et al (1999 and 2001): the Pooled Mean Group (PMG), the Mean Group (MG) and the Dynamic Fixed Effects (DFE). These econometric methods fit with our purposes for two reasons. Firstly, as ARDL (Autoregressive Distributed Lags) which allows to estimate both short and long term coefficients, these methods allow to consider the long-run relationship separately from the short-run adjustment, even if the long and short-term effects are estimated jointly. As we aim to identify and distinguish the short from the long term dynamics between private domestic investment and FDI, these methods seem to be the most adapted. Second, since this family of estimators offers more freedom in the choice of dynamics and the degree of heterogeneity, we can consider possible heterogeneity between countries in our sample.

These methods also takes into account the problems of endogeneity. In our model some variables such as FDI flows may suffer from the endogeneity problem due to double causality measurement errors or a problem of omitted variables. Reverse causality may come from the fact that FDI may influence private domestic investment which in turn may also influence FDI. The fundamental difference between PMG, MG and DFE lies in the constraints imposed on the coefficients. While the PMG method imposes homogeneity on the individual long-term coefficients, the mean group (MG) method imposes no restrictions either on the coefficients or on the estimated variances. The MG assumes perfect heterogeneity between individuals . The estimation is thus performed for each individual separately, and the model coefficients are

unweighted averages over the entire sample. Finally, the dynamic fixed effects estimator (DFE) is very similar to the PMG estimator and imposes restrictions on the slope coefficient and the error deviations must be equal in all countries in the long run. The DFE model further limits the speed of the adjustment coefficient and the short-term coefficients to be equal as well

The basic assumptions for the consistency of these estimators are the following: the existence of a long-term relationship between the dependent and explanatory variables, the error terms are serially uncorrelated and are distributed independently of the regressors. The relative size of T and N is crucial, as the use of these estimators requires that the individual (N) and time (T) dimensions be relatively large.

Formally, let a sample of N individuals observed over T periods, with (N, T). We consider the following ARDL model $(p, q_1, q_2, ..., q_k)$:

$$y_{it} = \sum_{j=1}^{p} \lambda_{it} y_{i,\,t-j} + \sum_{j=0}^{q} \delta'_{ij} X_{i,\,t-j} + \mu_i + \xi_{it} \tag{1}$$

$i = 1, 2..., N; t = 1, 2..., T$

Where y_{it} denotes the format dependent variables (k x 1) and X_{it} a matrix of explanatory variables, μ_i represents the individual fixed effects, λ_{ij} are coefficients assigned to the delayed dependent variables ($y_{i,t-j}$),δ'_{it} are coefficient vectors (k x 1). If the variables in equation (1) are cointegrated, then the equation can be reformulated to obtain a panel error-correction model in which the short-term and long-term dynamics between these variables are clear, as shown in the following equation:

$$\Delta y_{it} = (\phi_i y_{t-1} + \beta'_i X_{it}) + \sum_{j=1}^{p-1} \lambda^*_{ij} y_{i,\,t-j} + \sum_{j=0}^{q-1} \delta^{*\prime}_{ij} X_{i,\,t-j} + \mu_i + \xi_{it} \tag{2}$$

where $\Delta y_{it} = y_{it} - y_{i,t-1}, \phi_i = -(1 - \sum_{j=1}^{p} \lambda_{ij}), \beta_i = \sum_{j=0}^{q} \delta_{ij}, \lambda^*_{ij} = -\sum_{m=j+1}^{p} \lambda_{im},$
$\delta^*_{ij} = -\sum_{m=j+1}^{q} \delta_{im}$

By stacking all the observations for each individual in the panel, equation (2) can be reparameterized and expressed as follows:

$$\Delta y_i = \phi_i y_{i,t-1} + X_i \beta_i + \sum_{j=1}^{p-1} \lambda^*_{ij} \Delta y_{i,-j} + \sum_{j=0}^{q-1} \Delta X_{i,-j} \delta^*_{ij} + \mu_i \tau + \xi_{it} \tag{3}$$

Where $y_i = (y_{i1}, y_{i2}, y_{i3})'$ is a matrix of format (Tx1), $X_i = (X_{i1}, X_{i2}, X_{i3})'$ a matrix of format (Txk) and $\tau = (1, 1, \ldots, 1)'$ a matrix of format (Tx1). The parameter ϕ_i is the error correction speed of the adjustment term. If $\phi_i = 0$, so there is no evidence of a long-term relationship between the dependent variable and the independent variables. Pesaran et al (1998), assume that equation (3) is stable. This hypothesis ensures that $\phi_i < 0$, i.e. that the roots of the operator polynomial $1 - \sum_{j=1}^{p} \lambda_{ij} z^j = 0$ lie outside the unit circle reflecting the existence of a long term relationship between y_{it} and X_{it} defined by:

$$y_{it} = -(\beta_i'/\phi_i)X_{it} + \eta_{it} \tag{4}$$

with η_{it} a stationary process. The long-term coefficient is given by $\theta_i = \beta_i/\phi_i$.

Application : applying this model to our variables, the empirical equation is as follows.

$\Delta PRIVI_{it} = \mu_i + \varphi_t + \lambda_i PRIVI_{i,t-1} + \beta_1 FDI_{it} + \beta_3 PUBI_{it} + \beta_4 INF_{it} + \beta_5 FINDEV_{it} + \beta_6 EXRAT_{it} + \beta_7 DEBT_{it} + \beta_8 EXPDIV_{it} + \beta_9 PRDTY_{it} + \beta_{10} POSTAB_{it} + \beta_{11} COR_{it} + \sum_{j=0}^{q-1} \delta^{*\prime}_{ij} X_{i,\,t-j} + \xi_{it}$ (5)

y_{it}, our dependent variable $PRIVI_{it}$ private investment.
The Matrix $X_{i,\,t-j}$ includes:

- FDI_{it} foreign direct investment net inflows,

- $PUBI_{it}$ public investment,

- INF_{it} inflation,

- $FINDEV_{it}$ financial development,

- $EXRAT_{it}$ real effective exchange rate,

- $DEBT_{it}$ public debt,

- $PRDTY_{it}$ labor productivity,

- $POSTB_{it}$ political instability, and

- $EXPDIV_{it}$ export diversification

- COR_{it} coruption

3.2 Panel stationarity tests

The main problem in panel data, as in time series, is the consequences of regression involving non-stationary and non-cointegrated variables. Given that it is quite rare to find level-stationary macroeconomic series (Nelson and Plosser, 1982), and given that our study uses macroeconomic variables that are collected for several African countries (40) over a significant number of years (33 years), it is very likely that our variables follow a non-stationary unit root process. Unit root tests are therefore a prerequisite for any analysis of the cointegration relationship, especially since the problem of spurious regressions also arises for regressions in panel data. We implement unit root tests of Im, Pesaran Shin -IPS- and Maddala Wu -MW- based on the following regression:

$$\Delta y_{it}^* = \rho_i y_{t-1}^* + \sum_{j=1}^{k} \phi_{i,j} \Delta y_i^*{}_{,t-1} + \zeta_{i,t}^*, i = 1, 2, .., N; t = 1, 2, .., T \tag{6}$$

were $y_{it}^* = y_{it} - \bar{y}_i$. Under the null hypothesis, the time series are non-stationary, whereas the alternative assumes the opposite. The assumptions can be written as follows:

H_0 :ρ_i= 0 for all i

H_1:$\rho_i < 1$ for atleast one i, i= 1,2,..,N_1;$\rho_i = 0$; $i = N_1 + 1, N_1 + 2, .., N$.

3.3 Panel cointegration tests.

PMG, MG and DFE estimators that we use for our study requires the variables to be cointegrated. The cointegration analysis allows us to identify one or more long term relationships between at least two variables. The concept of cointegration stipulates that at least two variables are involved in a long term equilibrium relationship and that any imbalance in this relationship generates a correction mechanism by which one or more variables adjust to restore the long term equilibrium. We use Kao's test based on the following long-run relationship :

$$y_{i,t} = \theta_i + \alpha_i^1 x_{i,t}^1 + ... + \alpha_i^m x_{i,t}^m + ... + \alpha_i^M x_{i,t}^M + \zeta_{i,t}. \tag{7}$$

i=1,....,N ; t=1,....,T ; m=1,....,M. $E(\zeta_{i,t}, \zeta_{j,t}') = \sigma_\zeta^2$ if i=j and 0 if i$\neq$ j.

The estimated residuals are represented as follows:

$$\zeta_{i,t} = \rho_i \zeta_{i,t-1} + \mu_{i,t} \tag{8}$$

The null hypothesis that there is no cointegration between the variables is given by: $H_0 : \rho_i = \rho = 1$.

4 Data

The data used in this study were mainly collected from the Investment capital stock database of the International Monetary Fund (IMF), the World Development Indicators (WDI) database of the World Bank and the United Nations Conference on Trade and Development (UNCTAD). Additional sources for the database are from Policy IV and the Penn World Table. A major effort has been made to construct a balanced panel for the 40 African countries covering the period 1980-2013, excluding countries with insufficient data (Eritrea, Somalia, Seychelles, Southern Sudan, Liberia, Gambia, Democratic Republic of Congo, Djibouti, Liberia). We use domestic private investment as dependent variable as measured by domestic private sector gross fixed capital formation (as a % of GDP) and FDI is our variable of interest and is measured as flows in percentage of GDP. We selected 8 explanatory variables supported by strong theoretical foundations and empirical evidence. First, particular attention is paid to the impact of public investment on private investment in our model specification. Public investment in infrastructure provision for transport, communication, energy, and human capital complements private investment. But it may also crowd it out if it competes with private sector investment, or if public spending is financed by a deficit, raising interest rates and the cost of capital for the private sector. This relationship between these two variables is ambiguous.

Particular attention has also been paid to macroeconomic stability approximated by inflation, public debt and real effective exchange rates. inflation is generally perceived as a variable that increases the cost of capital, which in turn reduces its accumulation. However, other models such as Tobin-Mundell's argue that higher expected inflation lowers the real interest rate, which can potentially increase real investment (Ghura and Goodwin, 2000). The effect of real effective exchange rate on private investment, may also be ambiguous (Jongwanich and Kohpaiboon, 2008; Ndikumana and Verick 2008). We expect public debt (as a percentage of GDP) to discourage private investment.

The other control variables are financial development, productivity, political stability , economic diversification corruption. Domestic credit to the private sector as a percentage of GDP is used as a proxy to measure financial development. More credit to the private sector and high access to final services should encourage private investment (Ajide and Lawanson, 2012). We approximate productivity by labor productivity. In the Schumpeterian views, productivity is a key variable

for private investment, as it is a key factor of firm competitiveness. Innovation in processes, for example, provides productivity gains that will be reflected in prices. Thus, firms are likely to sell their products cheaper and gain market share, which in turn will increase their incentives to invest.

As proxies for institutional quality, we use political instability (Policy IV index) and the corruption perception index (as measured by Transparency international). We also took into account the level of economic diversification, proxies by the export diversification index. As shown by the literature review on economic diversification , in partical the development of manufacturing sector due to diversification may be a source of investment growth.

Because of the lack of detailed data on FDI and GDP decompositions by economic sector, we used the sectoral decomposition of GDP into agricultural, industry and services from the WDI database to control for well-established differentiated impacts on private investment and explore possible sectoral variations of the FDI impact on private investment. To this end we use manufacturing, services and agricultural value added (as a percentage of GDP) that we interact with the FDI in order to measure such sectoral effects.

The following table summarizes all the variables with their sources.

Table 1: summary of varibales

Variables	Sources	Expected sign
FDI inflows (FDI)	UNCTAD	+/-
Private investment (PRIVI)	IMF	
Public investment(PUBI)	IMF	+/-
Inflation (INF)	IMF	-
Exchange rate(EXRAT)	IMF	+/-
Political instability (POSTAB)	Policy IV	-
Productivity (PRDTY)	Penn World Table	+
Financial developement (FINDEV)	WDI World Bank	+
Debt (DEBT)	WDI World Bank	+/-
Export diversification	WDI World Bank	+
Manufacturing value added	WDI World Bank	+
Services value added	WDI World Bank	+
Agricultural value added	WDI World Bank	-
Corruption	Transparency international	-

Source: authors

Table 2: summary of descriptive statistics

| VARIABLES	N	mean	sd	min	max
FDI	1,298	2.459	5.181	-14.53	72.79
PRIVI	1,354	10.96	7.848	0.128	49.26
PUBI	1,320	6.092	4.933	0.00628	51.38
INF	1,291	48.32	691.8	-72.73	23,773
EXRAT	1,320	133.8	114.5	28.50	1,954
POSTAB	1,310	0.692	1.615	0	10
PRDTY	1,320	0.256	0.298	0.0203	1.876
FINDEV	1,187	14.53	12.53	0.403	106.3
DEBT	1,245	51.53	41.67	0	306.0
EXPDIV	1,072	4.414	0.965	1.784	5.953
MAFVA	1,059	11.25	6.116	0.232	31.21
SERVA	1,097	44.60	24.700	18.909	77.20
AGRVA	1,202	22.44	14.099	1.828	71.76
COR	438	28.75	9.001	10	60

Source: authors calculation from database.

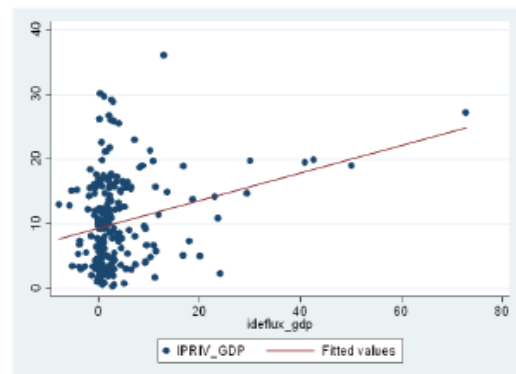**Figure 5 : correlation between FDI, domestic private and public investment**
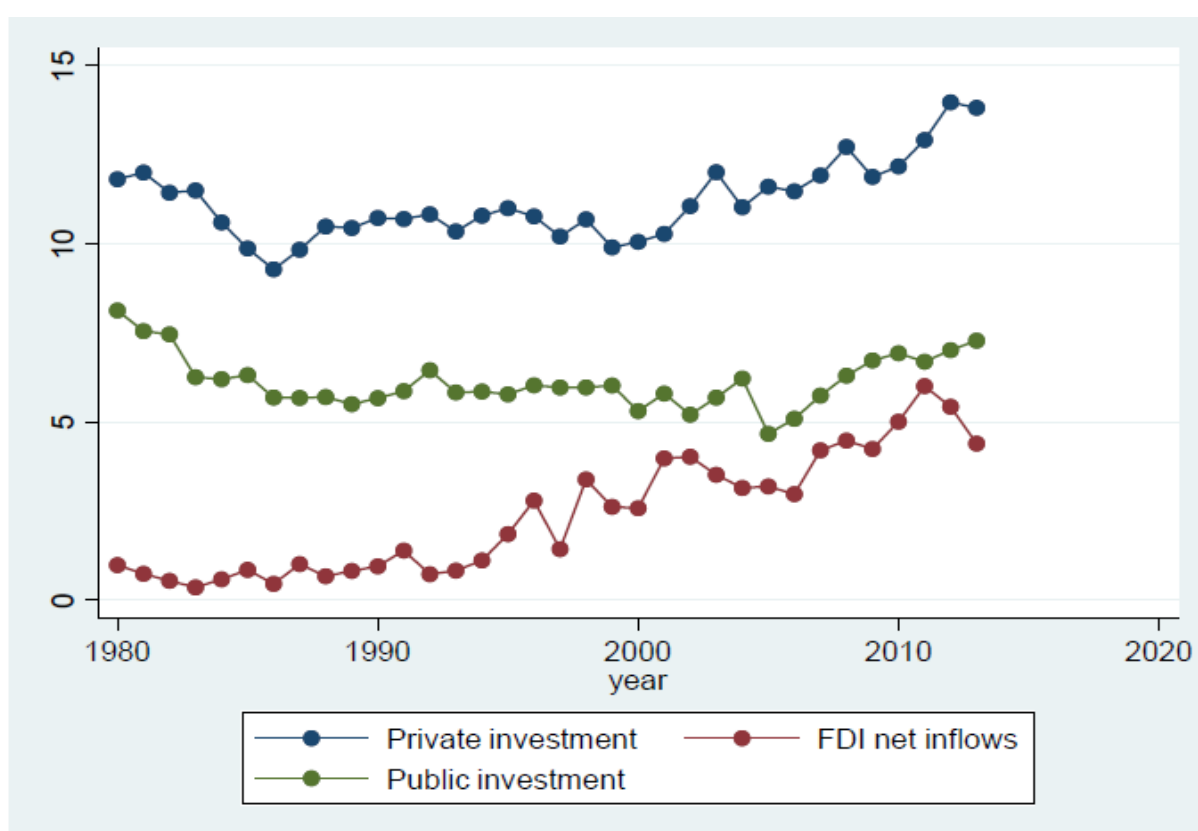
Sources: IMF investment capital stock data, UNTCAD

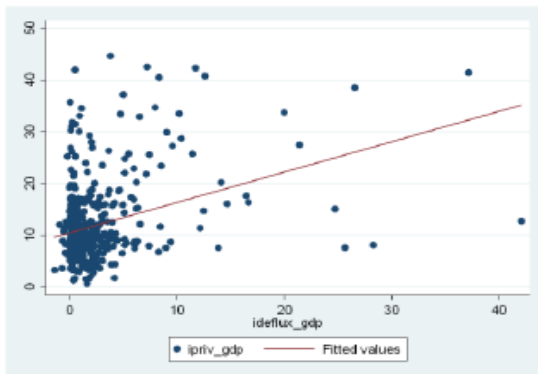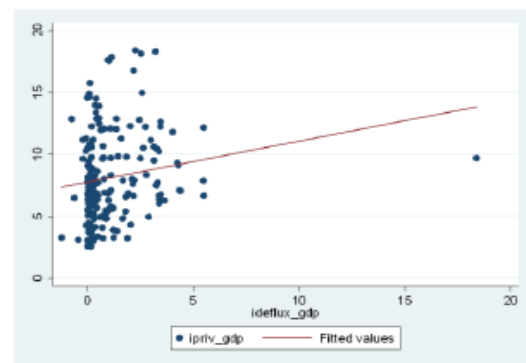**Figure 6 : correlation between FDI and domestic private investment**
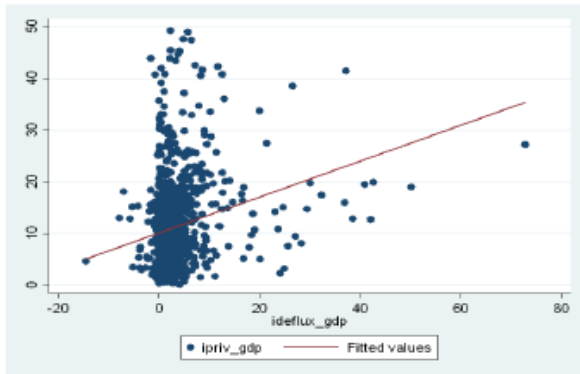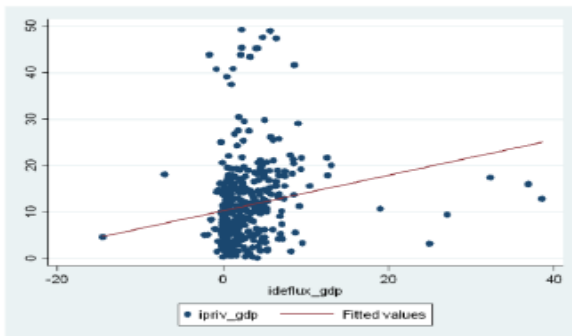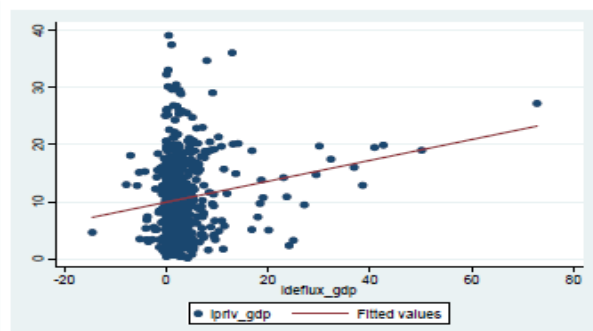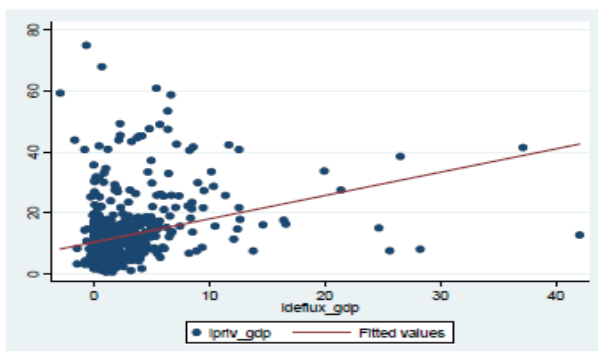
Sources :IMF investment capital stock data, UNTCAD

The above graphs show the relationship between FDI and private domestic investment for the full sample of Sub-Saharan African countries as well as different sub-regions. From these graphs we observe a positive correlation between our two variables of interest for SSA as a whole and all sub-regions.

5   Empirical results

5.1   Stationarity and cointegration test results

Tables 3 and 4 provide results of IPS(1997)'s stationarity test and Kao's cointegration test, respectively. IPS test shows that the variables private investment (PRIVI), FDI flows (FDI), public investment (PUBI), inflation (INF), exchange rates (EXRAT), political instability (POSTAB) are stationary in level. Variables financial development (FINDEV), productivity (PRDTY), debt (DEBT), export diversification (EXPDIV), Corruption(COR) are stationary in first difference. Stationarity of our variables prevents us from having biased results due to spurious regression. Output of Kao cointegration reports values of all test statistics with their respective p-values. All test statistics reject the null hypothesis of no cointegration in favour of the alternative hypothesis of the existence of a cointegrating relation among the variable. A cointegration of variables allow us to identify the long-term dynamics that we are seeking to highlight in this study.

Table 3 : panel unit root test: IPS (1997)

Variables	Level		First difference	
	No trend	trend	No trend	trend
PRIVI	-2.13	-2.64	-	-
FDI	-3.16	-3.97	-	-
PUBI	-2.41	-2.96	-	-
INF	-4.57	-4.56	-	-
FINDEV	-1.56	-2.14	-5.51	-5.58
EXRAT	-2.25	-2.40	-	-
DEBT	-1.30	-1.57	-4.76	-5.00
PRDTY	-1.36	-2.10	-6.54	-6.88
POSTAB	-2.67	-3.66	-	-
EXPDIV	-1.69	-2.57	-2.57	-6.50
PRIVI	-2.13	-2.64	-	-
COR	-3.12	-2.73	-	-

These value are compared to the following criticale value :no trend a 1% (-1.81), 5% (-1.73), 10% (-1.68).

With trend at 1% (-2.44), 5% (-2.36), 10% (-2.32). These critical values are available in IPS 1997.

Table 4 : panel cointegration test: Kao test.

	Statistics	P-value
Modified Dickey-Fuller t	-3.8314	0.0000
Dickey-Fuller t	-3.7975	0.0001
Augmented Dickey-Fuller t	-3.0321	0.0012
Unadjusted modified Dickey-Fuller t	-7.5785	0.0000
Unadjusted Dickey-Fuller t	-5.3720	0.0000

5.2 Results analysis

5.2.1 Diverging impact on the short term and the long term

Table 5 contains results of PMG, MG and DFE estimates and Hausman's test to measure comparative effectiveness and consistency between them. The Hausman's test indicates that the PMG estimation is the most efficient estimator and we will use and discuss this estimation technique in the rest of the paper. MG and DFE estimations were also carried out and available upon request. Our findings underline clear differences between short-term and long-term effects. We find that short-term dynamics are complex: the impact of FDI on private investment is always negative, but sometimes non significant. Long-term dynamics are much clearer, with consistently significant positive effects on private investment.

Our baseline results in table 6 (column 1) confirm the importance of macroeconomic stability and the quality of the institutional framework as determinants of private investment in developing countries. In the short term, a high rate of inflation and an appreciation of the currency have a positive effect on domestic investment, mainly reflecting cyclical effects. Financial development and productivity have a positive effect on domestic investment, as well as export diversification, while high public debt and corruption discourage it.

In the long term, inflation deters public investment, as well as the accumulation of public debt, in line with theory. This stems from the crowding-out effect of public investment, since public investment in developing countries is for a large part financed by public debt, given limited fiscal resources mobilization. This confirms theoretical predictions that an excessive accumulation of budget deficits can have a negative impact on private investment by pushing up interest rates. We still observe the positive effect of financial development, productivity and export diversification. Corruption also deters private investment by increasing the cost of economic operations and by creating economic distortions. The development of the financial system, enhances private domestic investment. As expected productivity has strongly positive effect on private investment as it plays an important role in the investment decisions of entrepreneurs , specialy in developing economies with more labor-intensive and less capital-and innovation-

16

intensive sectors than advanced economies.

When it comes to the impact of foreign direct investment, our results indicate that it has a highly significant crowding in effect on domestic investment in long term and a weakly crowding out effect in the short term. Our results are consistent with the findings of Agosin and Mayer (2000) for Asian countries in particular, with the only difference that in this case we use private domestic investment rather than total domestic investment. These results are also consistent with the findings of De Mello (1999) and Borensztein et al. (1998) for groups of developing countries in Latin America and Asia.

In the short term however, the ability of the private sector to adapt to FDI inflows may be slowed down by low human capital accumulation, market distortions, infrastructure bottlenecks and less favourable business climates found in sub-Saharan African economies. These weaknesses may limit the capacity of local firms to adapt and face competition from incoming foreign invest-ment in the short run, inducing temporary negative effects on private investment. These lags may depend on critical abilities :

1. Innovation capacity to create and rapidly adopt new technologies introduced by foreign direct investment in certain sectors,

2. trade efficiency, to promote efficient and flexible allocation of resources between sectors and firms,

3. human capital endowment and training to rapidly disseminate new technologies throughout the economy and develop the capacity of the workforce to assimilate them.

This long-term crowding-in effects of FDI on private investment are in line with empirical findings for developing countries such as Kottaridi and Stengos (2007).This literature highlights that FDI inflows may only enhance private investment beyond a threshold of absorptive capacity in terms of human capital. Some sub-Saharan African countries with low levels of human capi-tal, notably because of a deficit in infrastructure, may show lower absorptive capacity and the expected benefits of FDI on local firms may take some time to emerge. The insufficiency of FDI flows in key sectors of the economies and their concentration in extraction sectors also plays a role. Finally, the impact of FDI on private investment may be reduced and lagged when it focuses on sectors with weak interconnections with other economic activities. Our results therefore show that there are complementary features between foreign direct investment and domestic private investment in sub-Saharan African countries. FDI flows to these countries strengthen domestic private investment through an improvement in organization and management skills, marketing

know-how and market access. Also, through the introduction of more advanced production technologies as well as improved competition that encourages innovation.

5.2.2 FDI public investments compositional effects

In the baseline, we find that public investment has opposite effects on domestic private investment in the short and long-run. In the short run, public investment may have significant procyclical impact, creating business opportunities for the private sector in times of economic growth. It affects private investment negatively in the long run, in so far as it is associated with higher fiscal deficits and higher public debt. These imbalances may exert an upward pressure on interest rates, increase expectations of future tax increases and risks associated with financial instability. In countries with strong interactions between the public and the banking sectors (sovereign- bank nexus), as well as significant information asymmetries between borrowers and creditors, high fiscal deficits and levels of public debt may also limit available financing for the private sector. We then interacted public investment with foreign direct investment to create composition effects impacting domestic private investment (see column 2 of table 6). Interestingly, we find a crowding-in effect in the long run, reflecting a positive impact of these composition effects on domestic private investment. This result also shows up in the short time estimation (see column 2 table 6). Several studies based on geographical economics and endogenous growth theory also show that the combination between the stock of public infrastructure and FDI can potentially create agglomeration effects and inter-firm externalities that stimulate domestic investment (Kinda, 2007; Barro, 1990; Rieber, 1999). A large number of countries in sub-Saharan Africa welcome foreign participation in their public investments, particularly in the financing and provision of infrastructure services (World investment report, 2016). Increasing pressures on public budgets and general concern about the quality of services provided by operating entities have led to an explosion of FDI in infrastructure in these countries. These FDI inflows target sectors that traditionally were devoted to the public sector and large state-owned enterprises to provide infrastructure such as seaports and airports, telecommunications, electricity, railways, roads, urban infrastructure, industrial parks, mining, etc.

We also explored the relationship between national economic structure and private investment and possible FDI impacts by controlling by both exports diversification and sectoral decompositions of GDP, which provide complementary insights on economic diversification. As posited in the literature, our estimations in column (1) provide some evidence that private investment is boosted by exports diversification. More decisively, the positive impact of FDI on private

investment is significantly enhanced by export diversification, confirming the importance of FDI diversification itself to reap cross-sectoral benefits .

In column (3) table 6 , we further investigate the impact of currency appreciation, with an interaction between FDI and effective exchange rate which confirm a "Dutch disease" effect as highlighted by Cordon and Neary (1982) and a worsening of terms of trade as stated by Apergis et al. (2006).

In column (4) table 6, interacting FDI with sectoral decompositions provides more detailed evidence of the effects of economic diversification: the impact of FDI is magnified when the share of the secondary sector (industry) and tertiary sectors (services) increase in GDP. Given data limitation on sectoral FDI, we cannot conclude on the impact of FDI diversification itself, but these results are consistent with literature streams linking economic diversification, investment and economic growth. Symmetrically, FDI in less diversified countries (dependent on commodity output and exports in resource rich countries), may provide less private investment and economic diversification opportunities, consistently with empirical work on oil curse (World investment repport , 2018 ; Cordon and Neary, 1982) .

6   Robustness checks

We investigate whether our results are robust to a split of sample by singling out commodity exporting countries, and withdrawing outliers' nations, and to a different period span by examining the effect of the 2008's financial crisis. We concentrate on the long term results.

In table 7, we examine the extent to which our baseline results vary with the size of the economies and the level of natural resource exports from countries by re-estimating the model for the sample of "big" and "small" economies on the one hand and of natural resource-exporting and non-natural resource-exporting countries on the other hand. Securing the supply of raw materials and other natural resources has been recognized as an important objective of foreign direct investment from multinational firms. For these types of resource-seeking or rent-seeking FDI, a very weak correlation with domestic investment is to be expected. Moreover, the literature on the Dutch disease and the resource "curse" also shows that the abundance of natural resources limits the ability of foreign direct investment to stimulate domestic investment. To capture this type of economic structure, we introduced an export structure threshold in our sample: we classify countries where manufactured exports account for less than 25 per cent of total exports as resource-rich economies.

Crowding-in effects of FDI are significantly higher in non-natural resource-exporting countries

than in resource-exporting countries under long-run, shows from the comparisons of columns (2) and (3) in table 7.

As for the interaction of FDI with the export diversification index, we consistently find a long-term crowding-in effect. However this impact is more important for non-natural resource exporting countries compared to natural resource exporting countries. This result reflects the fact that the level of diversification of economies conditions the magnitude of the impact of FDI on domestic private investment in sub-Saharan African countries. As natural resource-exporting countries are relatively more concentrated and less diversified than non resource-exporting countries in sub-Saharan Africa (World investment report, 2018), FDI in these countries tends to be concentrated in resource-exporting sectors and spread very little across the economy and therefore has a low probability of having a strong impact on domestic private investment. In countries that do not export natural resources, FDIs tend to be spread over several sectors and therefore have a high probability of impacting the activity of local firms.

When it comes to the long run interaction of FDI with the real effective exchange rate, we consistently find a negative interaction term suggesting that Exchange rate appreciation reduces the positive impact of FDI inflows on private investment in the long run for both natural resource-exporting and non-natural resource-exporting countries.

As some countries may potentially be outliers (Angola, Ethiopia, Kenya, Nigeria, and South Africa), we have excluded them to test the sensitivity of our results. In the sub-Saharan Africa region, about 60% of FDI inflows in the region goes to natural resource producing countries and large market size countries. Some of the countries in our sample are important resource producers and have relatively large market sizes, and can therefore be outliers in terms of attracting FDI and also domestic private investment. Column (1) contains the results obtained for the baseline sample without Nigeria, South Africa, Angola, Ethiopia, Kenya. Column (4) contains the results obtained for natural resource exporting countries without Nigeria, Angola which are the two largest oil producers in Sub-Saharan Africa. Column (5) contains the results for non resource exporting countries without South Africa, Ethiopia which have large market sizes. All sub sample estimations confirmed results found in our baseline model

In table 8, we test the robustness of our results in different sub-periods of time. Since 2008 global economic crisis induced major shocks to economies. We investigate whether the crisis has impacted the relationship between FDI and domestic private investment. In 2008, international investment experimented a sharp slowdown. More precisely, the decline in global FDI resulted from two major factors affecting domestic and international private investment:

1. The reduced ability of multinational firms to invest because of constraints on access to financial resources;

2. a decreasing propensity to invest in developed countries, source economies of FDI inflows towards developing countries.

So, we devided our sample into two sub-periods from 1980-2007 (pre-crisis) and 2007-2013 (post-crisis). Since our estimators require a relatively long time period, we considered 1980-2007 and excluded the post-crisis period 2007-2013. Our results are robust to this specification, for the whole sample of countries (column 1), as well as for natural resources exporting economies (column 2) and nations which do not export these commodities (column 3).

7   Conclusion and policy recommendation.

This paper investigates whether the FDI inflows to sub-Saharan countries lead to crowding-in or crowding-out effects on private domestic investment, based on PMG, MG and DFE estimations on a panel of 40 countries over the period 1980 - 2013. Our results bring to light that FDI inflows has substantial crowding-out effects in the long run: a 1% increase in FDI is associated with a %1 increase in private domestic investment. In the short –run, we find weak evidence that FDI inflows have crowding-out effects, because of short-run adverse domestic dynamics. Our study also strives to disentangle effects of FDI on private and public domestic investment. Our estimations show that FDI combined with higher public investment may enhance private domestic investment in the long run. Such positive composition effects may however be undermined by crowding-out effects from higher fiscal deficits and debt, as well as by political instability and corruption. We also find weak evidence that crowding out effects of real effective exchange rate appreciation may be exacerbated by FDI inflows.

Finally, this research highlights the importance of economic diversification and resource endowments to assess the impact of FDI on private investment. Using an export diversification index, we find weak evidence that such diversification has a positive effect on private investment, particularly if it is associated with FDI inflows. When interacting FDI with the share of manufacturing and services, we also find that the effect of FDI inflows is larger if it focuses on secondary and tertiary sectors that contribute to economic diversification. To establish robustness of our findings, we checked that the positive impact of FDI on private investment is significantly higher in non-resource exporting diversified countries than in resource exporting countries. This is in line with literature concerns on the impact of FDI in enclaved sectors, such as the extractive

sector (oil curse), on economic development.

These findings lead us to qualify the conditions of success for investment promotion policies commonly led in sub-Saharan countries. First, such policies will likely to be more efficient if they are conducted consistently over the long run with a view to favor economic diversification. Such policies need to maximize spillover effects and intra and inter sector connections between FDI and domestic private investment over the long run. This is particularly important in the case of highly concentrated resource-exporting sectors where FDI crowding-in effects on private investment are more limited. National FDI strategies should therefore be based on specific country characteristics (natural resources, labor and capital endowments, type of FDI), as well as Sustainable Development Goals).

Second, such policies should go hand in hand with fiscal policies that limit potential crowding-out effects arising from high fiscal deficits and debts. Reallocating public spending in favor of high-yield public investment (e.g. reducing infrastructure bottlenecks) and leveraging scarce public resources partnerships with the private and international investors are also key. Such promotion policies should also be enabled by structural reforms aiming at improving the business climate for both foreign and domestic investors. Our results also show that financial depth and inclusiveness are essential to support domestic investment. The financial sector may play an essential role in channeling international financing and direct investment to support domestic investment and economic growth.

Finally, further research is clearly needed on the dynamics between FDI, public and private investment, particularly in the current context. Both digitalization and the Covid crisis represent challenges to the current globalization process and may result in trade relocation or regionalization, with possible structural breaks in associated FDI and private investment patterns . This question could be deepened by further studies that take into account the geographical origin of FDI (Asia, Europe, or on the contrary neighbouring countries) to better assess the long-term impact of FDI on private investment levels.

Table 5: comparison of estimations with the three estimators, in long an short period, for all sample

Variables	PMG	MG	DFE
Long term coefficients			
FDI inflows	0.308***	0.347***	0.408***
	(0.0542)	(0.0813)	(0.0730)
Public investment	- 0.120**	-0.104*	- 0.099*
	(0.0462)	(0.0573)	(0.0517)
Financial development	0.404**	0.385***	0.289***
	(0.1469)	(0.0716)	(0.1028)
Inflation	-0.107*	-0.086	-0.078
	(0.0384)	(0.0716)	(0.1162)
Productivity	0.454***	0.352***	0.478***
	(0.0901)	(0.1356)	(0.9917)
Debt	-0.167*	-0.136	-0.098
	(0.0860)	(0.0553)	(0.1163)
Political instability	-0.181**	-0.246***	-0.183**
	(0.0659)	(0.0561)	(0.0465)
Exchange rate	-0.082*	-0.094	-0.076
	(0.0360)	(0.1029)	(0.1320)
Corruption	-0.099*	-0.105	0.0195
	(0.0536)	(0.0578)	(0.0409)
Exports diversification	0.059*	0.075	0.0485
	(0.0350)	(0.0853)	(0.0394)
Error correction term	-0.203***	-0.289***	-0.190***
	(0.0532)	(0.0518)	(0.0436)
Short term coefficients			
Δ FDI inflows	-0.103*	-0.089	-0.071
	(0.0546)	(0.1813)	(0.057)
Δ Public investment	0.287**	-0.196*	-0.133**
	(0.1192)	(0.0832)	(0.048)
Δ Financial development	0.208**	0.276*	0.223***
	(0.1019)	(0.1430)	(0.0518)
Δ Inflation	0.096*	0.087*	-0.079*
	(0.0494)	(0.0302)	(0.041)
Δ Productivity	0.291***	0.229***	0.369***
	(0.0901)	(0.0586)	(0.8217)
Δ Debt	0.069*	-0.086	-0.056
	(0.0363)	(0.090)	(0.076)
Δ Political instability	-0.123***	-0.295***	-0.209***
	(0.0351)	(0.064)	(0.0526)
Δ Exchange rate	0.052*	0.105*	0.36
	(0.025)	(0.056)	(0.059)
Δ Corruption	-0.090	-0.062	-0.044
	(0.0696)	(0.068)	(0.0593)
Δ Exports diversification	0.065	0.096	0.044
	(0.0465)	(0.0765)	(0.053)
Constant	2.301***	2.516***	1.935***
	(0.5124)	(0.5036)	(0.4032)
Observations	1360	1360	1360
Hausman test	0.014	0.014	0.023
Country number	40	40	40

Standard errors in parentheses ;*** p<0.01, ** p<0.05, * p<0.1

Table 6 : estimation with PMG for the all sample and in the long run (Baseline results)

Variables	(1)	(2)	(3)	(4)
Long term coefficients				
FDI inflows	0.308 ***	0.312***	0.307***	0.310***
	(0.0542)	(0.0538)	(0.0525)	(0.0654)
Public investment	-0.120**	-0.115**	-0.114**	-0.102**
	(0.0462)	(0.0473)	(0.0469)	(0.0428)
Financial development	0.404**	0.398**	0.379**	0.382**
	(0.1469)	(0.1411)	(0.1429)	(0.1318)
Inflation	-0.107*	-0.099*	-0.109*	-0.096*
	(0.0384)	(0.0523)	(0.0392)	(0.0508)
Productivity	0.454***	0.497***	0.489***	0.585***
	(0.0901)	(0.0913)	(0.0921)	(0.1186)
Debt	-0.167*	-0.189*	-0.171*	-0.118*
	(0.0860)	(0.0994)	(0.0901)	(0.0628)
Political instability	-0.181***	-0.201***	-0.190***	-0.196**
	(0.0659)	(0.0568)	(0.0543)	(0.0736)
Exchange rate	-0.082*	-0.090*	-0.099*	-0.076
	(0.0360)	(0.0360)	(0.0523)	(0.0634)
Exports diversification	0.059**	0.057*	0.064*	0.071
	(0.0307)	(0.0301)	(0.0336)	(0.1305)
Corruption	-0.099*	-0.094*	-0.086*	-0.093
	(0.0536)	(0.0512)	(0.0456)	(0.0715)
FDI*public invest		0.210***	0.205***	0.256***
		(0.0428)	(0.0435)	(0.0533)
FDI*exports divers		0.379***	0.368***	0.408***
		(0.0982)	(0.0969)	(0.0890)
FDI*exchange rate			-0.089*	0.0785*
			(0.0464)	(0.0413)
Manufacturing VA*FDI				0.118***
				(0.0298)
Service VA*FDI				0.199***
				(0.0539)
Agriculture VA*FDI				0.065*
				(0.0341)
Error correction term	-0.203***	-0.215**	-0.219***	-0.0189***
	(0.0532)	(0.0589)	(0.0565)	(0.0496)
Short term coefficients	-0.103*	-0.097*	0.101*	-0.086*
Δ FDI inflows				
	(0.0546)	(0.0513)	(0.0531)	(0.0455)
Δ Public investment	0.287**	0.209**	0.217**	0.201**
	(0.1192)	(0.0779)	(0.0775)	(0.0731)
Δ Financial development	0.208**	0.216**	0.209**	0.219**
	(0.1019)	(0.084)	(0.0728)	(0.0782)
Δ Inflation	0.096*	0.079*	0.089*	0.090*
	(0.0494)	(0.0417)	(0.0468)	(0.0462)
Δ Productivity	0.291***	0.306***	0.310***	0.300***
	(0.0901)	(0.0762)	(0.0771)	(0.0789)
Δ Debt	0.069*	0.047	0.056	0.081
	(0.0363)	(0.039)	(0.0416)	(0.0634)
Δ Political instability	-0.123***	-0.213***	-0.209***	-0.207***
	(0.0351)	(0.0572)	(0.0526)	(0.0530)
Δ Exchange rate	0.052*	0.055	0.049	0.073
	(0.025)	(0.0465)	(0.0410)	(0.059)
Δ Exports diversivication	0.065	0.083*	0.079*	0.048
	(0.0465)	(0.0436)	(0.0412)	(0.0457)
Δ Corruption	-0.090	-0.079	-0.083	-0.069
	(0.0696)	(0.065)	(0.0683)	(0.0571)
Δ FDI*public invest		0.273***	0.269***	0.290***
		(0.0682)	(0.0671)	(0.0691)
Δ FDI*exports divers		0.289***	0.279***	0.287***
		(0.0721)	(0.0734)	(0.0735)
Δ FDI*exchange rate			-0.065*	-0.076*
			(0.0342)	(0.0401)
Δ Manufacturing VA*FDI				0.068*
				(0.0350)
Δ Service VA*FDI				0.091*
				(0.0478)
Δ Agriculture VA*FDI				0.045
				(0.048)
Constant	2.301***	2.519***	2.405***	2.568***
	(0.5124)	(0.5412)	(0.6124)	(0.6031)
Observations	1360	1360	1360	1360
Country number	40	40	40	40

Standard errors in parentheses ;*** p<0.01, ** p<0.05, * p<0.1

Table 7: results for natural and non natural ressources exporting countries and results without

Nigeria, South Africa, Angola, Ethiopia, Kenya

Variables	(1)	(2)	(3)	(4)	(5)
Long term coefficients					
FDI inflows	0.311***	0.431***	1.325***	0.419***	1.126***
	(0.0691)	(0.0941)	(0.2201)	(0.0910)	(0.2502)
Public investment	-0.097**	-0.103**	-0.089 *	-0.100**	-0.080*
	(0.0375)	(0.0371)	(0.0471)	(0.0341)	(0.0421)
Financial development	0.206***	0.302**	0.298***	0.295***	0.296***
	(0.0528)	(0.1123)	(0.1163)	(0.0653)	(0.0641)
Inflation	-0.098*	-0.258*	-0.079	-0.249*	-0.073
	(0.0515)	(0.1431)	(0.068)	(0.1310)	(0.0590)
Productivity	0.413***	0.453***	0.499***	0.417***	0.480***
	(0.1032)	(0.0981)	(0.1203)	(0.0922)	(0.0979)
Debt	-0.153*	-0.201**	-0.048	-0.198**	-0.069
	(0.0800)	(0.0763)	(0.5231)	(0.0710)	(0.0762)
Political instability	-0.315***	-0.190***	-0.257***	-0.181***	-0.259***
	(0.078)	(0.0681)	(0.1034)	(0.0476)	(0.0573)
Exchange rate	-0.076*	-0.083*	-0.099*	-0.072*	-0.088
	(0.0410)	(0.0311)	(0.0503)	(0.0371)	(0.0910)
Corruption	-0.045	-0.183*	-0.092	-0.086	-0.089
	(0.0532)	(0.0693)	(0.0731)	(0.069)	(0.0741)
Exports diversivication	0.070*	0.103*	0.201*	0.138*	0.204*
	(0.0372)	(0.0431)	(0.1031)	(0.0720)	(0.1070)
FDI*publique ivest	0.294***	0.356***	0.152***	0.345***	0.150***
	(0.0739)	(0.0901)	(0.038)	(0.0763)	(0.035)
FDI*exports divers	0.253***				
	(0.068)				
FDI*exchange rate	-0.079*	-0.060	-0.070*	-0.067	-0.049
	(0.0410)	(0.0481)	(0.0371)	(0.0541)	(0.0398)
Manufacturing VA*FDI					
Service VA*FDI					
Agricultural VA*FDI					
Error correction term	-0.245***	-0.283***	-0.236***	-0.263**	-0.302***
	(0.049)	(0.061)	(0.0592)	(0.0674)	(0.075)
Short term coefficients					
Δ FDI inflows	-0.090*	-0.042	-0.119*	-0.039	-0.108*
	(0.0483)	(0.0353)	(0.0629)	(0.0910)	(0.0568)
Δ Public investment	0.228**	0.180**	0.107**	0.175**	0.110**
	(0.0848)	(0.0642)	(0.0396)	(0.0642)	(0.0384)
Δ Financial development	0.198**	0.276**	0.305***	0.260***	0.299***
	(0.0725)	(0.0956)	(0.0835)	(0.0105)	(0.0826)
Δ Inflation	0.092*	0.076	0.039*	0.065	0.042*
	(0.0483)	(0.0962)	(0.0204)	(0.0581)	(0.0223)
Δ Productivity	0.273***	0.351***	0.269***	0.349***	0.273***
	(0.0593)	(0.0902)	(0.0727)	(0.0873)	(0.0760)
Δ Debt	0.069*	0.056	0.032*	0.054	0.030*
	(0.0363)	(0.0583)	(0.0169)	(0.0570)	(0.0157)
Δ Political instability	-0.119***	-0.175***	-0.201***	-0.178***	-0.205***
	(0.0276)	(0.0481)	(0.0467)	(0.0501)	(0.0523)
Δ Exchange rate	0.045*	0.077*	0.082	0.073*	0.085
	(0.0236)	(0.0411)	(0.0684)	(0.0394)	(0.0708)
Δ Corruption	-0.059	-0.079*	-0.093	-0.070*	-0.090
	(0.0655)	(0.0417)	(0.0715)	(0.0415)	(0.0752)
Δ Exports diversivication	0.079	0.056	0.061	0.049	0.063
	(0.0658)	(0.0583)	(0.0508)	(0.0576)	(0.0525)
Δ FDI*public invest	0.239**	0.227**	0.109**	0.218**	0.112**
	(0.0873)	(0.07842)	(0.0406)	(0.0889)	(0.0419)
Δ FDI*exports divers	0.199**				
	(0.0798)				
Δ FDI*exchange rate	-0.046*	-0.082*	-0.060	-0.075*	-0.057
	(0.0243)	(0.0424)	(0.0701)	(0.0395)	(0.0518)
Δ Manufacturing VA*FDI					
Δ Service VA*FDI					
Δ Agriculture VA*FDI					
Constant	2.573***	2.463***	2.651***	2.523***	2.483***
	(0.3678)	(0.4647)	(0.5412)	(0.4106)	(0.3998)

Table 8: results before 2008's economic crisis (1980-2007)

Variables	(1)	(2)	(3)
Long term coefficients			
FDI inflows	0.278***	0.368***	0.927***
	(0.0591)	(0.092)	(0.231)
Public investment	-0.089*	-0.189**	-0.099**
	(0.0470)	(0.0736)	(0.0341)
Financial development	0.203***	0.287***	0.203**
	(0.0821)	(0.0723)	(0.0532)
Inflation	-0.103*	-0.096*	-0.101*
	(0.0521)	(0.0527)	(0.0529)
Productivity	0.598***	0.583***	0.477***
	(0.1032)	(0.1290)	(0.1032)
Debt	-0.167*	-0.053*	-0.089*
	(0.0441)	(0.0271)	(0.0461)
Political instability	-0.486***	-0.286***	-0.218***
	(0.097)	(0.0715)	(0.0503)
Exchange rate	-0.090*	-0.0723	-0.049
	(0.0470)	(0.01261)	(0.039)
Corruption	-0.078*	-0.069*	-0.106*
	(0.0421)	(0.036)	(0.0591)
Exports diversivication	0.060*	0.189*	0.090*
	(0.0310)	(0.0712)	(0.047)
FDI*publique ivest	0.286***	0.269***	0.213***
	(0.0732)	(0.0756)	(0.056)
FDI*exports divers	0.289***		
	(0.0831)		
FDI*exchange rate	-0.043*	-0.056*	-0.049
	(0.0226)	(0.0291)	(0.0398)
Manufacture VA*FDI			
Service VA*FDI			
Agricultural VA*FDI			
Error correction term	-0.345***	-0.263**	-0.302***
	(0.0756)	(0.0674)	(0.075)
Short term coefficients			
Δ FDI inflows	-0.057*	-0.075*	-0.085*
	(0.0309)	(0.0388)	(0.0454)
Δ Public investment	0.248**	0.208**	0.197**
	(0.0887)	(0.0855)	(0.0791)
Δ Financial development	0.283***	0.305***	0.245***
	(0.0658)	(0.0802)	(0.0716)
Δ Inflation	0.053*	0.078	0.067
	(0.0278)	(0.0821)	(0.0609)
Δ Productivity	0.316***	0.389***	0.372***
	(0.0685)	(0.01065)	(0.0865)
Δ Debt	-0.098*	-0.019*	-0.059
	(0.0518)	(0.0101)	(0.0655)
Δ Political instability	-0.236***	-0.119***	-0.315***
	(0.0502)	(0.0321)	(0.0703)
Δ Exchange rate	0.043*	0.060	0.053
	(0.0226)	(0.0545)	(0.0623)
Δ Corruption	-0.052	-0.076	-0.097
	(0.0764)	(0.084)	(0.0808)
Δ Exports diversivication	0.040	0.081	0.053
	(0.0363)	(0.0675)	(0.0401)
Δ FDI*public invest	0.207**	0.289***	0.157***
	(0.0716)	(0.0628)	(0.0441)
Δ FDI*exports divers	0.189***		
	(0.0675)		
Δ FDI*exchange rate	-0.053*	-0.049*	-0.079
	(0.0278)	(0.0263)	(0.0106)
Δ Manufacturing VA*FDI			
Δ Service VA*FDI			
Δ Agriculture VA*FDI			
Constant	3.154***	2.356**	2.287***
	(0.5087)	(0.4207)	(0.4973)

8 Annex 1

# 9 Recent trends of foreign direct investment in sub-Saharan Africa region

This section presents recent trends of foreign direct investment flows in Sub-Saharan African countries. As shown by figure 1, FDI flows to sub-Saharan Africa have followed a rising trend over the last three decades. FDI is now comparable to development aid, until recently the main source of external financing of countries (figure 2). The rising attractiveness of SSA reflects the improvements in macroeconomic policy and stability, as well as more favorable business climates-brought by structural reforms carried out since the 1990s by most SSA states, under the guidance of the World Bank and the IMF . These reforms include opening up to international trade, financial liberalization, privatization, simplification of FDI policies and institutional reforms. However, Sub-Saharan Africa's share in global FDI flows remains lower than other emerging and developing regions, partly due to a number of factors: structural barriers in African manufacturing, which have led to a decline in manufacturing flows, small, sluggish and highly fragmented markets, due to high domestic and international transport costs.

Figure 1: FDI inflows to sub-Saharan African, World and Least developed countries (% of GDP) from 1980 to 2018.
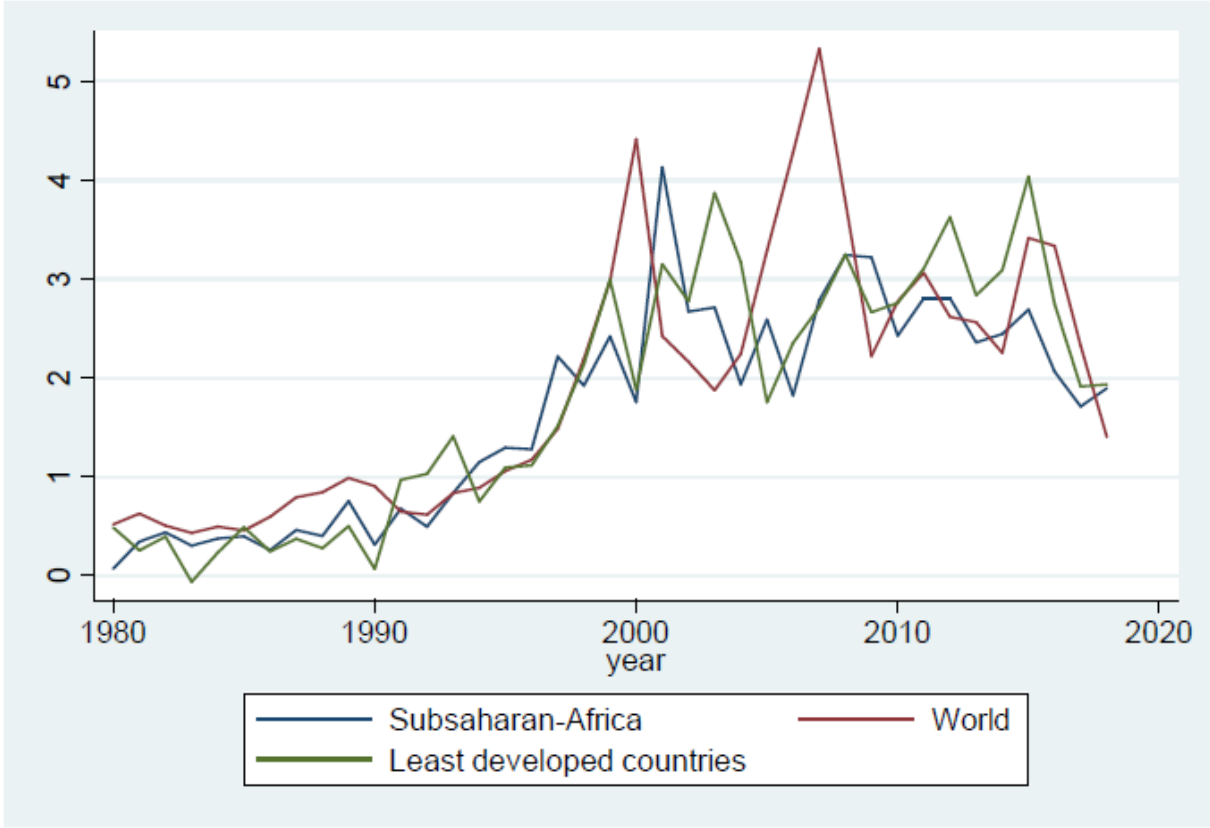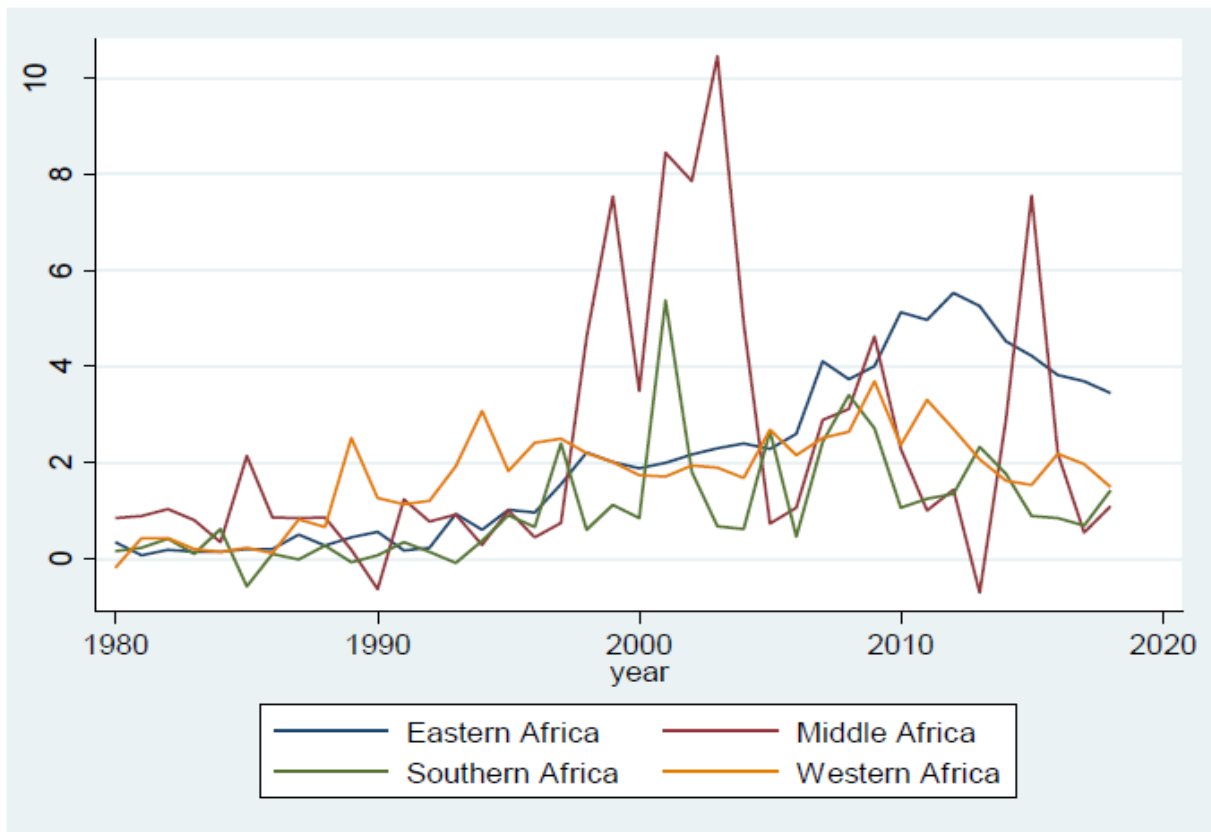

Sources: UNTCAD.

Figure2: FDI compared to aid and remittances (% of GDP) from 1980 to 2018.
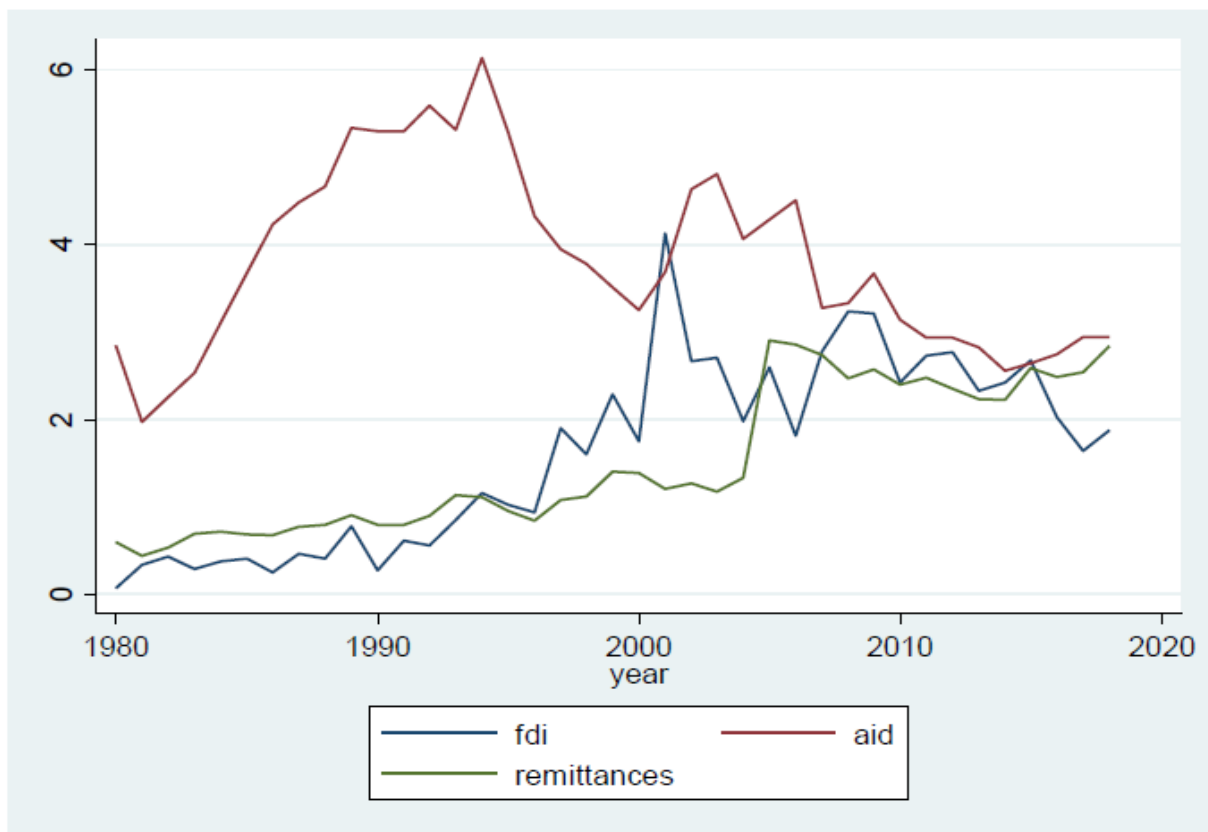
Sources: WDI World Bank , OECD , UNTCAD.

A detailed analysis(see figure 3), however, reveals that there are heterogeneities between the different sub-regions and that the trend in inflows differs from one sub-region to another. Central Africa and South Africa have been the least performing regions in terms of FDI attraction. FDI flows have been unstable and more volatile in these two regions. This poor performance can be explained in part by the socio-political instability and civil wars affecting some countries in this sub-region. On the contrary, the Eastern and Western African regions have been more successful in attracting FDI. the good performance in western Africa may be explained by the economic, political and social reforms undertaken in this zone. There is also the fact that Western Africa mainly receives FDI in the mining and oil sectors, especially with Nigeria, a major oil producer, which attracts massive foreign investment. Concerning Eastern Africa, the performance in terms of attracting FDI can be explained by the fact that countries such as Ethiopia, Kenya, Tanzania and Uganda, which have natural resources and a significant market size, are present in this region.

Figure 3: regional distribution of FDI (% of GDP) from 1980 to 2018.

Sources: UNTCAD.

References

[1] Manuel Agosin and Ricardo Mayer. Foreign direct investment: Does it crowd in domestic investment. In *United Nations Conference on Trade and Development Geneva, Switzerland, Working Paper*, volume 146, 2000.

[2] Manuel R Agosin and Roberto Machado. Foreign investment in developing countries: does it crowd in domestic investment? *Oxford Development Studies*, 33(2):149–162, 2005.

[3] Kazeem Bello Ajide and Olukemi Lawanson. Inflation thresholds and economic growth: Evidence from nigeria. *Asian Economic and Financial Review*, 2(7):876, 2012.

[4] KB..= Ajide and O. Lawanson. Modelling the long run determinants of domestic private investment in nigeria. *Asian Social Science*, 8(13):139–152, 2012.

[5] Laura Alfaro, Areendam Chanda, Sebnem Kalemli-Ozcan, and Selin Sayek. Fdi and economic growth: the role of local financial markets. *Journal of international economics*, 64(1):89–112, 2004.

[6] James B Ang. Do public investment and fdi crowd in or crowd out private domestic investment in malaysia? *Applied Economics*, 41(7):913–919, 2009.

[7] Nicholas Apergis, Costantinos P Katrakilidis, and Nikolaos M Tabakis. Dynamic linkages between fdi inflows and domestic investment: a panel cointegration approach. *Atlantic Economic Journal*, 34(4):385–394, 2006.

[8] Christian Arndt and Anselm Mattes. The impact of inward fdi and foreign ownership on the performance of german multinational firms. *mimeo Institute for Applied Economic Research*, 2008.

[9] Salvador Barrios, Holger Görg, and Eric Strobl. Foreign direct investment, competition and industrial development in the host country. *European Economic Review*, 49(7):1761–1784, 2005.

[10] Robert J Barro. The stock market and investment. *The review of financial studies*, 3(1):115–131, 1990.

[11] Eduardo Borensztein, Jose De Gregorio, and Jong-Wha Lee. How does foreign direct investment affect economic growth? *Journal of international Economics*, 45(1):115–135, 1998.

[12] Barry P Bosworth, Susan M Collins, and Carmen M Reinhart. Capital flows to developing economies: implications for saving and investment. *Brookings papers on economic activity*, 1999(1):143–180, 1999.

[13] Jong Il Choe. Do foreign direct investment and gross domestic investment promote economic growth? *Review of Development Economics*, 7(1):44–57, 2003.

[14] CNUCED. *World investment report 2018: Investment and new industrial policies*. UN, 2018.

[15] WM Cordon and JP Neary. Booming sector and dutch disease economics: A survey. In *Working paper no. 79*. Australian National University Faculty of Economics and Research School of . . . , 1982.

[16] Luiz R De Mello. Foreign direct investment-led growth: evidence from time series and panel data. *Oxford economic papers*, 51(1):133–151, 1999.

[17] Mihir A Desai, C Fritz Foley, and James R Hines Jr. Foreign direct investment and the domestic capital stock. *American Economic Review*, 95(2):33–38, 2005.

[18] David Dollar. Outward-oriented developing economies really do grow more rapidly: evidence from 95 ldcs, 1976-1985. *Economic development and cultural change*, 40(3):523–544, 1992.

[19] Nigel Driffield and Dylan Hughes. Foreign and domestic investment: regional development or crowding out? *Regional studies*, 37(3):277–288, 2003.

[20] Nigel Driffield and Max Munday. Industrial performance, agglomeration, and foreign manufacturing investment in the uk. *Journal of International Business Studies*, 31(1):21–37, 2000.

[21] Perekunah Bright Eregha. The dynamic linkages between foreign direct investment and domestic investment in ecowas countries: A panel cointegration analysis. *African Development Review*, 24(3):208–220, 2012.

[22] Maxwell J Fry. *Foreign direct investment in a macroeconomic framework: finance, efficiency, incentives and distortions*, volume 1141. World Bank Publications, 1993.

[23] D. Ghura and B. Goodwin. Determinants of private investment: a cross-regional empirical investigation. *Applied Economics, 32(14), 1819-1829*, 2000.

[24] Dhaneshwar Ghura and Barry Goodwin. Determinants of private investment: a cross-regional empirical investigation. *Applied Economics*, 32(14):1819–1829, 2000.

[25] Ann Harrison. Determinants and effects of fdi in cote d'ivoire, morocco and venezuela. *Industrial Evolution in Developing Countries", Oxford University Press, Oxford*, 1996.

[26] Dierk Herzer and Mechthild Schrooten. Outward fdi and domestic investment in two industrialized countries. *Economics letters*, 99(1):139–143, 2008.

[27] Juthathip Jongwanich and Archanun Kohpaiboon. Capital flows and real exchange rates in emerging asian countries. *Journal of Asian Economics*, 24:138–146, 2013.

[28] Cristina Jude. Does fdi crowd out domestic investment in transition countries? *Economics of Transition and Institutional Change*, 27(1):163–200, 2019.

[29] Ahmed Kamaly. Evaluation of fdi flows into the mena region. In *9th Annual Conference of ERF, Sharjah*, volume 40, pages 1–17, 2002.

[30] Tidiane Kinda. Increasing private capital flows to developing countries: The role of physical and financial infrastructure. 2007.

[31] Constantina Kottaridi and Thanasis Stengos. Foreign direct investment, human capital and non-linearities in economic growth. *Journal of Macroeconomics*, 32(3):858–871, 2010.

[32] Marc Lautier and Francois Moreaub. Domestic investment and fdi in developing countries: the missing link. *Journal of Economic Development*, 37(3):1, 2012.

[33] James R Markusen and Anthony J Venables. Foreign direct investment as a catalyst for industrial development. *European economic review*, 1999.

[34] Yasmine Merican. Foreign direct investment and growth in asean-4 nations. *International Journal of Business and Management*, 4(5):46–61, 2009.

[35] Jan Mišun, Vladimír Tomšík, et al. Foreign direct investment in central europe–does it crowd in domestic investment? *Prague Economic Papers*, 11(1):57–66, 2002.

[36] Oliver Morrissey, Manop Udomkerdmongkol, et al. Foreign direct investment and exchange rates: a case study of us fdi in emerging market countries. *BOT in June*, 2008.

[37] L. Ndikumana and S. Verick. The linkages between fdi and domestic investment: Unravelling the developmental impact of foreign investment in sub-saharan africa. *Development Policy Review*, 26(6), 2008.

[38] C. Nelson and c. Plosser. Trends and random walks in macroeconomic time series: Some evidence and implications. *Journal of Monetary Economics, 10, 139-162*, 1982.

[39] H. Peasaran, Y. Shin, and Smith R. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16, 289-326*, 2001.

[40] M.-H. Peasaran and R. Smith. Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics, 68(1), July, 79-113*, 1995.

[41] H Pesaran and Y Shin. An autoregressive distributed lag modelling approach to cointegration "chapter 11. In *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*, 1999.

[42] Badri Narayan Rath and Debi Prasad Bal. Do fdi and public investment crowd in or crowd out private domestic investment in india. *The Journal of Developing Areas*, pages 269–284, 2014.

[43] Arsène Rieber, Thi Anh-Dao Tran, et al. Technology diffusion, north-south spillovers and industrial location. *Journal of Economic Development*, 27(1):25–40, 2002.

[44] Paul M Romer. Increasing returns and long-run growth. *Journal of political economy*, 94(5):1002–1037, 1986.

[45] B Bayraktar Saglam, A Yasemin Yalta, et al. Dynamic linkages among foreign direct investment, public investment and private investment: Evidence from turkey. *Applied Econometrics and International Development*, 11(2):71–82, 2011.

[46] Manh Vu Le* and Terukazu Suruga. Foreign direct investment, public expenditure and economic growth: the empirical evidence for the period 1970–2001. *Applied economics letters*, 12(1):45–49, 2005.