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Establishing Central and East Africa as Sources of Quality Products and Investment Destinations of Choice, to Accelerate Industrialization and Economic Diversification, and to Strengthen Food Security

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High-level dialogue on improving attractiveness of Central and East Africa to accelerate industrialization and economic diversification, strengthen food security in Central and East Africa

Provisional Working Document

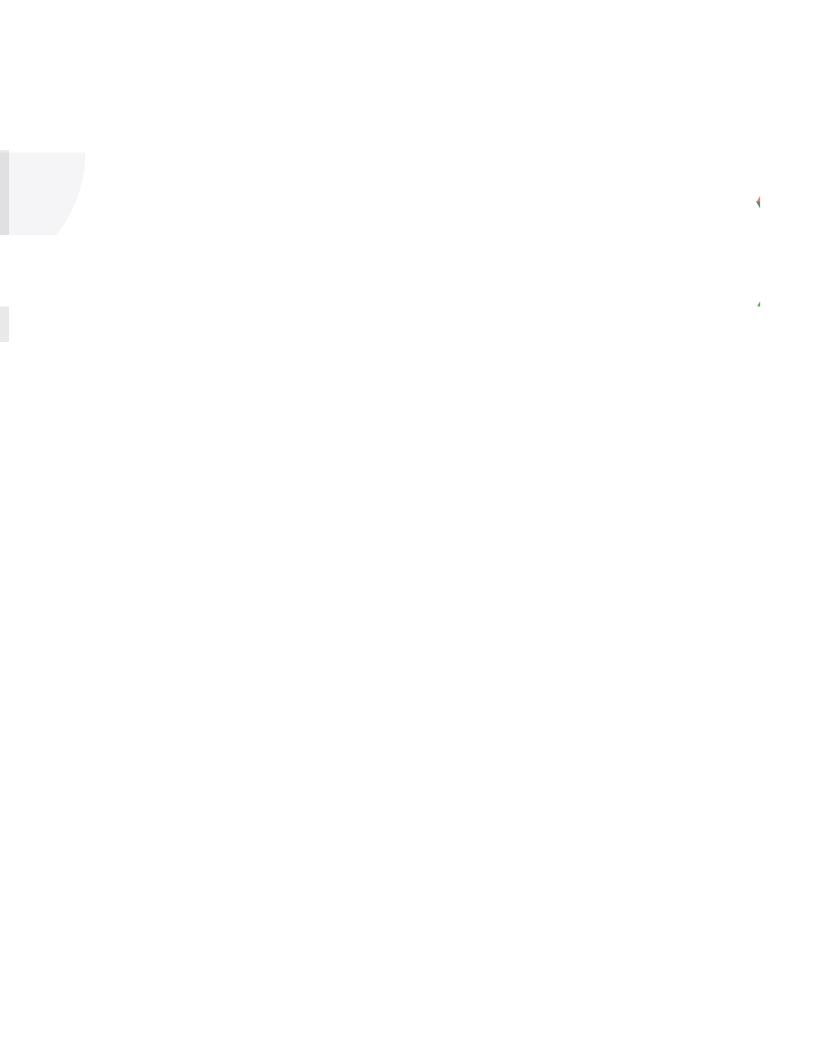**Benchmarking, Determinants of Quality Investment and Reforms: A Fresh Look at the Evidence.**

Content

Tables

Figures

Abbreviations

DTF	Distance to Frontier
FE	Panel Fixed Effect
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
RE	Random Effects
SME	Small and Medium-sized Enterprises
UNCTAD	United Nations Conference on Trade and Development
WBES	World Bank Enterprise Survey
WGI	Worldwide Governance Indicators

1. Introduction

1.1.   Background

Positioning the economies of Central and East Africa as prime investment destinations in the evolving post-COVID industrial landscape necessitates a concerted drive to attract high-caliber investments. Despite the inherent advantages stemming from their abundant natural resources, these regions have not yet emerged as favored choices for international investors. The business climates in both Central and East Africa currently lack the allure necessary to entice foreign direct investment (FDI), with a conspicuous concentration of such investments in the extractive and commodities sectors. Data from UNCTADstat, spanning from 1980 to 2019, reveals that Central African nations received approximately $37 billion in FDI, while their East African counterparts garnered approximately $24 billion. These figures starkly contrast with the performance of North, Southern, and West African subregions, which attracted $98 billion, $71 billion, and $57 billion in FDI, respectively, during the same period. This evident underperformance in Central and East Africa underscores the existence of a lackluster and uninviting business environment.

1.2.   Objectives

The overarching objective of the study is to conduct a baseline comparative study that examines the conditions necessary for accelerating economic diversification and industrialization in Central and East Africa through an effective policy promoting high-quality investment ecosystems. Drawing upon existing studies and the experiences of Central and East African countries in relation to global best practices, the specific objectives are as follows [1]:

a) To provide an assessment of investment concepts relevant to expediting economic diversification and industrialization, thereby establishing a clear definition of what constitutes "quality investment."
b) To examine trends in FDI in Central and East Africa, evaluate their impact on economic growth, and formulate policy recommendations aimed at attracting and maximizing the benefits of FDIs.
c) To investigate the drivers and consequences of intra-African FDIs in Central and East Africa, considering factors like market attractiveness, trade regulations, and economic indicators.
d) To assess the investment environment from the perspective of local entrepreneurs, identifying factors that either facilitate or impede domestic investments and proposing strategies to bolster the confidence of local entrepreneurs, thereby encouraging increased investments.
e) To evaluate the investment needs of Small and Medium-sized Enterprises (SMEs) and large enterprises, and to develop actions aimed at supporting the development of national champions in various target sectors.

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[1] The narrative shared in the present version of the working document you are about to read is only an extract of the full report to cover part d) of the five specific objectives as outlined.

2. Economic Reform and Corporate Investment in Africa

2.1. Summary

We analyze the domestic investment by firms in Africa over the period of 2002-2020 as the region experienced rapid economic growth of about 5 percent per year. We use a rich panel dataset that contains a combination of detailed firm-level information, matched with Doing Business Distance to Frontier indicators. Analyzing this data, we find compelling evidence that investment growth was higher in countries where, before 2005, business environment was closer to the frontier. Our analysis shows that the pre-2005 buildup of ease of doing business seems to have intensified the accelerator effect of investment as economic growth has occurred in Africa and contributed to the subsequent sharp increases in corporate investment. We also find that the improvement in the business environment between 2005 and 2020 had a positive effect on investment that was smaller in magnitude than the initial conditions. In other words, there was a sign of first come first served.

2.2. Correlation between investment growth and business environment

Explaining the variation in rates of investment over time has been a central challenge for macroeconomists and for policymakers for several decades. The post-2008 increase in corporate investment in Africa occurred at the same time that the business environment improved. From 2007 to 2014, corporate investment rose from 13.15% to 15.76% and slowed down temporary afterwards (see Figure 1). These trends were associated with significant reforms of the ease of doing business across the continent. For instance, Figure 1 plots the evolution of the ease of doing business in Africa: it shows an increasing trend, just like the investment distribution. According to World Bank Group (2016), Africa accounted for about 30 percent of global business regulatory reform between 2014 and 2015, with a great percentage aimed at reducing the complexity and the cost of regulatory processes as well as strengthening legal institutions for local entrepreneurs. Macroeconomists have long been tempted to relate economic growth in Africa and the associated changes in investment to commodity prices. However, causal factors leading to high investment growth in Africa remain speculative, and our knowledge of the effect of recent efforts by African policymakers to create an environment conducive to investment is limited.

Figure 2-1: Private investment and doing business in Africa
Source: World Development Indicators & Doing Business Indicators, World Bank

2.3. Economic reform and investment growth: Do initial conditions matter?

To investigate the effect of economic reform on corporate investment in Africa, we use a unique firm-level panel dataset from the World Bank Enterprise Survey (WBES hereafter), matched with the Doing Business Indicators also from the Word Bank. We use a panel of 9,462 firms from 26 African countries for which we have complete information on investment, measured in terms of firm buying fixed assets. The sample periods vary by country, as the survey is conducted in different years across countries. While the WBES also contains firm-level information on the business environment, we match the responses in the WBES with data from the Doing Business Distance to Frontier (DTF hereafter) at the country level to avoid endogeneity between investment and business environment. The DTF metric captures the overall investment in the private sector and is expressed as the distance to the best performer. [2] For each country, DTF scores were obtained by averaging the DTFs scores of the 10 topics: starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency. The scores range from 19 to 80, with a high score indicating a regulatory environment that is conducive to setting up and operating a business closer to the frontier. To capture the extent to which countries have made progress in the business environment after 2004, we calculate the change in the DTF between 2017 and 2005 following World Bank (2018). The overall change in DTF scores were categorized into three quantile groups (little, moderate and significant change). Table 1 shows the basic summary statistics, along with the variable definition. On average, 46.8% of firms in the sample invested in fixed assets. While sales growth across the sample is estimated at 7.7%, the data shows considerable variation both within and across countries. This evidence suggests significant heterogeneity in sales growth across countries and industries. Finally, the median of the change in DTF is 2, meaning that most of the countries in Africa have made progress toward the frontier of doing business.

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[2] See http://www.doingbusiness.org for further details on the doing business distance to frontier metrics.

Table 2-1: Summary statistics

	Mean	Median	Std. Dev.	Min	Max
Investment in fixed assets (dummy)	0.468	0.000	0.499	0	1
Sales growth	0.077	0.084	0.191	-0.667	0.667
Employment growth	0.038	0.041	0.120	-0.665	0.667
Firm age group	4.370	4.000	1.750	1	7
Manager's experience (log)	3.165	3.178	0.393	2.303	4.382
Being part of a larger firm	0.176	0.000	0.381	0	1
Firm size (1=More than 20 employees)	0.570	1.000	0.495	0	1
Credit constrained (dummy)	0.012	0.000	0.109	0	1
DTF in 2005 (log)	3.671	3.650	0.255	3.220	4.156
Change in DTF (three quantiles)	1.978	2.000	0.821	1	3

To explain the variation in rates of domestic investment, we follow the theoretical and empirical literature on corporate investment behavior, particularly the standard accelerator theory of investment (Clark 1917, Chenery 1952). This theory views investment as the result of the changes in the level of output and the amounts to imposing investment as a linear function of sales growth. An advantage of using firm-level panel data compared to cross-sectional data is that they take into account variations in investments and economic reform over time and the extent to which corporate investment responded following economic reform. One concern remains: there may be time-varying unobservable factors correlated with both investment and sales growth. There may also be reverse causality: perhaps firms forecasting higher sales growth can invest more in fixed assets, for example. To partially solve this problem, we use the annualized three-year change in sales measured at the industry-city pair level, instead of the firm level. In the empirical analysis, we estimate several variants of our investment model. In some specifications, for example, we explore how the estimated impacts of sales growth vary with employment growth. In other specifications, we control for a small set of firm-level characteristics such as firm size and the manager's experience, and for a large set which adds variables such as firm size, part of a larger firm, and credit constrained.

Table 2 presents the results from estimating a simple accelerator model that includes sales growth as our main variable of interest and a full set of fixed effects. Sales growth is strongly positively and significantly associated with investment in fixed assets. When controlling for employment growth in column (2), we find that the magnitude of sales growth remains virtually unchanged. Furthermore, it is worth mentioning that the estimates prove to be robust throughout all the specifications. For example, the specification in column (3) adds the additional controls for a small set of firm-level characteristics, while column (4) controls for a large set of firm-level characteristics. We find that the magnitude of sales growth does not change significantly and varies between 0.021 and 0.026, depending on whether firm size and credit constraints are included in the regression or not.

One mechanism that could generate the findings above is the economic reform to ease the business environment in Africa. To explore this possibility, we investigate whether domestic investment during higher demand growth would be more responsive to initial conditions in the business environment and whether the responsiveness of investments to sales growth is robust to the recent change in the business environment. Our estimation strategy is to introduce an interaction term between change in DTF scores and sales growth, controlling for the initial condition in the ease of doing business. Column 5 of Table 2 reports a fixed effect estimate of the specification, including the DTF in 2005 as our initial condition. The interaction term is positive and statistically significant, meaning that the accelerator effect is higher for countries which were closer to the frontier of doing business in 2005. Column (6)

shows that the results are robust even after controlling for resource endowment and political stability. These findings indicate that countries that started implementing doing business reforms earlier benefited for the first-come positive effect, regardless of their endowment in natural resource or their political stability. Columns (7) and (8) assess the effect of reforms implemented since 2005 by including our measure of progress in DTF. The findings show that the initial condition in the business environment remains positive and significant, meaning that the benefit of first come persists. The progress in DTF enters the model positively and significantly, but with a smaller magnitude. These results suggest that the countries who have moderately or significantly improved their business environment over the past 10 years have also benefited from the accelerator effect, but the initial business environment matters the most.

Table 2-2: Empirical results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sales growth	0.022***	0.022***	0.026***	0.021***	0.012	0.0086	0.0413	0.0173
	(0.005)	(0.005)	(0.005)	(0.005)	(0.0235)	(0.288)	(0.088)	(0.106)
Sales growth X DTF in 2005					0.141**	0.149*	0.051**	0.038
					(0.067)	(0.083)	(0.022)	(0.027)
Reference (Sales growth X little change in DTF							0.000	0.000
Sales growth X moderate change in DTF							0.010*	0.005
							(0.005)	(0.004)
Sales growth X significant change in DTF							0.011**	0.010**
							(0.005)	(0.005)
Employment growth		Yes	Yes	Yes				
Small set of controls			Yes	Yes				
Large set of controls				Yes				
Resource endowment						Yes		Yes
Political stability						Yes		Yes
Observations	9462	9462	9002	9002	9462	9462	9462	9462

2.4.   Conclusion

Africa's impressive corporate investment growth post-2008 was not due only to commodity prices – though this played a non-negligible role. This paper examines whether economic reform to ease the business environment contributed to corporate investment growth and establishes two empirical facts. First, the accelerator effect of investment was more effective in increasing investment in countries with better initial conditions in terms of doing business indicators. Second, some of the variations in corporate investment were associated with differences in the progress of doing business reform between 2005 and 2017, whereby the accelerator effect was higher in countries which made significate progress in DTF. The finding implies that the magnitude of the accelerator of investment appears to rise with initial conditions in the business environment. Taken together, the patterns we find lead us to believe that an important explanation for the substantial differences in corporate investment across countries are the sequencing of business environment reform.

3. What is driving private investment growth in Africa?

3.1. Summary

We investigate the drivers of private investment in Africa over the period 2002-2020 using a newly constructed firm-level panel data. We document several sources of evidence that together show profitability plays a smaller role in explaining private investment. The effect of value added appears larger. Decomposing our findings by country groups and industries, we find that value added plays a more important role in investment growth in the food processing and other manufacturing sectors. Finally, we show that poor business environment may increase investment in the service sector.

3.2. Introduction

It is widely acknowledged that private investment in many African countries has undergone profound changes over the past decade. For instance, Otchia (2018) documents that after 2009, investment in Africa increased sharply to more than 16.1% of the gross domestic product (GDP) in 2010 and 2012, reaching the highest rate on record. So far, there is little consensus as to what drives these changes; various hypotheses have been advanced to explain Africa's impressive private investment growth. The most prevalent views are that external shocks, including higher commodity prices, low global risk aversion, and a change in trading patterns with countries such as China, India, and Brazil, are involved (IMF, 2018, UNCTAD, 2018). Other researchers have mentioned the terms of trade improvement and financial deepening, as well as a reform spurt (World Bank Group, 2017). On the microeconomic side, most existing studies have used the Lucas paradox to explain the level of investment in Africa (see Lucas (1990); Montiel (2006); and Alfaro, et al. (2008) for an excellent overview). Prior studies (Bigsten, et al., 1997, Pattillo, 1998, Warnholz, 2008) have found that firms already operating in Africa have low levels of investment despite high profitability.[3] Virtually all of these studies find a significant coefficient for profitability, suggesting that the rate of profit is critical in firm-level investment. The magnitude of profitability has been explored in other papers, including one by Mazumdar and Mazaheri (2003). To date, however, there is little evidence as to whether these magnitudes have widened over time, and, if so, whether they can help explain the recent rise in private investment in Africa.

In this paper, we combine a unique firm-level panel dataset from the World Bank Enterprise Survey (WBES), matched with other data, to offer the most comprehensive evidence to date on firm-level determinants of investment in Africa. Specifically, we use a panel of 9,462 firms from 26 African countries over the period of 2002 to 2020. We have made three main contributions to the research on this topic. First, using a large amount of firm-level panel data, we have documented the large and significant increases in investment among firms already operating in Africa and we have explored

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[3] The main reason is uncertainty rather than credit constraints.

alternative explanations using a comprehensive set of variables. Our argument is that the business climate has improved spectacularly in Africa. Growth in demand (itself partially influenced by a resource boom and surge in non-traditional investors) and in the use of information and communication technologies has increased a great deal, and both of these forces have reduced the risk premium and information deficit to the point that they now play a minor role in firms' investment decisions. Second, our main substantive contribution is a simple decomposition of the determinants of investment among different subsamples, something that was absent in previous literature due to the lack of a large, comparable firm-level dataset. We have investigated, for the first time, the determinants of investment in the service sector using a large sample of African firms. Along these lines, we have also provided a detailed analysis of the subsectors of both the manufacturing and service sectors. Finally, our paper contributes to the policy debate on measuring investment climate variables. We have proposed three policy-oriented, trackable indicators for the business environment using the WBES.

The remainder of the paper proceeds as follows: Section two discusses related literature; section three describes the data; and section four explains the empirical strategy. We discuss our findings in section five and our conclusions in section six.

3.3.   Related Literature

Our paper builds on and expands the literature on private investment, particularly in Africa. On the theoretical side, our paper combines various strands of the literature on investment behavior, including the standard accelerator theory of investment and the liquidity theory of investment. The standard accelerator models view investment as a result of changes in the level of output and amounts to imposing investment as a linear function of sales or output and lags in capital stock. In the liquidity theory of investment behavior, the focus is on imperfections in the capital market that arise mainly because of asymmetric information and agency costs. Thus, the level of investment is modeled as a function of liquidity rather than output. Liquidity in these models is often measured by internal funds as income after taxes plus depreciation. Kuh and Meyer (1963) built a model where investment is expressed as a proportion of the internal funds of a firm. Because the degree of information asymmetry and agency costs depends on the characteristics of a firm, other researchers have introduced alternative (external) sources of firm funding, such as debt or equity finance. Some recent studies have tested the hypothesis of the financing hierarchy between internal and external funds and found that internal funds have a cost advantage over new debt or equity finance. For instance, internal funds were found to be more important determinants of investment for smaller companies.

On the empirical side, our work is most closely related to that of Bigsten, et al. (1997) and Mazumdar and Mazaheri (2003), who provided similar evidence on firm investment in a few African countries. We have extended their work in two important ways. First, we expanded the number of countries and observations and covered more years in a panel setting. This allowed us to see whether their results were specific to the group of countries under investigation or could be applied more generally. Second, although Bigsten, et al. (1997) and Mazumdar and Mazaheri (2003) focused only on manufacturing, we used our extensive firm-level information on investment in service sectors such as retail sales and other services. There is usually no or little analysis of determinants of investment in the service sector in developing countries, particularly in Africa (Bigsten and Söderbom, 2006). Previous literature on

investment in Africa has provided compelling macro-level evidence that the investment climate and profitability can significantly influence the levels of investment and serve as the first step in an investment industrial policy (Mlambo and Oshikoya, 2001, Ndikumana, 2000, UNCTAD, 2018). Up to now, far too little attention has been paid to firm-level data. The few existing studies on firm-level data use a single country and only a small amount of data for that country (Bigsten, et al., 1997, Mazumdar and Mazaheri, 2003). So far, no recent research has been found that surveyed firm-level private investment in a large set of African countries.

3.4. Data

We used firm-level panel data from the WBES, which provided extensive information on the investment behavior of firms, including investment in capital, decisions on buying fixed assets, sources of investment, and various aspects of the investment climate. The survey included data on firm performance for the year of the survey and 3 years preceding it, including sales and employment figures. The WBES also identified credit-constrained firms that had applied for credit but did not receive it. Other variables included the size of the firm and the number of years it had been in business. The WBES does not provide direct information on the age of a firm, so firm administrators were asked to provide the year in which the firm began operations. The firm age was calculated as the year of the survey minus the year in which the firm began. The firm size was measured as a total of permanent workers; we defined a firm as large if the number of employees was greater than or equal to 100 and medium if the number of employees was 20 to 99.

In addition to this information, the survey measured the investment climate by recording perceptions about obstacles to doing business; obviously, a poor business environment increases such obstacles. In fact, many studies have found that these indicators are correlated with business performance (Dethier, et al., 2011, Harrison, et al., 2014). To avoid econometric problems related to subjective measures of the business environment, we did not include individual perceptions in our analysis; we generated a local average to describe the business environment as our proxy of the investment climate. Following practices in the literature (Aterido, et al., 2011, Harrison, et al., 2014), we computed a city-industry-size cell average of the perceived obstacles for each firm. Then, we used principal component analysis (PCA) to aggregate various data on the investment climate in the WBES. Although the city-industry-size measure reduced the endogeneity issues, we combined this approach with the PCA analysis to avoid remaining issues such as multicollinearity. We constructed three main dimensions: labor quality and regulations, instability and uncertainty, and infrastructure. Thus, we constructed each indicator as a weighted sum of principal components whose eigenvalues were higher than one. *Labor market* issues included an inadequately educated labor force and ineffective labor regulations. *Instability and uncertainty* were measured by political instability, corruption, crime, theft, and tax issues (tax administration and rates). The fact that these measures were loaded into the same component indicated that political instability goes along with corruption, insecurity, and weak institutions. In the same vein, our measure of *infrastructure* included electricity, transport, and access to finance. Labor quality and infrastructure have been seen as important factors for investment because investors are naturally hesitant about investing in countries where the infrastructure is inadequate. The simplest

reason is that the lack of infrastructure and human capital increases the costs of doing business and reduces the rate of return on the investment, thus discouraging investors. Prior studies have also shown that instability and uncertainty are important influences on investment in developing countries. Evidence from macro studies suggests that countries with higher levels of instability and uncertainty have lower levels of investment.

One important advantage of the WBES is that it uses a uniform methodology of implementation, which makes the survey comparable across 80 countries and over an extended period. For our analysis, we used a panel of 9,462 firms from 26 countries in Africa. The sample periods varied by country but were roughly from 2002 to 2018. One final note is that these data are often plagued by missing information, in particular, data on investment and capital. Table 1 presents the countries in our sample, including the number of firms, the percentage of firms buying fixed assets, and the average of the investment ratio. One can see that the sample varies by country; Nigeria is 16.6% of the sample, followed by Ethiopia (7.9%), Senegal (6.6%), Zimbabwe (6.4%), and Mali (5.9%). The rest of the countries in the sample are less than 5% each. Among them, Senegal has the lowest share of firms buying fixed assets and Mali has the lowest investment rate.

Table 3-1: Sample description and investment variables

	Observation	Invested in fixed asset (%)	Investment ratio (mean)
Angola	366	0.35	0.22
Benin	228	0.58	
Botswana	238	0.58	0.18
Burkina	176	0.38	0.20
Cameroon	464	0.56	0.33
Capeverde	106	0.71	
Cotedivoire	290	0.40	0.42
DRC	394	0.43	0.22
Ethiopia	744	0.48	0.34
Ghana	62	0.53	0.29
Kenya	302	0.54	0.30
Lesotho	122	0.61	
Liberia	162	0.62	
Malawi	328	0.57	0.45
Mali	556	0.45	0.16
Niger	240	0.72	
Nigeria	1,566	0.42	0.54
Rwanda	140	0.44	
Senegal	624	0.27	0.17
Sierra Leone	150	0.62	
Southafrica	382	0.65	0.15
Tanzania	230	0.63	0.20
Togo	120	0.51	
Uganda	418	0.44	0.15
Zambia	450	0.49	0.14
Zimbabwe	604	0.31	0.20

The WBES is collected by sampling across 15 sectors, but we arranged our samples in five broad groups for comparability across countries and years. Table 2 reports the number of firms by industry. There are also large variations. Other manufacturing represents 34.2% of firms in our sample and has a higher share of firms buying fixed assets. Surprisingly, the retail sector has the lowest share of firms investing in fixed assets but the largest investment ratio. Nevertheless, we see no significant variation in the investment ratio among manufacturing firms.

Table 3-2: Distribution of firms by sectors and investment behavior

Sector	Observation	Invested in fixed asset (%)	Investment ratio (mean)
Food	1252	0.49	0.20
Textiles & Garments	968	0.45	0.18
Other Manufacturing	3238	0.52	0.21
Retail	1682	0.35	0.62
Other Services	2134	0.48	0.23
Unclassified	188	0.58	0.19

Table 3 reports the descriptive statistics for our main variables, showing information on the pooled data for all years. These statistics underpin the most basic feature of investment patterns in Africa, the Lucas paradox. The table shows that 46% of firms declared that they had invested in fixed assets, a finding similar to those of Bigsten, et al. (1997) and Mazumdar and Mazaheri (2003). The investment ratio is also low. The median value is 0.05, but the mean is estimated at 0.21. Bigsten, et al. (1997) also found a small share of the firm's investment ratio, nearly zero. Despite low levels of investment, the descriptive statistics indicated that profits were high. On average, the profit rate was 0.48%, but we have observed a large variation across firms. Regarding access to credit, our data also showed that firms were less likely to be credit constrained, because only 36.6% declared that their loan application had been rejected.

Table 3-3: Descriptive statistics

Variables	Mean	Standard Deviation	Minimum	Maximum
Investment ratio	0.2071	0.3626	0	2.8462
Buying fixed assets	0.4677	0.4990	0	1
Value added to capital	1.4274	1.2921	-4.91	4.9880
Sales growth	0.4858	1.5558	-4.91	5
Credit constrained	0.3661	0.4818	0	1
Firm age (log)	2.5568	0.8442	0	4.6052
Firm size (small)	0.5850	0.4927	0	1
Firm size (Medium)	0.2712	0.4446	0	1
Firm size (Large)	0.1436	0.3507	0	1
Labor quality and regulations	0	1	-2.5427	7.7728
Taxes, corruption, instability	0	1	-3.5122	7.6267

| Finance, electricity, transport | 0 | 1 | -10.9977 | 4.5295 |

3.5.   Empirical Strategy

The main goal of the empirical analysis was to analyze the determinants of private investment during recent episodes of economic growth in Africa. Following the voluminous literature on investment decisions of firms in a world of liquidity constraints, our empirical model is based on the following specification:

$$I_{ijct} = \beta_1 Q_{ijct} + \beta_2 K_{ijct-1} + \beta_3 Z_{ijct} + \beta_3 X_{ijct} + \delta_{cj} + \alpha_t + \varepsilon_{jct} \qquad (1)$$

In this equation, i denotes a firm, j denotes a sector, c is the country-city, and t denotes a year. δ_{cj} and α_t are the country-industry and year fixed effect. Two investment measures were used in the analysis: the share of firms buying fixed assets and the investment ratio. Although these variables measure different aspects of investment behavior, they can be used as a robustness (or sensibility) test.[4] The investment ratio is measured as the value of investment in the previous year over capital. Capital is estimated as the owner's estimate of the replacement value of the plant and equipment. The other measure of investment is a dummy variable that takes a value of 1 if the firm invests in fixed assets and a value of 0 otherwise. Our independent variables included the profitability of the firm (Q_{ijct}), the value-added–to–capital ratio (K_{ijct}), and the liquidity constraint ($Z_{i,c,t}$). We have proxied the liquidity constraint using a dummy that takes a value of 1 if the firm is credit-constrained and a value of 0 otherwise. X_{ijct} is a vector of control variables such as firm age and size. In additional specifications, we also controlled for the business environment measured at the city-industry-size level and country-level characteristics such as its landlocked status and resource endowment.

The interpretation of the profit variable is usually ambiguous in the literature. For example, Mazumdar and Mazaheri (2003) argued that the profit rate could proxy elements both on the demand side, predicting market conditions for the firm, and the supply side, easing credit constraints facing the firm. In this analysis, we introduced additional variables to represent the easing credit constraints, such as a dummy of whether the firm is credit-constrained and city-industry-size measures of access to finance as a constraint to the investment climate. Thus, our variable profit identifies the pure effect of the demand side related to the market conditions for the firm. The effect of profit will be positive, whereas the credit constraint and finance obstacles will be negative. The inclusion of the city-year fixed effect in our empirical model controlled for other improvements contemporaneous with a higher demand, such as an increase in the public investment in infrastructure and logistics, which encourage firms to buy fixed assets.

An advantage of using panel data compared with cross-sectional data is that we can take into account unobserved individual heterogeneity and observe the trajectories of profit and investment in fixed assets over time and how profit changes (or not) following the decision to make a fixed investment. In

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[4]This approach is quite common in the recent literature. For example, Harrison et al., "Explaining Africa's (Dis)advantage." used various measures of productivity to assert the robustness of their results.

this context, we tackled any possible endogeneity issue by including the time dimension of the data. There were still, however, several potential concerns about the fact that our data did not have enough variation to control for city-year fixed effects. Because the time dimension in our panel was small, we could not use difference-in-difference methods. Nonetheless, fixed effects would help us control for cases where we could observe a large fluctuation in a firm's investment that coincided with profit growth both spatially and temporally. The dependent variables in our specifications varied at the firm-year level, but our regressor of interest varied at a more aggregated province-industry-year level; therefore, the inference will be based on the Huber-White standard errors robust to the heteroskedasticity clustered at the city-industry-year level, following Moulton (1990).

3.6.   Results

3.6.1. Main results

Table 4 presents evidence on the determinants of investment in Africa. Columns 1 to 4 report the results when the dependent variable is the investment ratio. In column 1, we regressed the investment ratio on profitability, value added, credit constrained. Like Bigsten, et al. (1997), we found that higher profitability growth was associated with a significant increase in investment. We also found, however, that the magnitude of profitability was quite small. This was mainly because our measure of profitability captured the demand side as we controlled for the supply side using credit constraint. Indeed, our variable of credit constraint entered the model significantly and negatively, indicating that credit-constrained firms were less likely to invest. Another reason is that we found a positive and significant effect of value-added to capital. Previous literature found a positive but small and not significant effect. Consistent with the literature (Bigsten and Söderbom, 2006), these findings indicated that even profitable and efficient firms cannot use external funds to finance their new projects.

Table 3-4: Determinant of investment

	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
	Dependent variable is Investment ratio					*Dependent variable is Buying fixed assets*			
Value added to capital	0.061***	0.062***	0.061***	0.066***		0.027***	0.025***	0.026***	0.026***
	(0.013)	(0.013)	(0.014)	(0.014)		(0.008)	(0.008)	(0.008)	(0.010)
Profit	0.018*	0.014	0.015	0.018**		0.015*	0.015*	0.015*	0.014*
	(0.010)	(0.012)	(0.013)	(0.008)		(0.009)	(0.008)	(0.008)	(0.008)
Credit constrained	-0.138***	-0.138***	-0.143***	-0.132***		-0.185***	-0.140***	-0.146***	-0.139***
	(0.038)	(0.044)	(0.046)	(0.044)		(0.032)	(0.031)	(0.031)	(0.034)
Firm age (log)		-0.052**	-0.050**	-0.046**			0.006	0.007	0.016
		(0.025)	(0.025)	(0.022)			(0.018)	(0.018)	(0.019)
Firm size = 2, Medium		0.010	0.010	0.011			0.102***	0.102***	0.116***
		(0.016)	(0.014)	(0.010)			(0.030)	(0.029)	(0.024)
Firm size = 3, Large		0.045**	0.047**	0.035*			0.244***	0.245***	0.257***
		(0.021)	(0.018)	(0.020)			(0.026)	(0.024)	(0.022)
Labor quality and regulations			-0.003	-0.005				0.002	0.002
			(0.012)	(0.004)				(0.017)	(0.011)
Taxes, corruption, instability			-0.062**	-0.046***				-0.078***	-0.085***
			(0.025)	(0.018)				(0.026)	(0.026)
Finance, electricity, transport			-0.001	0.009				0.008	-0.000
			(0.012)	(0.011)				(0.032)	(0.023)
Landlocked				-0.033					-0.001
				(0.024)					(0.042)
Fragile				-0.018					0.019
				(0.025)					(0.027)
Oil-rich countries				-0.059					0.013
				(0.072)					(0.027)
minerals-rich countries				-0.018					-0.009
				(0.040)					(0.031)
Observations	1,127	1,126	1,126	1,126		1,411	1,403	1,403	1,424
Country-City FE	Yes	Yes	Yes	No		Yes	Yes	Yes	No
Sector FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes

In column 2, we added controls for firm characteristics such as age and size. Although we found that firm characteristics also matter in explaining firm investment, our previous results appeared to be robust as to the inclusion of firm age and size. Specifically, we found that the magnitude of profitability was only slightly reduced when we controlled for firm characteristics. Regarding firm age, the results showed that younger firms were more likely to invest. These results are consistent with those of previous research on firm investment in Africa. We also found that larger firms were more likely to invest than smaller firms. In unreported results, we included a dummy for ownership (1 if the firm was foreign-owned) that might be endogenous; this had no impact on our results. This high significance of firm characteristics in explaining investment could mean that other factors also exist that affect investment.

Column 3 of Table 4 added controls for the investment climate as it was perceived by owners. Our results remained quite stable. Because investment climate variables affect both sales and credit conditions, as we controlled, we could test whether city-level variables affected investment at the firm level. The results showed a negative but no statistically significant effect of labor quality and regulations, electricity, or transport. Interestingly, the effect of taxes, corruption, and instability was statistically

significant and large. This finding showed that instability and uncertainty might play a bigger role than expected in constraining investment growth in Africa.

In columns 5-8, we changed the dependent variable to be unity if the firm invested in fixed assets and zero otherwise. Then we estimated the determinant of investment using the same variables as in the previous discussion. If anything, the results were stronger. Once again starting with profitability, we found that much like with the investment ratio, higher profitability increased the probability that firms would buy fixed assets. In addition, the value added was positively and significantly associated with an investment in fixed assets, with marginal effects varying between 0.025 and 0.027. Also similar to the investment ratio, we found that credit-constrained firms were less likely to invest in fixed assets, whereas larger firms were more likely to do so. The results for taxes, corruption, and instability were also consistent with the model for the investment ratio. Unlike the model for the investment ratio, however, we found that the firm age had no significant effect on the likelihood to invest in fixed assets.

3.6.2. Heterogeneity effect by country

An important aspect of the relation between demand growth and investment is an understanding of how the effect of demand operates across different categories and countries. In this subsection, we differentiate among countries according to their geography, fragility, and resource endowment. Disaggregating requires more information, which reduces the sample size, so in Table 5, we presented the results by introducing an interaction term between profitability and country-level information. Column 1 sets the profitability variable with a dummy of unity if the country is landlocked and zero otherwise. The coefficient of this interaction was negative and significant and indicated that firms in landlocked countries were significantly less likely to invest when the market demand was high. Columns 2 to 5 introduce dummies for fragile resources, oil, and minerals. The interaction between profitability and these countries' dummies was estimated to be highly negative but not statistically significant.

Table 3-5: Interaction between profit and country categories

	(1)	(2)	(3)	(4)	(5)
Profit	0.012	0.027***	0.018**	0.019**	0.014*
	(0.014)	(0.008)	(0.008)	(0.009)	(0.008)
Landlocked X Profit	-0.038*				
	(0.022)				
Fragile X Profit		0.022			
		(0.028)			
Resource X Profit			-0.029		
			(0.035)		
Oil X Profit				-0.019	
				(0.067)	
Minerals X Profit					-0.032
					(0.043)
Observations	1,126	1,126	1,126	1,126	1,126
Country-City	No	No	No	No	No
Firm characteristics	Yes	Yes	Yes	Yes	Yes
Investment climate	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

3.6.3. Additional evidence

The previous sections have focused on the determinants of investment by pooling the manufacturing and service sectors together. To better understand the mechanisms at play, we explored the heterogeneity across sectors. We started by providing evidence for the manufacturing sector. Table 6 compared the value added to the capital, profitability, and credit constraints across the food processing industry (column 1), leather, garment, and textile industries (column 2), and other manufacturing industries (column 3). We controlled for the firm age and size and a series of country-region and year dummies. We found a sizeable heterogeneous effect of credit constraints, whereas the effect of profitability on the investment ratio was quite homogeneous across sectors. In the food processing sector, we found that the effect of credit constraints was –0.259 and statistically significant. The effect was not statistically significant and was estimated at –0.056 for the leather, garment, and textile industries and at –0.128 for the other manufacturing sectors. We also found different patterns for the effects of the investment climate on the investment ratio across sectors. Our findings indicated that taxes, corruption, and instability were significant but negatively correlated with the investment ratio in the food processing and other manufacturing sectors. The effect of finance, electricity, and transport was largely negative and significant in the leather, garment, and textile sectors. We found similar effects when we used a dummy of the firm-buying fixed effects as the dependent variable.

Table 3-6: Determinant of investment by manufacturing subsectors

	Food processing	Garment, Leather, Textiles	Other manufacturing	Food processing	Garment, Leather, Textiles	Other manufacturing
	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable is: Investment ratio			*Dependent variable is: buying fixed asset*		
Value added to capital	0.024***	0.023	0.017	-0.004	0.024	0.024***
	(0.007)	(0.037)	(0.028)	(0.009)	(0.038)	(0.009)
Profit	0.028*	0.069	0.075**	0.024	0.071***	0.019*
	(0.016)	(0.044)	(0.030)	(0.015)	(0.019)	(0.011)
Credit constrained	-0.259***	-0.056	-0.128	-0.269***	-0.212***	-0.101***
	(0.072)	(0.044)	(0.085)	(0.063)	(0.034)	(0.032)
Firm age (log)	-0.031**	-0.045	-0.051	0.055	-0.007	0.003
	(0.014)	(0.066)	(0.045)	(0.043)	(0.058)	(0.032)
Firm size = 2, Medium	-0.064	0.009	0.004	-0.013	0.255***	0.122***
	(0.044)	(0.039)	(0.026)	(0.029)	(0.020)	(0.004)
Firm size = 3, Large	-0.062***	0.077	0.048***	0.155***	0.279***	0.213***
	(0.021)	(0.064)	(0.007)	(0.036)	(0.046)	(0.015)
Labor quality and regulations	-0.029	-0.673	0.035	-0.004	-0.166	0.089*
	(0.140)	(0.449)	(0.027)	(0.230)	(0.174)	(0.054)
Taxes, corruption, instability	-0.221**	-0.300	-0.169**	-0.262***	0.027	-0.120
	(0.110)	(0.299)	(0.072)	(0.058)	(0.090)	(0.074)
Finance, electricity, transport	-0.071	-0.302***	0.002	-0.009	-0.213**	0.029
	(0.063)	(0.048)	(0.055)	(0.038)	(0.091)	(0.072)
Observations	298	154	654	319	194	779
Country-City	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Investment climate	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

We presented the results for the service sector in Table 7. Because our data did not include enough information on capital and investment for the service sector, we proxied profitability by sales growth, measured as the aggregate sales growth in the preceding 3 years in a given industry-city-year cell. We found that our indicator of profitability was positive, significant, and consistent with our previous findings. Credit constraint was negatively correlated with the likelihood of buying a fixed asset, but the effect was significant for the retail sales sector. Surprisingly, we found different patterns for various business environments. For example, we found that the pattern for finance, electricity, and transport was positive and significant. In other manufacturing sectors, we found that the labor quality and regulations were positive and significant. This was surprising in light of our previous argument and previous studies on the negative effects of the business environment on investment. However, other recent studies have suggested that the business environment might play a minor role for some sectors and some investors.

Table 7. Determinant of investment by service subsectors

Table 3-7: Determinant of investment by service subsectors

	Retail	Other service
	(1)	(2)
	Dependent variable is: buying fixed asset	
Sales growth	0.017***	0.024**
	(0.006)	(0.012)
Credit constrained	-0.052***	-0.055
	(0.010)	(0.044)
Firm age (log)	-0.006	-0.025**
	(0.007)	(0.010)
Firm size = 2, Medium	0.107***	0.190***
	(0.004)	(0.014)
Firm size = 3, Large	0.340***	0.320***
	(0.024)	(0.027)
Labor quality and regulations	-0.007	0.034*
	(0.024)	(0.020)
Taxes, corruption, instability	-0.032	-0.011
	(0.029)	(0.027)
Finance, electricity, transport	0.075***	0.046*
	(0.011)	(0.025)
Observations	1,139	1,402
Country-City	Yes	Yes
Firm characteristics	Yes	Yes
Investment climate	Yes	Yes
Sector FE	No	No
Year FE	Yes	Yes

3.7.   Conclusion

This paper contributes to the firm-level literature on private investment in Africa, using a unique panel of 9,462 firms from 26 African countries over the period between 2002 and 2020 collected by the World Bank. The richness of our data, which contains information on manufacturing and service sectors, allows us to provide a first assessment of the determinants of investment in service sector. This is important, given the growing importance of the service sector in African economies.

We established that investment by existing firms has been increasing and is highly related to profit. We then estimated an investment model and found that the value added has been playing a key role in explaining investment decisions in Africa, whereas credit constraints and taxes, corruption, and instability are still the main obstacles to investment. Other business environmental factors, such as the labor quality and regulations and the infrastructure, play a minor role. However, we show that these poor business environment indicators may increase investment in the service sector. Similar to previous research, we also found that firm characteristics such as age and size are important.

4. What are the gains from improving business environment?

4.1. Summary

Enhancing the investment climate holds the promise of not only bolstering firm performance but, significantly, elevating investment growth rates. In theory, achieving this goal necessitates a coordinated effort spanning various dimensions. However, when we delve into practicality, a series of critical questions emerge: Should every nation direct its attention to identical domains, or is a tailored approach more apt? What rewards lie in advancing within specific domains? And what emerge as the foremost priority sectors across diverse countries?

4.2. Some extra evidence from the field

The following tabulated information and graphs clearly show, along the extra FDI determinants related findings, the potential productivity gains associated with improving business environment to the level of the best performer in Africa.

Table 4-1: Potential investment gains associated with improving business environment to the level of the best performers in Africa.

	Investment in fixed assets	Quality of investment
9-Inadequately Educated Workforce	1.01	27.20
8-Electricity	9.86	12.76
7-Customs And Trade Regulations	1.25	25.67
6-Crime, Theft And Disorder	1.60	23.18
5-Courts	0.20	24.82
4-Corruption	2.31	21.32
3-Business Licensing And Permits	0.61	24.27
2-Access To Land	1.77	23.26
1-Access To Finance	5.83	9.41
15-Transport	1.15	25.60
14-Tax Rates	2.62	18.52
13-Tax Administration	1.23	23.72
12-Practices Of Competitors In The Info	2.73	16.73
11-Political Instability	2.67	19.51
10-Labor Regulations	0.46	29.43

Figure 4-1: Aggregate Gains in quality of investment, by Country

Chart Title

4.3. Overal conclusion

This paper contributes to the firm-level literature on private investment in Africa, using a unique panel of 9,462 firms from 26 African countries over the period between 2002 and 2020 collected by the World Bank. The richness of our data, which contains information on manufacturing and service sectors, allows us to provide a first assessment of the determinants of investment in service sector. This is important, given the growing importance of the service sector in African economies.

We established that investment by existing firms has been increasing and is highly related to profit. We then estimated an investment model and found that the value added has been playing a key role in explaining investment decisions in Africa, whereas credit constraints and taxes, corruption, and instability are still the main obstacles to investment. Other business environmental factors, such as the labor quality and regulations and the infrastructure, play a minor role. However, we show that these poor business environment indicators may increase investment in the service sector. Similar to previous research, we also found that firm characteristics such as age and size are important.

In sum

- o Investment is low in Central and East Africa despite high profitability: This is puzzling but might be due to bad business environment and information asymmetry.
- o Recently, productive capability and high domestic demand are driver of domestic investment
- o The timing of reforms is important. Those who do reform early benefited for the first come first serve
- o There are significant gains if countries improve their business environment through quality reforms, but the sequencing and gains are different by country.

Table 4-2: Ranking of Priorities for moving firms to the best performer Benchmark

	1-Access To Finance	2-Access To Land	3-Business Licensing And Permits	4-Corruption	5-Courts	6-Crime, Theft And Disorder	7-Customs And Trade Regulations	8-Electricity	9-Inadequately Educated Workforce	10-Labor Regulations	11-Political Instability	12-Practices Of Competitors In The Info	13-Tax Administration	14-Tax Rates	15-Transport
Angola	9	3	4	1	15	7	5	2	8	13	11	10	14	12	6
Benin	5	13	15	4	14	9	7	1	10	11	8	2	3	6	12
Botswana	7	2	4	5	13	3	10	11	1	9	15	6	14	8	12
BurkinaFaso	2	9	14	3	12	15	5	7	8	10	11	4	6	1	13
Burundi	4	7	10	6	12	13	5	1	14	15	3	8	9	2	11
CAR	3	14	13	4	12	9	2	1	11	15	8	5	7	10	6
Cameroon	6	14	15	3	10	8	7	4	11	12	13	2	1	5	9
CapeVerde	12	4	13	10	14	7	6	3	1	11	15	2	8	5	9
Chad	11	9	15	2	14	10	5	3	12	13	1	7	4	8	6
Congo	5	6	10	3	13	11	4	1	7	14	2	15	8	12	9
Côte d'Ivoire	2	8	15	4	13	6	9	12	10	14	1	3	7	5	11
DRC	3	10	15	6	14	11	7	1	9	12	2	4	5	8	13
Eritrea	15	4	2	13	11	12	8	10	6	9	1	14	7	5	3
Eswatini	11	7	5	4	14	2	9	6	8	12	15	1	10	3	13
Ethiopia	3	1	13	7	11	15	6	2	9	12	14	8	5	4	10
Gabon	12	9	13	4	14	8	5	2	3	10	15	7	6	11	1
Gambia	2	3	13	14	10	7	9	1	6	15	5	8	11	4	12
Ghana	2	3	10	6	12	13	5	1	8	14	11	15	7	4	9
Guinea	10	12	15	5	11	7	4	1	13	14	2	9	8	6	3
Guinea Bissau	2	15	13	4	8	10	11	1	12	14	3	7	9	5	6
Kenya	12	11	10	4	15	7	8	6	13	14	2	1	9	3	5
Lesotho	11	4	15	5	14	3	9	7	6	10	1	8	12	2	13
Liberia	2	6	13	4	10	5	12	1	8	14	15	11	9	3	7
Madagascar	5	13	14	7	15	3	8	2	11	12	1	4	6	10	9
Malawi	1	5	9	4	15	6	11	2	10	14	12	7	13	3	8
Mali	2	6	13	7	12	14	9	1	15	10	8	5	3	4	11
Mauritania	2	7	15	11	13	12	5	3	6	14	9	1	8	4	10
Mauritius	3	5	8	6	15	4	10	11	1	9	13	2	12	14	7
Mozambique	7	5	12	3	13	2	9	6	8	14	10	1	15	4	11
Namibia	1	2	9	3	12	4	10	8	5	7	15	14	13	6	11
Niger	7	12	15	5	14	11	9	3	10	13	2	1	6	4	8
Nigeria	4	6	12	2	15	8	9	1	14	11	7	10	13	5	3
Rwanda	3	4	10	14	13	11	9	7	2	12	15	8	5	1	6
Senegal	2	4	12	9	14	13	7	1	10	11	15	3	6	5	8
Sierra Leone	1	2	9	4	15	6	11	3	14	12	7	13	10	5	8
South Africa	7	9	10	4	8	1	11	2	5	6	3	12	13	13	13
South Sudan	7	3	10	2	15	11	8	5	12	13	1	9	14	4	6
Sudan	13	7	9	5	15	12	1	13	11	6	3	10	2	4	8
Tanzania	2	4	6	12	15	7	5	1	9	13	14	11	8	3	10
Togo	5	14	13	3	12	10	8	7	11	15	1	6	4	2	9
Uganda	8	4	7	6	15	12	10	1	11	13	14	3	9	2	5
Zambia	3	5	13	6	15	7	9	2	8	11	14	1	10	4	12
Zimbabwe	2	11	10	6	14	12	4	5	15	8	1	3	7	9	13

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ANNEXES with narratives and tables

Annex 1 - Tables

Table 1. Sample description and investment variables

	Observation	Invested in fixed asset (%)	Investment ratio (mean)
Angola	366	0.35	0.22
Benin	228	0.58	
Botswana	238	0.58	0.18
Burkina	176	0.38	0.20
Cameroon	464	0.56	0.33
Capeverde	106	0.71	
Cotedivoire	290	0.40	0.42
DRC	394	0.43	0.22
Ethiopia	744	0.48	0.34
Ghana	62	0.53	0.29
Kenya	302	0.54	0.30
Lesotho	122	0.61	
Liberia	162	0.62	
Malawi	328	0.57	0.45
Mali	556	0.45	0.16
Niger	240	0.72	
Nigeria	1,566	0.42	0.54
Rwanda	140	0.44	
Senegal	624	0.27	0.17
Sierra Leone	150	0.62	
Southafrica	382	0.65	0.15
Tanzania	230	0.63	0.20
Togo	120	0.51	
Uganda	418	0.44	0.15
Zambia	450	0.49	0.14
Zimbabwe	604	0.31	0.20

Table 2. Distribution of firms by sectors and investment behavior

Sector	Observation	Invested in fixed asset (%)	Investment ratio (mean)
Food	1252	0.49	0.20
Textiles & Garments	968	0.45	0.18
Other Manufacturing	3238	0.52	0.21
Retail	1682	0.35	0.62
Other Services	2134	0.48	0.23
Unclassified	188	0.58	0.19

Table 3. Descriptive statistics

Variables	Mean	Standard Deviation	Minimum	Maximum
Investment ratio	0.2071	0.3626	0	2.8462
Buying fixed assets	0.4677	0.4990	0	1
Value added to capital	1.4274	1.2921	-4.91	4.9880
Sales growth	0.4858	1.5558	-4.91	5
Credit constrained	0.3661	0.4818	0	1
Firm age (log)	2.5568	0.8442	0	4.6052
Firm size (small)	0.5850	0.4927	0	1
Firm size (Medium)	0.2712	0.4446	0	1
Firm size (Large)	0.1436	0.3507	0	1
Labor quality and regulations	0	1	-2.5427	7.7728
Taxes, corruption, instability	0	1	-3.5122	7.6267
Finance, electricity, transport	0	1	-10.9977	4.5295

Table 4. Determinant of investment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent variable is Investment ratio				*Dependent variable is Buying fixed assets*			
Value added to capital	0.061***	0.062***	0.061***	0.066***	0.027***	0.025***	0.026***	0.026***
	(0.013)	(0.013)	(0.014)	(0.014)	(0.008)	(0.008)	(0.008)	(0.010)
Profit	0.018*	0.014	0.015	0.018**	0.015*	0.015*	0.015*	0.014*
	(0.010)	(0.012)	(0.013)	(0.008)	(0.009)	(0.008)	(0.008)	(0.008)
Credit constrained	-0.138***	-0.138***	-0.143***	-0.132***	-0.185***	-0.140***	-0.146***	-0.139***
	(0.038)	(0.044)	(0.046)	(0.044)	(0.032)	(0.031)	(0.031)	(0.034)
Firm age (log)		-0.052**	-0.050**	-0.046**		0.006	0.007	0.016
		(0.025)	(0.025)	(0.022)		(0.018)	(0.018)	(0.019)
Firm size = 2, Medium		0.010	0.010	0.011		0.102***	0.102***	0.116***
		(0.016)	(0.014)	(0.010)		(0.030)	(0.029)	(0.024)
Firm size = 3, Large		0.045**	0.047**	0.035*		0.244***	0.245***	0.257***
		(0.021)	(0.018)	(0.020)		(0.026)	(0.024)	(0.022)
Labor quality and regulations			-0.003	-0.005			0.002	0.002
			(0.012)	(0.004)			(0.017)	(0.011)
Taxes, corruption, instability			-0.062**	-0.046***			-0.078***	-0.085***
			(0.025)	(0.018)			(0.026)	(0.026)
Finance, electricity, transport			-0.001	0.009			0.008	-0.000
			(0.012)	(0.011)			(0.032)	(0.023)
Landlocked				-0.033				-0.001
				(0.024)				(0.042)
Fragile				-0.018				0.019
				(0.025)				(0.027)
Oil-rich countries				-0.059				0.013
				(0.072)				(0.027)
minerals-rich countries				-0.018				-0.009
				(0.040)				(0.031)
Observations	1,127	1,126	1,126	1,126	1,411	1,403	1,403	1,424
Country-City FE	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Interaction between profit and country categories

	(1)	(2)	(3)	(4)	(5)
Profit	0.012	0.027***	0.018**	0.019**	0.014*
	(0.014)	(0.008)	(0.008)	(0.009)	(0.008)
Landlocked X Profit	-0.038*				
	(0.022)				
Fragile X Profit		0.022			
		(0.028)			
Resource X Profit			-0.029		
			(0.035)		
Oil X Profit				-0.019	
				(0.067)	
Minerals X Profit					-0.032
					(0.043)
Observations	1,126	1,126	1,126	1,126	1,126
Country-City	No	No	No	No	No
Firm characteristics	Yes	Yes	Yes	Yes	Yes
Investment climate	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Table 6: Determinant of investment by manufacturing subsectors

	Food processing	Garment, Leather, Textiles	Other manufacturing	Food processing	Garment, Leather, Textiles	Other manufacturing
	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable is: Investment ratio			*Dependent variable is: buying fixed asset*		
Value added to capital	0.024***	0.023	0.017	-0.004	0.024	0.024***
	(0.007)	(0.037)	(0.028)	(0.009)	(0.038)	(0.009)
Profit	0.028*	0.069	0.075**	0.024	0.071***	0.019*
	(0.016)	(0.044)	(0.030)	(0.015)	(0.019)	(0.011)
Credit constrained	-0.259***	-0.056	-0.128	-0.269***	-0.212***	-0.101***
	(0.072)	(0.044)	(0.085)	(0.063)	(0.034)	(0.032)
Firm age (log)	-0.031**	-0.045	-0.051	0.055	-0.007	0.003
	(0.014)	(0.066)	(0.045)	(0.043)	(0.058)	(0.032)
Firm size = 2, Medium	-0.064	0.009	0.004	-0.013	0.255***	0.122***
	(0.044)	(0.039)	(0.026)	(0.029)	(0.020)	(0.004)
Firm size = 3, Large	-0.062***	0.077	0.048***	0.155***	0.279***	0.213***
	(0.021)	(0.064)	(0.007)	(0.036)	(0.046)	(0.015)
Labor quality and regulations	-0.029	-0.673	0.035	-0.004	-0.166	0.089*
	(0.140)	(0.449)	(0.027)	(0.230)	(0.174)	(0.054)
Taxes, corruption, instability	-0.221**	-0.300	-0.169**	-0.262***	0.027	-0.120
	(0.110)	(0.299)	(0.072)	(0.058)	(0.090)	(0.074)
Finance, electricity, transport	-0.071	-0.302***	0.002	-0.009	-0.213**	0.029
	(0.063)	(0.048)	(0.055)	(0.038)	(0.091)	(0.072)
Observations	298	154	654	319	194	779
Country-City	Yes	Yes	Yes	Yes	Yes	Yes
Firm characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Investment climate	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Determinant of investment by service subsectors

	Retail	Other service
	(1)	(2)
	Dependent variable is: buying fixed asset	
Sales growth	0.017***	0.024**
	(0.006)	(0.012)
Credit constrained	-0.052***	-0.055
	(0.010)	(0.044)
Firm age (log)	-0.006	-0.025**
	(0.007)	(0.010)
Firm size = 2, Medium	0.107***	0.190***
	(0.004)	(0.014)
Firm size = 3, Large	0.340***	0.320***
	(0.024)	(0.027)
Labor quality and regulations	-0.007	0.034*
	(0.024)	(0.020)
Taxes, corruption, instability	-0.032	-0.011
	(0.029)	(0.027)
Finance, electricity, transport	0.075***	0.046*
	(0.011)	(0.025)
Observations	1,139	1,402
Country-City	Yes	Yes
Firm characteristics	Yes	Yes
Investment climate	Yes	Yes
Sector FE	No	No
Year FE	Yes	Yes

Annex 2: Empirical analysis of FDI inflows determinants in Africa and East Africa

Annex 2 - Model and estimation techniques

The empirical model to estimate is the following:

$$FDI_{it} = u_i + \sum_{k=1}^{m} \beta_k X_{k\,it} + \varepsilon_{it} \qquad (1)$$

where the dependent variable FDI_{it} represents per capita FDI net inflows in country i in year t; X_{kit} is the explanatory variable k; m represents the number of control variables; u_i are the individual countries fixed effects; and ε_{it} is the error term.

The set of explanatory variables $\{X_{kit}, k = 1, ..., m\}$ is composed of:
- Country income level measured by the real GDP par capita;
- Real GDP growth rate;
- Financial sector development proxied by the domestic credit to the private sector divided by GDP;
- Government consumption expenditures over GDP;
- Openness to trade measured by the sum of exports and imports of goods and services divided by GDP;
- Inflation approximated by the annual percentage change in the GDP deflator;
- Level of infrastructure development approximated by the subscription rate of mobile or fixed telephones per hundred inhabitants;
- Education approximated by gross school enrollment ratio at all levels;
- Urbanization approximated by the percentage of population living in urban areas;
- Forest rents as a proportion of GDP;
- Mineral rents as a proportion of GDP;
- Natural gas rents as a proportion of GDP;
- Oil rents as a proportion of GDP;
- Net official development assistance and official aid received as a proportion of GDP;
- Institutional quality indicator approximated by the sum of five (Political stability, Corruption, Regulatory quality, Rule of law, Government effectiveness) of the six governance indicators from the World Bank's Worldwide Governance Indicators (WGI) database.

Data for all these variables are obtained from the World Bank's World Development Indicators (WDI) database, except data on institutional quality which are calculated based on five of the six governance indicators of the World Bank's Worldwide Governance Indicators (WGI).

To estimate equation (1), we use three alternative strategies on panel data: the panel fixed effects (FE) method, the panel random effects (RE) method, and the ordinary least squares (OLS) method. For the OLS, we use four-year non-nested means to control for the cyclicity of the data in the regressions. Table A.1 reports the regression results. We choose deliberately to report the results for the FE and the RE to ensure that our results are robust across the two estimation methods. As such,

we prefer the economic importance of the results to any econometric test of specification between the two methods which are sometimes seen in the literature as substitutes. For regressions using the FE and the RE, all explanatory variables are lagged by one year to control for potential endogeneity issue.

Panel A[37] of Table A.1 provides the estimation results for the Africa sample, while panel B[38] reports results for Eastern Africa countries. The underlying idea is to investigate the possibility of convergence or divergence of the determinants of FDI for East Africa in comparison to Africa in general.

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[37] Panel A is composed of 47 African countries listed as follows: Algeria; Angola; Benin; Botswana; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Comoros; Congo, Dem. Rep.; Congo, Rep.; Cote d'Ivoire; Djibouti; Egypt, Arab Rep.; Equatorial Guinea; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Libya; Madagascar; Malawi; Mali; Mauritania; Mauritius; Morocco; Mozambique; Namibia; Niger; Nigeria; Rwanda; Senegal; Seychelles; Sierra Leone; South Africa; Sudan; Tanzania; Togo; Tunisia; Uganda; Zambia; Zimbabwe.
[38] Panel B is composed of all the Eastern African countries covered by this study, except South Sudan for which required data are not available.

Table A.1: FDI determinants regressions' results

This table presents the regression results for the Africa sample (Panel A) and East Africa region (Panel B) of the panel fixed effects (FE), panel random effects (RE) and the OLS. For the FE and RE, the explanatory variables are lagged by 1 year, whereas for the OLS, we use the 4-year non-overlapping means for each variable. For all these regressions, the dependent variable is the FDI inflows per capita. The sample for columns (1), (3) and (5) covers the period 1987-2018, while for columns (2), (4) and (6), the sample period is 1996-2018 for which data on worldwide governance indicators are available.

	Panel A: Africa						Panel B: East Africa region					
	Dependent variable: FDI inflows per capita						Dependent variable: FDI inflows per capita					
	FE	FE	RE	RE	OLS	OLS	FE	FE	RE	RE	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Real GDP per capita	0.148***	0.156***	0.0861***	0.0890***	0.107***	0.0955***	0.139**	0.207*	0.0585**	0.0400	0.126	0.0511
	[0.0147]	[0.0231]	[0.00668]	[0.00749]	[0.0274]	[0.0310]	[0.0677]	[0.121]	[0.0257]	[0.0393]	[0.0969]	[0.107]
Real GDP growth	0.334	1.523	0.768	3.154	1.033	2.667	15.43*	22.58*	10.65	25.41**	5.949	12.58
	[1.556]	[2.243]	[1.561]	[2.224]	[1.650]	[3.314]	[8.075]	[13.13]	[7.120]	[11.61]	[4.331]	[13.25]
Domestic credit to GDP	-2.832***	-3.096**	-1.994***	-2.333***	-2.146*	-2.606*	-12.57	-13.64	-12.80**	-17.43**	-13.26	-27.24
	[0.907]	[1.485]	[0.660]	[0.805]	[1.151]	[1.510]	[9.878]	[18.78]	[5.311]	[7.396]	[9.414]	[16.25]
Government consumption	-1.438	-1.260	-5.326***	-5.423*	-4.705*	-7.913*	11.83	23.18	4.986	7.742	-6.014	-14.12
	[2.322]	[3.752]	[1.987]	[2.815]	[2.767]	[4.365]	[10.17]	[16.05]	[8.065]	[11.51]	[9.243]	[14.14]
Trade over GDP	4.949***	5.366***	3.718***	3.808***	5.591***	5.748***	10.29***	17.05***	10.73***	16.33***	13.19***	24.87***
	[0.605]	[0.992]	[0.523]	[0.743]	[1.633]	[1.966]	[3.048]	[5.087]	[2.591]	[4.280]	[3.685]	[6.728]
Inflation	-0.00191	0.661	-0.00124	0.516	-0.00778*	0.0971	0.00209	2.404	0.00339	1.525	0.00604	-6.416
	[0.00828]	[0.713]	[0.00837]	[0.687]	[0.00402]	[0.239]	[0.0167]	[4.195]	[0.0158]	[3.922]	[0.0126]	[4.725]
Infrastructure	0.343	0.299	1.078***	0.713**	0.839*	0.902	3.978*	2.964	4.416***	4.807**	2.706	1.926
	[0.340]	[0.498]	[0.227]	[0.288]	[0.459]	[0.563]	[2.267]	[3.923]	[1.455]	[2.028]	[1.777]	[2.247]
Education	-0.104	0.0961	-0.214	-0.00209	-0.289	-0.173	-0.981	-1.519	-1.218*	-1.406	-0.834	-2.151
	[0.175]	[0.242]	[0.170]	[0.228]	[0.216]	[0.293]	[0.783]	[1.154]	[0.705]	[1.031]	[0.583]	[1.287]
Urbanisation	-5.894**	-8.793*	-6.849***	-5.782***	-6.416**	-8.258**	-16.71	-8.680	-8.669*	-10.32	-10.92	16.16
	[2.335]	[4.995]	[1.279]	[1.529]	[2.812]	[3.888]	[12.76]	[30.69]	[4.566]	[10.63]	[7.681]	[16.82]
Forest over GDP	-4.050	-4.888	-1.215	-2.864	-5.628**	-9.682***	-0.243	-1.409	-3.457	-9.294	-1.151	-9.205

	[2.937]	[4.799]	[2.423]	[3.441]	[2.337]	[3.273]	[7.778]	[13.64]	[4.866]	[8.699]	[4.897]	[6.442]
Minerals over GDP	-1.947	-1.172	-2.583	-3.272	**-6.831***	-5.518	-13.03	-22.60	-12.23	-11.43	-6.895	**-142.6***
	[4.172]	[6.086]	[3.817]	[4.990]	[2.607]	[4.207]	[40.18]	[158.5]	[36.34]	[143.4]	[14.72]	[82.72]
Natural Gas over GDP	**-40.44****	-34.34	-15.50	-10.28	-23.35	-1.298	-192.9	-1,003	-666.7	-601.3	-350.6	-478.3
	[19.51]	[27.48]	[16.56]	[19.61]	[17.44]	[19.43]	[861.6]	[1,490]	[689.0]	[1,329]	[358.0]	[565.8]
Oil over GDP	**-3.586***	**-4.381***	**-3.924***	**-6.203***	-5.415	-6.546	-27.84	-1,374	36.73	-1,478	-120.8	**-3,274****
	[1.850]	[2.500]	[1.461]	[1.863]	[3.599]	[4.604]	[167.4]	[2,880]	[127.4]	[2,687]	[77.09]	[1,577]
Aid received over GDP	-0.218	-0.0807	-0.0160	**0.357***	-0.254	0.112	-0.295	-0.120	-0.556	-0.605	0.472	-0.505
	[0.175]	[0.219]	[0.153]	[0.182]	[0.379]	[0.639]	[0.533]	[0.711]	[0.451]	[0.586]	[1.376]	[1.637]
Institutional quality		-7.169		**-12.45****		-2.110		-37.46		**-47.36***		-13.67
		[9.370]		[6.212]		[6.672]		[35.04]		[24.99]		[22.95]
Constant	-130.7	-116.4	96.97	-16.27	1.728	109.2	-108.1	-974.9	2.161	-316.2	51.91	303.9
	[105.0]	[218.9]	[59.92]	[86.31]	[173.7]	[242.0]	[339.2]	[908.1]	[144.0]	[377.3]	[260.1]	[573.9]
Country fixed effects					YES	YES					YES	YES
Observations	1,117	806	1,117	806	323	242	239	162	239	162	71	48
R-squared	0.208	0.138			0.824	0.854	0.321	0.263			0.928	0.959
Number of countries	46	45	46	45	46	45	13	13	13	13	13	13
Period of data	1987-2018	1996-2018	1987-2018	1996-2018	1987-2018	1996-2018	1987-2018	1996-2018	1987-2018	1996-2018	1987-2018	1996-2018
Wald Test			353.53	274.67					301.98	214.16		
P-value			0.000	0.000					0.00	0.00		

Source of data: Data for all the variables are obtained from the World Bank's World Development Indicators (WDI) database, except data on institutional quality which are calculated based on five of the six governance indicators of the World Bank's Worldwide Governance Indicators (WGI).

*Standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1*

Annex 2- Interpretation of results

The results indicate that real GDP per capita has a positive and significant impact on inward FDI flows for both African and East African countries. This means that the level of income of the country is an important determinant in attracting FDI flows into the country. The evidence also indicates that real GDP growth determines FDI inflows only for East African countries. Openness to trade is an important determinant of FDI for both African countries and East African countries. This factor is positively related to the flow of incoming FDI in the two samples considered. This means that countries that are more opened to international trade, all other things being equal, should attract more FDI than those that are less so. Also, as expected, infrastructure development positively impacts FDI attractiveness in the host country. Official development assistance and official aid (ODA) have a weak significant positive impact on FDI inflows. ODA more often serve as funding source for improving socio-economic infrastructure; hence, consistent with the positive impact of infrastructure observed, it has a positive impact on FDI inflows.

The empirical evidence indicates that the level of financial development is negatively associated with FDI inflows for both Africa and East Africa. This result may seem counterintuitive at first glance as one would expect a developed and dynamic financial market and banking sector to be a pull factor for FDI inflows. However, a closer look at the composition of FDI towards most African countries could help explain this negative relationship. Indeed, FDI inflows toward most African countries were concentrated in the extractive sector. In this sense, it can be conjectured that the more local financial markets develop, the more there is a breakdown of FDI towards the services sector and less towards the extractive sector. If the decline in FDI into the extractive sector is not offset by an increase in FDI to the services sector, there can be a negative relationship between the development of financial markets and FDI to African countries. Government consumption expenditure also has a negative impact on FDI in Africa, but turns out to have non-significant impact in East Africa.

Following the principles of market demand, one would expect that the urbanization of countries would be positively associated with the flow of inward FDI into those countries. Indeed, one of the arguments used to justify the fact that a multinational wants to invest abroad is that of seeking the satisfaction of local demand in a logic of expanding the market for its products. In this perspective, increased urbanization should lead to an expansion of the market potential for a given country. However, the empirical evidence here indicates a negative relationship between urbanization and FDI inflows. Here, also the composition of African countries FDI inflows could explain this negative relationship. Indeed, in countries where FDI are carried out in a logic of access to raw materials as is the case in most African countries, it is possible that the market expansion argument becomes less important, and as a result, one may observe a negative relationship between urbanization and flows of FDI in the country.

The results also indicate a negative relationship between natural resources (forest, minerals, natural gas, oil) rents and FDI flows whenever the coefficient is significant. For example, oil rents are negatively associated to FDI inflows in Africa and East Africa. This means that, on average, the volatility of oil prices negatively impacts the flow of FDI for African countries in general during the period of the study.

The quality of institution is negatively associated to FDI inflows in the random effects regressions, but not confirm by the other regressions. So, the impact of the institutional quality is not conclusive. However, the weak negative effect observed has probably to do with the sectorial distribution of inwards FDI in African economies.

Annex 2 key messages 1- Overall, the level of the country income, the degree of openness to trade and the quality of infrastructure development are pull factors for FDI inflows in East

Annex 3: Empirical analysis of the Impact of FDI on real GDP per capita

Annex 3 - Model and estimation techniques

The empirical model to be estimated is as follows:

$$Y_{it} = \omega_i + \theta FDI_{it} + \sum_{k=1}^{n} \gamma_k X_{kit} + \vartheta_{it} \qquad (2)$$

where Y_{it} represents the real income per capita approximated by the logarithm of real GDP per capita; FDI_{it} is the per capita net FDI inflows in country i at period t; X_{kit} is the explanatory variable k; n is the number of explanatory variables; ω_i is for individual countries fixed effects; and ϑ_{it} is the error term.

The set of explanatory variables $\{X_{kit}, k = 1, …, n\}$ is composed of:
- Real GDP growth rate;
- Financial sector development proxied by the domestic credit to the private sector divided by GDP;
- Government consumption expenditures over GDP;
- Openness to trade measured by the sum of exports and imports of goods and services divided by GDP;
- Inflation approximated by the annual percentage change in the GDP deflator;
- Level of infrastructure development approximated by the subscription rate of mobile or fixed telephones per hundred inhabitants;
- Education approximated by gross school enrollment ratio at all levels;
- Urbanization approximated by the percentage of population living in urban areas;
- Forest rents as a proportion of GDP;
- Mineral rents as a proportion of GDP;
- Natural gas rents as a proportion of GDP;
- Oil rents as a proportion of GDP;
- Net official development assistance and official aid received as a proportion of GDP;
- Institutional quality indicator approximated by the sum of five (Political stability, Corruption, Regulatory quality, Rule of law, Government effectiveness) of the six governance indicators from the World Bank's Worldwide Governance Indicators (WGI) database.

Data for all these variables are obtained from the World Bank's World Development Indicators (WDI) database, except data on institutional quality which are calculated based on five of the six governance indicators of the World Bank's Worldwide Governance Indicators (WGI).

To estimate equation (2), we use three alternative estimation strategies on panel data: the panel fixed effects (FE) method, the panel random effects (RE) method, and the ordinary least squares (OLS) method. For the OLS, we use the four-year non-nested means to control for the cyclicity of the data in the regressions. We deliberately choose to keep regressions with FE and RE to ensure the robustness of our results. For the regressions using FE and RE, all explanatory variables are included in the regressions by taking their order 1 delays to control potential endogeneity issues.

Panel A[39] of Table A.2 provides the estimation results for the Africa sample, while panel B[40] reports results for Eastern Africa countries.

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[39] Panel A is composed of 47 African countries listed as follows: Algeria; Angola; Benin; Botswana; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Comoros; Congo, Dem. Rep.; Congo, Rep.; Cote d'Ivoire; Djibouti; Egypt, Arab Rep.; Equatorial Guinea; Gabon; Gambia; Ghana; Guinea; Guinea-Bissau; Kenya; Lesotho; Libya; Madagascar; Malawi; Mali; Mauritania; Mauritius; Morocco; Mozambique; Namibia; Niger; Nigeria; Rwanda; Senegal; Seychelles; Sierra Leone; South Africa; Sudan; Tanzania; Togo; Tunisia; Uganda; Zambia; Zimbabwe.
[40] Panel B is composed of all the Eastern African countries covered by this study, except South Sudan for which required data are not available.

Table A.2: Impact of FDI on real GDP per capita regressions' results

This table presents the regression results for the Africa sample (Panel A) and East Africa region (Panel B) of the panel fixed effects (FE), panel random effects (RE) and the ordinary least squares (OLS) regressions. For the FE and RE, the explanatory variables are lagged by 1 year, whereas for the OLS, we use the 4-year non-overlapping means for each variable. The dependent variable if the log of the real GDP per capita. The sample for columns (1), (3) and (5) covers the period 1987-2018, while for columns (2), (4) and (6), the sample period is 1996-2018 for which data on worldwide governance indicators are available.

	Panel A: Africa						Panel B: East Africa region					
	Dependent variable: Log of Real GDP per capita						Dependent variable: Log of real GDP per capita					
	FE	FE	RE	RE	OLS	OLS	FE	FE	RE	RE	OLS	OLS
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
FDI per capita	-1.18e-05	-1.45e-05	-8.34e-06	-1.04e-05	0.000713***	-2.10e-05	-2.31e-05	1.51e-05	-0.000105	-7.25e-05	-0.000196	4.77e-06
	[1.61e-05]	[1.37e-05]	[1.71e-05]	[1.53e-05]	[0.000198]	[6.23e-05]	[2.40e-05]	[1.47e-05]	[7.62e-05]	[7.50e-05]	[0.000357]	[6.84e-05]
Real GDP growth	0.00294***	0.00142	0.00275***	0.001000	-0.0210**	-0.00598	0.00448*	0.00302	0.00902	0.00220	0.00654	-0.0156***
	[0.000859]	[0.000868]	[0.000911]	[0.000971]	[0.0105]	[0.00362]	[0.00264]	[0.00202]	[0.00773]	[0.00948]	[0.0165]	[0.00470]
Domestic credit to GDP	0.00557***	0.00317***	0.00586***	0.00361***	0.0116***	0.00530***	0.0138***	0.00873***	-0.0120**	-0.00696	-0.00423	0.00954
	[0.000467]	[0.000548]	[0.000490]	[0.000601]	[0.00134]	[0.00143]	[0.00334]	[0.00288]	[0.00527]	[0.00576]	[0.0102]	[0.00947]
Government consumption	-0.00568***	-0.00461***	-0.00507***	-0.00416***	-0.000294	-0.00787**	-0.0111***	-0.00496**	-0.0155*	0.00227	-0.00957	-0.0162***
	[0.00126]	[0.00141]	[0.00133]	[0.00156]	[0.00613]	[0.00347]	[0.00326]	[0.00242]	[0.00810]	[0.00929]	[0.0232]	[0.00580]
Trade over GDP	0.000533	0.000606	0.000721**	0.000895**	0.00657***	0.000290	0.00130	-0.00182**	0.0153***	0.0175***	0.0174**	-0.00144
	[0.000344]	[0.000393]	[0.000363]	[0.000435]	[0.00178]	[0.001000]	[0.00101]	[0.000845]	[0.00263]	[0.00328]	[0.00740]	[0.00258]
Inflation	8.35e-06*	-0.000414	8.29e-06*	-0.000390	2.01e-05	-0.000344	8.24e-06	0.000468	1.23e-05	-0.00724**	3.57e-05	0.00176
	[4.56e-06]	[0.000274]	[4.84e-06]	[0.000306]	[2.11e-05]	[0.000215]	[5.63e-06]	[0.000668]	[1.72e-05]	[0.00331]	[3.38e-05]	[0.00215]
Infrastructure	0.00222***	0.00246***	0.00217***	0.00241***	0.000428	0.00215***	0.00152**	0.00253***	0.00461***	0.00518***	0.00376	0.00180
	[0.000124]	[0.000118]	[0.000131]	[0.000131]	[0.000911]	[0.000318]	[0.000615]	[0.000425]	[0.00144]	[0.00154]	[0.00358]	[0.00127]
Education	0.000731***	0.000379***	0.000744***	0.000359***	0.00254***	0.000695***	0.000340	-0.000290	-0.000352	0.00260***	-0.000849	-8.20e-07
	[9.58e-05]	[9.36e-05]	[0.000102]	[0.000105]	[0.000771]	[0.000251]	[0.000251]	[0.000181]	[0.000763]	[0.000844]	[0.00172]	[0.000637]

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Forest over GDP	-0.0135***	-0.00643***	-0.0153***	-0.00898***	-0.0715***	-0.00899	-0.0134***	-0.00238	-0.0534***	-0.0420***	-0.0499***	-0.00566
	[0.00162]	[0.00185]	[0.00171]	[0.00205]	[0.00738]	[0.00627]	[0.00262]	[0.00217]	[0.00425]	[0.00554]	[0.00810]	[0.00585]
Minerals over GDP	-0.00401*	0.00174	-0.00464*	0.000922	0.00126	-0.00261	-0.00522	0.0637**	-0.0897**	-0.258**	-0.0848*	0.0819
	[0.00229]	[0.00236]	[0.00242]	[0.00262]	[0.00981]	[0.00323]	[0.0135]	[0.0250]	[0.0387]	[0.122]	[0.0458]	[0.0762]
Natural Gas over GDP	0.0827***	0.0599***	0.0845***	0.0628***	0.0603	0.0767***	0.808***	0.452*	-0.556	0.155	-0.818	0.820*
	[0.0107]	[0.0106]	[0.0113]	[0.0118]	[0.0697]	[0.0227]	[0.283]	[0.232]	[0.739]	[1.119]	[0.730]	[0.442]
Oil over GDP	0.00160	0.00418***	0.00263**	0.00542***	0.0309***	0.00812**	-0.0532	0.520	0.152	-5.626***	0.0842	0.929*
	[0.00102]	[0.000962]	[0.00107]	[0.00106]	[0.00435]	[0.00368]	[0.0564]	[0.425]	[0.130]	[2.015]	[0.197]	[0.533]
Aid received over GDP	7.93e-05	7.14e-06	8.47e-05	-1.71e-06	0.00139*	0.000199	0.000239	-4.63e-05	0.00314***	0.00150***	0.00585***	0.000234
	[9.57e-05]	[8.43e-05]	[0.000101]	[9.40e-05]	[0.000826]	[0.000191]	[0.000168]	[0.000103]	[0.000473]	[0.000500]	[0.00145]	[0.000268]
Institutional quality		0.0353***		0.0376***		0.0377***		0.0601***		0.0462**		0.0587***
		[0.00360]		[0.00395]		[0.00837]		[0.00557]		[0.0213]		[0.0102]
Constant	6.955***	7.136***	7.025***	7.212***	6.421***	7.948***	6.619***	6.920***	6.158***	6.770***	6.237***	6.178***
	[0.0269]	[0.0318]	[0.0739]	[0.0713]	[0.116]	[0.140]	[0.0556]	[0.0651]	[0.113]	[0.182]	[0.199]	[0.226]
Country fixed effects					YES	YES					YES	YES
Observations	1,117	806	1,117	806	323	242	239	162	239	162	71	48
Number of countries	46	45	46	45	46	45	0.582	0.825			0.883	0.997
Period of data	1987-2018	1996-2018	1987-2018	1996-2018	1987-2018	1996-2018	13	13	13	13	13	13
R-squared	0.619	0.653			0.795	0.992	1987-2018	1996-2018	1987-2018	1996-2018	1987-2018	1996-2018
Wald-Test			1600.75	1217						1202.91	1038.39	
P-value			0.00	0.00						0.00	0.00	

Source of data: Data for all the variables are obtained from the World Bank's World Development Indicators (WDI) database, except data on institutional quality which are calculated based on five of the six governance indicators of the World Bank's Worldwide Governance Indicators (WGI).

Standard Errors in brackets: *** p<0.01, ** p<0.05, * p<0.1

Annex 3 - Interpretation of results

The results provided in Table A.2 indicate a non-significant relationship between per capita FDI and per capita income in East Africa. For Africa sample, only the OLS regression without the institutional quality indicator shows a significant positive association between FDI and per capita GDP for the period spanning 1987-2018. This relationship is not supported by the other regressions.

Annex 2 key messages 2: Overall the type of FDI that goes in African countries, particularly in East Africa, does not translate into wealth improvement for the population after controlling for all other factors pertaining to FDI attraction and income growth. There is therefore urgent need for quality FDI that would have real impact on the countries' income level.

Above (in annex 1 and 2), we have analysed factors that favor the attraction of FDI inflows into Africa and East Africa, and the impact of FDI on income growth. However, it appears that the impact of FDI on countries' income is not positive, and that may be due to the type and quality of FDI received by these countries. We further investigate the impact of FDI on sectoral value added.

Annex 4 - Model and estimation techniques

The empirical model to be estimated is the following:

$$VA_{ijt} = \alpha_i + \mu FDI_{it} + \sum_{k=1}^{p} \delta_k X_{kit} + \varepsilon_{ijt} \qquad (3)$$

where VA_{ijt} represents the value added (as percentage of GDP) of sector j in country i at date t; FDI_{it} represents the FDI inflows as a proportion of GDP in country i at date t; X_{kit} is the control variable k; p is the number of control variables; α_i are individual countries fixed effects; and ε_{ijt} is the error term.

Data on sectoral added value are obtained from the WDI database. These added values concern four sectors:

- The agricultural sector (agriculture, forestry, and fishing, value added as % of GDP) hereinafter referred to as *Agriculture*

- The industry sector (industry (including construction) value added as % of GDP) called hereinafter *Industry*

- The manufacturing sector (manufacturing value added as % of GDP) hereinafter *Manufacturing*

- The services sector (services value added as % of GDP) referred hereinafter to as *Services*

The set of explanatory variables {X_{kit}, k = 1, …, p} is composed of:
- Country income level measured by the real GDP par capita;
- Real GDP growth rate;
- Financial sector development proxied by the domestic credit to the private sector divided by GDP;
- Government consumption expenditures over GDP;
- Openness to trade measured by the sum of exports and imports of goods and services divided by GDP;
- Inflation approximated by the annual percentage change in the GDP deflator;
- Level of infrastructure development approximated by the subscription rate of mobile or fixed telephones per hundred inhabitants;
- Education approximated by gross school enrollment ratio at all levels;
- Urbanization approximated by the percentage of population living in urban areas;
- Forest rents as a proportion of GDP;
- Mineral rents as a proportion of GDP;

- Natural gas rents as a proportion of GDP;
- Oil rents as a proportion of GDP;
- Net official development assistance and official aid received as a proportion of GDP;
- Institutional quality indicator approximated by the sum of five (Political stability, Corruption, Regulatory quality, Rule of law, Government effectiveness) of the six governance indicators from the World Bank's Worldwide Governance Indicators (WGI) database.

Data for the control variables are obtained from the World Bank's World Development Indicators (WDI) database, except data on institutional quality which are calculated based on five of the six governance indicators of the World Bank's Worldwide Governance Indicators (WGI).

To estimate equation (3), we use the panel fixed effects (FE) method. All explanatory variables are lagged 1 year to control for possible endogeneity issue.

Annex 4- Table A.3: Impact of FDI on sectoral value added – Panel A: Africa

This table presents the results for the Africa sample of the panel fixed effects regressions. All explanatory variables are lagged by 1 year. The dependent variable is the value added in the sector over GDP. In each table, the first four columns span the period 1987-2018, while for the last four columns, the sample period is 1996-2018 for which data on worldwide governance indicators are available.

VARIABLES	Dependent variable: Value added in the sector over GDP							
	Agriculture	Industry	Manufacturing	Services	Agriculture	Industry	Manufacturing	Services
FDI over GDP	-0.138***	0.0832**	0.0273	0.0294	-0.124***	0.0680**	0.0183	0.0512
	[0.0345]	[0.0347]	[0.0210]	[0.0411]	[0.0291]	[0.0310]	[0.0212]	[0.0370]
Real GDP per capita	1.96e-05	-0.00135***	-0.000255	0.00268***	6.98e-05	-0.00119***	-0.000944***	0.00252***
	[0.000295]	[0.000298]	[0.000179]	[0.000356]	[0.000309]	[0.000331]	[0.000224]	[0.000398]
Real GDP growth	-0.115***	0.0933***	-0.0557***	-0.0668*	-0.0906***	0.127***	-0.0453**	-0.106***
	[0.0321]	[0.0324]	[0.0200]	[0.0385]	[0.0310]	[0.0331]	[0.0230]	[0.0395]
Domestic credit to GDP	0.0471**	-0.0330*	-0.0389***	-0.0122	0.0458**	-0.0144	-0.0181	-0.0699***
	[0.0191]	[0.0199]	[0.0116]	[0.0229]	[0.0206]	[0.0235]	[0.0149]	[0.0263]
Government consumption	-0.0929*	-0.245***	-0.0832***	0.414***	-0.193***	-0.135**	-0.169***	0.367***
	[0.0474]	[0.0479]	[0.0297]	[0.0567]	[0.0524]	[0.0563]	[0.0397]	[0.0668]
Trade over GDP	0.0296**	0.0611***	-0.0287***	-0.0840***	0.0463***	0.0447***	-0.0188*	-0.0848***
	[0.0121]	[0.0122]	[0.00741]	[0.0145]	[0.0135]	[0.0144]	[0.00983]	[0.0172]
Inflation	0.00121***	-0.000746***	-0.0130***	-0.000340*	0.00228	0.0163	0.00181	-0.0108
	[0.000171]	[0.000172]	[0.00397]	[0.000203]	[0.00987]	[0.0105]	[0.00737]	[0.0125]
Infrastructure	-0.0380***	-0.00686	-0.0124***	0.0243***	-0.0309***	-0.0110**	-0.00785**	0.0257***
	[0.00522]	[0.00529]	[0.00326]	[0.00627]	[0.00478]	[0.00521]	[0.00351]	[0.00611]
Education	-0.0205***	0.00207	-0.00436*	0.0158***	-0.0135***	0.00966***	-0.00492*	0.00856*
	[0.00361]	[0.00363]	[0.00228]	[0.00434]	[0.00340]	[0.00363]	[0.00261]	[0.00437]
Institutional quality					-0.517***	-0.0250	0.153	0.162
					[0.132]	[0.142]	[0.100]	[0.168]
Constant	25.68***	28.71***	17.09***	36.13***	22.49***	26.37***	19.39***	40.38***
	[1.156]	[1.164]	[0.739]	[1.381]	[1.355]	[1.448]	[1.019]	[1.717]

Observations	1,092	1,088	1,000	1,070	798	794	737	785
R-squared	0.194	0.143	0.153	0.223	0.157	0.121	0.159	0.191
Number of countries	46	46	44	45	45	45	43	44
Period of data	1987-2018	1987-2018	1987-2018	1987-2018	1996-2018	1996-2018	1996-2018	1996-2018

Source of data: Data for all the variables are obtained from the World Bank's World Development Indicators (WDI) database, except data on institutional quality which are calculated based on five of the six governance indicators of the World Bank's Worldwide Governance Indicators (WGI).

*Standard Errors in brackets: *** p<0.01, ** p<0.05, * p<0.1*

Annex 4 - Table A.4: Impact of FDI on sectoral value added – Panel B: East Africa region

This table presents the results for the East Africa region of the panel fixed effects regressions. All explanatory variables are lagged by 1 year. The dependent variable is the value added in the sector over GDP. In each table, the first four columns span the period 1987-2018, while for the last four columns, the sample period is 1996-2018 for which data on worldwide governance indicators are available.

VARIABLES	Dependent variable: Value added in the sector over GDP							
	Agriculture	Industry	Manufacturing	Services	Agriculture	Industry	Manufacturing	Services
FDI over GDP	-0.164	0.0659	0.00804	**0.208****	0.0145	-0.0168	0.00277	0.0973
	[0.104]	[0.0738]	[0.0560]	[0.0898]	[0.0737]	[0.0557]	[0.0565]	[0.0809]
Real GDP per capita	-6.16e-05	**-0.00114***	-0.000682	**0.00201*****	0.000394	**-0.00350*****	**-0.00260*****	**0.00265*****
	[0.000821]	[0.000584]	[0.000443]	[0.000729]	[0.000744]	[0.000562]	[0.000579]	[0.000849]
Real GDP growth	-0.0675	0.0518	-0.0967	-0.0340	0.0979	0.131*	0.0377	-0.0185
	[0.105]	[0.0746]	[0.0654]	[0.0919]	[0.0927]	[0.0700]	[0.0798]	[0.106]
Domestic credit to GDP	-0.0680	**0.293*****	0.135*	-0.0538	**0.230***	0.138	-0.0595	**-0.319****
	[0.139]	[0.0989]	[0.0767]	[0.129]	[0.130]	[0.0979]	[0.101]	[0.144]
Government consumption	**-0.244***	-0.143	**-0.144***	**0.285****	**-0.197***	**-0.144***	**-0.191****	**0.206***
	[0.135]	[0.0962]	[0.0767]	[0.121]	[0.111]	[0.0841]	[0.0906]	[0.122]
Trade over GDP	0.0671	**-0.0524***	-0.0256	-0.0424	-0.0222	-0.0725**	**-0.0824*****	0.0645
	[0.0432]	[0.0307]	[0.0232]	[0.0387]	[0.0371]	[0.0281]	[0.0294]	[0.0416]
Inflation	**0.00116*****	**-0.000754*****	**-0.0230*****	-0.000273	**0.0672****	-0.0136	0.0247	-0.00884
	[0.000209]	[0.000148]	[0.00532]	[0.000180]	[0.0294]	[0.0222]	[0.0214]	[0.0328]
Infrastructure	**-0.0500***	-0.0165	-0.0161	0.0380	**-0.0454****	0.00859	0.0245	0.0298
	[0.0261]	[0.0186]	[0.0150]	[0.0238]	[0.0217]	[0.0164]	[0.0173]	[0.0257]
Education	**-0.0577*****	0.00513	-0.0104	**0.0399*****	**-0.0357*****	-0.000996	-0.00206	**0.0299*****
	[0.0101]	[0.00716]	[0.00656]	[0.00882]	[0.00801]	[0.00606]	[0.00936]	[0.00887]
Institutional quality					**-0.622*****	0.274	-0.0120	0.319
					[0.234]	[0.177]	[0.226]	[0.257]
Constant	39.06***	20.08***	15.69***	33.64***	29.24***	27.74***	22.45***	37.38***
	[2.549]	[1.813]	[1.473]	[2.227]	[3.280]	[2.480]	[2.647]	[3.633]

Observations	232	232	181	216	162	162	122	155
R-squared	0.376	0.199	0.209	0.330	0.341	0.391	0.360	0.380
Number of countries	13	13	13	13	13	13	13	13
Period of data	1987-2018	1987-2018	1987-2018	1987-2018	1996-2018	1996-2018	1996-2018	1996-2018

Source of data: Data for all the variables are obtained from the World Bank's World Development Indicators (WDI) database, except data on institutional quality which are calculated based on five of the six governance indicators of the World Bank's Worldwide Governance Indicators (WGI).

Standard Errors in brackets: *** p<0.01, ** p<0.05, * p<0.1

Annex 4 - Interpretation of results

The results presented in Table A.3 & Table A.4 indicate that **FDI flows have a negative and significant impact on value added in the agriculture sector in African countries in general, but the impact is non-significant in East Africa. Inflows of FDI tend to have a positive impact on value added in the industrial sector in Africa in general, but not in East Africa.**

On the other hand, FDI inflows have a positive and significant effect on value added in the services sector only in the sample of East African countries, while the effect is not significant for African countries.

There is then a divergence between samples (Africa and East Africa) in the effects of FDI on sectoral value added for Africa in general and for East African countries in particular.

> **Annex 4 key messages 2: Overall, over the period under review, foreign direct investments (FDI) do not seem to create value in the different economic sectors in East Africa. This calls for change in strategies to attract more volume and better quality FDI, which could have real positive effects on the sub region economies**