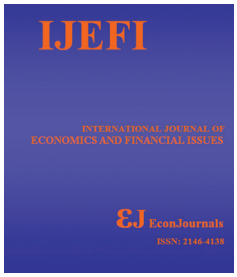

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Does Better Business Regulatory Environment Translate to Increased Foreign Direct Investment Inflows? Evidence from Eastern Africa

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ABSTRACT

The private sector plays a pivotal role in social economic development. A thriving business environment creates employment and generates returns that can be re-invested both domestically and internationally. Unfortunately, there has been scanty scholarly exploration on how improvements in doing business environment affect foreign direct investments. For that reason, this paper intended to establish how improvements in doing business environment affect the flow of foreign direct investments into the eastern Africa region. The study used panel data, maintained by the World Bank from 12 Eastern Africa countries for the period 2004 through 2017. The World Bank has profiled 11 parameters to define doing business environment, namely; doing business, starting a business, dealing with construction permits, getting electricity, registering property and getting credit. Others include, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency. GDP per capita, trade openness and labour force controlled the relationship between ease of doing business and FDI. Using OLS regression on Pooled data, the paper established a significant influence of ease of doing business variables on FDI. Therefore, the paper concluded that FDI follows the size and quality of the market and production efficiency. Then, the paper advises governments to enact adequate regulations that support the development of the private sector.

Keywords: Foreign Direct Investments, Ease of Doing Business, Starting a Business
JEL Classifications: C33, F21, F23, O11

1. INTRODUCTION

In 2015, the United Nations coined together 17 sustainable development goals (SDGs) with an ultimate aim of balancing the economic, social and ecological extents of sustainable development by the year 2030 (Mercer, 2018). SDGs 6-9 and 13 particularly, focus on infrastructure development. For instance, SDG 8 advocates for full and productive employment and decent work for all, by the year 2030, and SDG 9 promotes building of irrepressible infrastructure, all-encompassing and maintainable industrialization and nurturing innovation (United Nations, 2015). The African union also adopted agenda 2063, composed of 7 aspirations with an objective of delivering a prosperous continent to the next generation. In particular, aspiration 1 envisages a flourishing Africa grounded on inclusive growth and sustainable development (Africa Union Commission, 2015). Therefore, for countries to meet these goals, a deliberate effort to commit resources to deserving and productive sectors is paramount. Furthermore, there is need for proper coordination among governments, non-governmental organizations and the private sector (Mercer, 2018) which are key in economic development.

This then calls for nations to organize resources from both local and international markets in order to meet this challenge. Nevertheless, domestic resources should be more preferred to foreign resources. Regrettably, domestic savings for African nations fall way below the

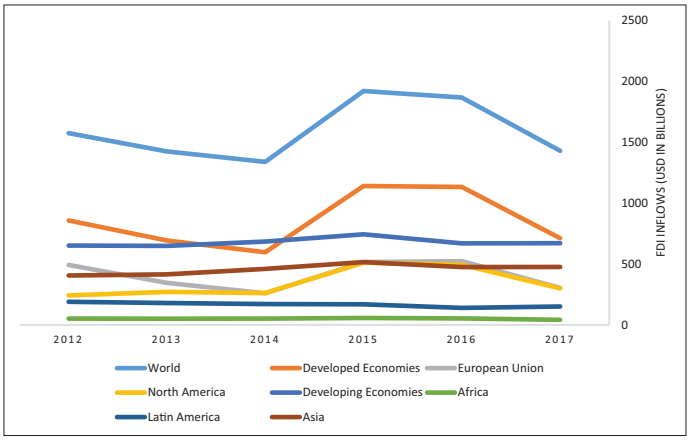
requirements. For instance, by the year 2040, Africa is projected to struggle with USD 1.7 trillion of infrastructure investment gap (Global Infrastructure Hub, 2017) and sub-Saharan Africa is suffering from an annual infrastructure deficit of about USD 100 billion (BCG, 2017).

Therefore, there is need to attract and retain foreign investments which can either be in the form of portfolio investments or direct investments to supplement domestic investments (Epaphra and Massawe, 2017; Bosire, 2019). According to UNCTAD (2018), foreign direct investments accounted for 39% of external funding for developing countries between 2013 and 2017, making it one of the most important sources of development finance. This is because, FDI is not just finance but also a package of both tangible and intangible assets necessary for enhancing productive capacity for the developing world. To this extent, foreign direct investments enable countries to enrich their productive efficiency and stimulate industrial competitiveness, transmit knowledge, information and new technology necessary for industrial development and generation of employment (KNBS, 2015). Notably, in search for new investment opportunities, foreign investors consider factors such as natural resources, the size and quality of the market, production efficiency and strategic assets (Masipa, 2018).

However, according to UNCTAD (2018), the 2017 foreign direct investment trends, report a 23% decline in global inflows. This decline is explained by 37% decrease in FDI flows into the developed economies, 42% decrease to the European Union, 39% decrease to North America and 21% decrease to Africa (Figure 1). Evidently, Africa received very low FDIs in 2017 (USD. 42 Billion) despite the continent holding at-least 30% of the world's mineral deposits, at-least 8% of the world's verified oil deposits and at-least 7% of natural gas (AFDB, 2016). This phenomenon puts Africa at a precarious position and the prospects of attaining both SDGs and agenda 2063 becomes an up-hill task. Consequently, there is need for a deep investigation as to what influences the flow of foreign direct investments into Africa and this paper narrows its focus to business regulatory environment as defined by the ease of doing business index by the World Bank.

For an economy to thrive, policies that foster the development of the private sector are paramount. This is because the private sector has

Figure 1: FDI inflows by region, 2012-2017



Source: UNCTAD, 2018

the ability of creating jobs and generating earnings for further local reinvestment. Therefore, governments have an obligation of reforming business laws and regulations to enable businesses to form, innovate, grow and graduate to large enterprises. The doing business index gives policy makers an indication of areas that need urgent attention and reform to make it easy for businesses to operate (World Bank, 2019).

2. LITERATURE REVIEW

This section dissects scholarly works from the past to bring out the theoretical orientation and empirical literature review to aid in conceptualizing a framework for analysis.

2.1. Theoretical Orientation

According to Kombo and Tromp (2009), a theory conceptualizes why some occurrences behave in a certain manner. This paper dichotomizes the eclectic paradigm to explain why foreign direct investments happen.

2.1.1. The eclectic paradigm (OLI paradigm)

This theory was advanced by Dunning (1977) after a careful consideration of Hymer (1976) and Kindleberger (1969) work. Dunning (1977) amalgamated the oligopolistic theory with internalization theory and added a third dimension to it – the location theory to come up with the eclectic paradigm or the O-L-I paradigm (Ownership, Location and Internalization). The theory state that firms in certain markets should have specific and exclusive advantages over other firms for them to remain competitive. These ownership advantages include monopolistic advantages such as trademarks and patents, information and technological advancements and economies of large scale that will enable them reduce their cost of production hence more profitable. In addition, firms should be able to tap into the locational advantages such as both quantitative and qualitative economic benefits (availability of natural resources cost of transportation and telecommunication and market size), political advantages (business oriented regulations) and social advantages. After firms have met the two advantages, they should be able to profitably use them internally through production rather than export, lease or sell them to other firms (Boddewyn, 1985; Dunning, 1973; Shin, 1998; Dunning, 1980). Therefore, for FDI to occur, all the three conditions must be satisfied simultaneously (Makoni, 2015). However, this theory has faced some criticism over time. For instance, it has been argued that the eclectic theory incorporates many parameters that it misses its operational practicality (Nayak and Choudhury, 2014). Moreover, Shin (1998) has questioned the applicability of eclectic paradigm to least developed countries that hardly possess firm specific monopolistic advantages like patents and technological advancements and Boddewyn (1985) though praised the paradigm, has raised serious doubts as to inadequacy of justifications with regard to succeeding FDI surges.

2.2. Empirical Literature

Mahuni and Bonga (2017) studied the nexus between doing business indicators and foreign direct investment for Zimbabwe and established that enforcing contracts, paying taxes, getting electricity and dealing with construction permits parameters significantly influence the flow of foreign direct investments into Zimbabwe.

The study used time series data for the period 2009 through 2016 and an OLS regression analysis to arrive at their findings. Therefore, the paper appreciated the importance of Zimbabwe enhancing the process of enforcing contracts, fairly and efficiently distribute electricity, improve on their tax procedures and compliance and improve on their process of approving construction permits.

Hossain et al. (2018) did their study on ease of doing business and its impact on inward FDI in 177 economies across the globe and found out that enforcing contracts has a positive and a significant influence on the flow of foreign direct investments into the economies. Getting credit and registering property parameters have a negative but significant influence on the flow of foreign direct investments into the economies. Moreover, starting a business and paying taxes were found to have no particular influence on the flow of foreign direct investments. The study used panel data for the period 2011 through 2015 from 177 countries across the globe and a least square regression model to arrive at the findings.

Nangpiire et al. (2018), undertook a study on the ease of doing business and foreign direct investment inflow among sub Saharan Africa countries and established that, overall, ease of doing business has a significant influence on the flow of foreign direct investments. In addition, the paper established a positive and a significant relationship between, protecting minority investors, trading across borders and resolving insolvency. Moreover, starting a business, getting electricity, paying taxes and enforcing contracts had a positive but non-significant relationship. On the other hand, dealing with construction permits, registering property and getting credit had a negative and insignificant relationship with foreign direct investment inflows into sub-Saharan countries. The paper used cross sectional data from the World Bank for the year 2014 and employed regression analysis in arriving at the findings.

Ebero and Begum (2016) investigated the desirability of doing business and flow of foreign direct investment nexus in Ethiopia and established a positive correlation between enforcing contracts, protecting minority investors and paying and foreign direct investment inflows. On the other hand, starting business, getting electricity, registering property and resolving insolvency are strongly but negatively correlated with foreign direct investment inflows. In addition, dealing with construction permits, getting credit and trading across boarders have a moderate negative correlation with foreign direct investment inflows. The study used time series data for the period 2010 through 2014 and correlation analysis to arrive at their results.

Jayasuriya (2011) examined whether improvement in the world banks ease of doing business rankings, translate into greater foreign direct investments inflows and established the possibility of foreign direct investment inflows increasing when doing business rankings improve. However, the paper found out that carrying out business regulation reforms on a large scale does not significantly attract the foreign direct investments. The paper used panel data from 84 economies across the globe for the period 2006 through 2009 and generalized method of moments based on Arellano-Bond methodology to take into account of the fixed effects to arrive at their findings.

Corcoran and Gillanders (2012) undertook a study on foreign direct investment and the ease of doing business and established that on average, a better-regulated business environment leads to attraction of more foreign direct investments. Nevertheless, this relationship is better explained by the ease of trading across boarders and other parameters having little or no effect on foreign direct investments. The paper adopted a cross section approach with data from 2009 for ease of doing business and summed up data for foreign direct investments from 2004 to 2009.

Bayraktar (2013) considered foreign direct investments and investment climate and established that nations that have better ranking on ease of doing business are likely to attract more foreign direct investments. This is also true for developing nations, which appeared to attract more foreign direct investments when they implemented improvements of doing business. The study made use of panel data from the year 2004 through 2010.

Morris and Aziz (2011) investigated ease of doing business and FDI inflows to sub Saharan Africa and Asian countries and established a partial support for the association between ease of doing business and foreign direct investments into sub-Saharan Africa and Asian countries. Further, they established that getting credit and protecting minority investors were significant in influencing the flow of foreign direct investments into sub-Saharan Africa. Trading across boarders and enforcing contracts were significant influencers of FDI into Asian countries. The combined model established a correlation between employing workers, registering property, trading across borders, enforcing contracts, closing business and foreign direct investments. The study sampled 57 countries composed of 36 from sub Saharan Africa and 21 from Asia. Data was drawn from the year 2000 through 2005 and a correlation analysis was a preferred method of analysis.

2.3. Conceptual Framework

In the year 2003, the World Bank launched the doing business project through which they intended to collect, analyze and store comprehensive and objective data on business regulations and hence assist governments to put in place reforms with a view to improving doing business procedures (World Bank, 2019). The ease of doing business score reflects the gap between a country's performance and a measure of best practice. Since 2003, the World Bank has revised and improved its parameters and quantifiable measures to settle at 10 parameters as at 2019 and 1 overall measure – Doing business score. They include;

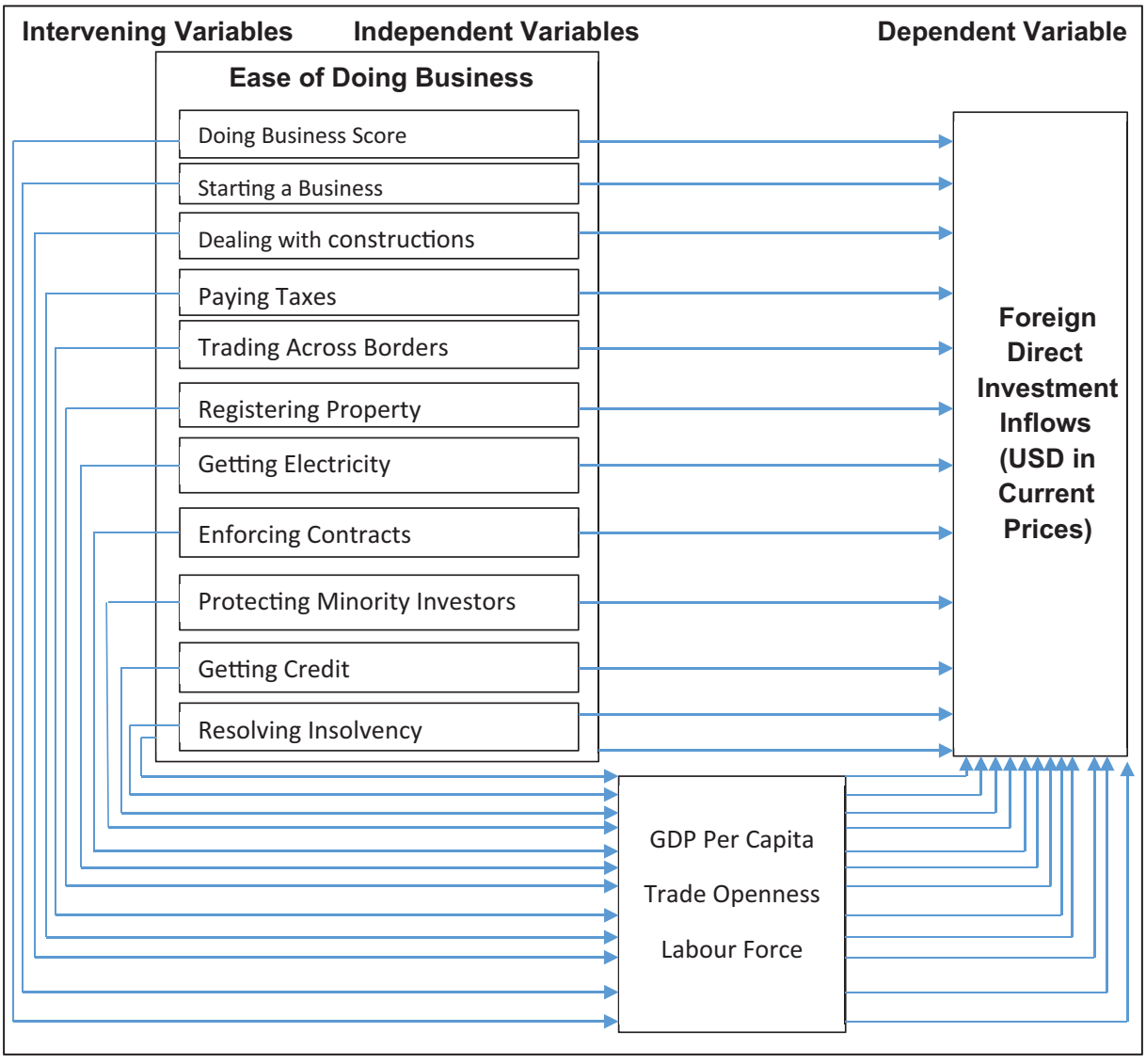
- Starting a business: Measured by number of procedures, time in days, cost as a % of income per capita and minimum capital as a % of income per capita (Djankov et al., 2002; World Bank, 2019).
- Dealing with construction permits: Measured by number of procedures, time in days, cost as a percentage of income per capita and building quality control index (World Bank, 2019).
- Getting electricity: Measured by number of procedures, time in days, cost as a % of income per capita and reliability of supply and transparency of tariffs index (Geginat and Romalho, 2015; World Bank, 2019).
- Registering property: Measured by number of procedures, time in days, cost as a percentage of income per capita and quality of land administration index (World Bank, 2019).

- Getting credit: Measured by strength of legal rights index and depth of credit information index (Djankov et al., 2006; World Bank, 2019).
- Protecting minority investors: Measured by extent of disclosure index, extent of director liability index, ease of shareholders suits index, extent of shareholders rights index, extent of ownership and control index and extent of corporate transparency index (Djankov et al., 2008; World Bank, 2019).
- Paying taxes: Measured by number of payments per year, time in hours per year, total tax and contributions rate as a % of profits and post filing index (Djankov et al., 2010; World Bank, 2019).
- Trading across boarders: Measured by time to export, cost to export, time to import and cost to import (Djankov et al., 2008; World Bank, 2019).
- Enforcing contracts: Measured by time in days, cost as percentage of claim and quality of judicial process index (Djankov et al., 2003; World Bank, 2019).
- Resolving insolvency: Measured by recovery rate and strength of insolvency framework index (Djankov et al., 2008; World Bank, 2019).

However, of recent, ease of doing business measures have received some criticism. For instance, Hallward-Driemeier and Pritchett (2015) argued that EDB rank is a measure that does not bring into perspectives actual practices governing the business world such as personal connections and *jugaad* solutions. Moorthy and Jason (2016) also argues about cost of doing business and the ease of doing business. To this extent, unorganized economies loose taxing most business activities leading to a low cost of doing business, but due to inefficiencies, doing business becomes more difficult, hence poor EDB ranking. Nevertheless, unorganized economies record better economic growth prospects than organized ones.

This paper adopted scores for each of the parameters as measurable units for analysis and assumed a direct relationship between ease of doing business parameters and foreign direct investment flows into the eastern Africa region for the period 2004 through 2017. In addition, GDP per capita, trade openness and labour force were selected as intervening variables to control the relation between ease of doing business and foreign direct investment flows. Figure 2 illustrates this relationship.

Figure 2: Conceptual framework



3. METHODOLOGY

This section breaks down the road map adopted to establish the link between ease of doing business and foreign direct flows into the eastern Africa region.

3.1. Data Sources

This study fully relied on secondary data collated and archived by UNCTAD and the World Bank through their FDI, Ease of Doing Business, and World Development Indicators databases. Specifically, data for foreign direct investment inflows was obtained from UNCTAD whereas that of ease of doing business, GDP per capita, trade openness and labour force was obtained from the World Bank databases. Data was collected from 2004 through 2017 from 12 eastern Africa countries (Kenya, Tanzania, Uganda, Rwanda, Burundi, Comoros, Djibouti, Eritrea, Madagascar, Mauritius, Seychelles and Ethiopia).

3.2. Data Diagnostic Tests

To ensure basic assumptions of regression models are met, the study conducted data diagnostic tests including; Shapiro Wilk test to check for data normality, Levin-Lin-Chu test to check for data stationarity and variance inflation factors (VIF) to check for multi collinearity. Others include white's general test to check for heteroscedasticity, Woodridge test to check for autocorrelation. Then Dumitrescu and Hurlin tests was used to check for granger non-causality and Pairwise Pearson correlation analysis to determine the extent and the direction of association among variables.

3.3. Model Specification

Foreign direct investment inflows was taken as a dependent variable, ease of doing business parameters as independent variables and GDP per Capita, Trade Openness and log of labour force were adopted as control variables.

The study assumed a linear function between foreign direct investment inflows and its explanatory variables thus equation 1.

$$FDI=f(DBS,SBS,DCS,GES,RPS,GCS,PMIS,PTS,TABS,ECS,RIS,GDPPC,TRDOPN,LABF) \quad (1)$$

To bring the panel (pooled) properties into perspective, equation 1 then transforms into equation 2.

$$FDI=\alpha+\beta_1 DBS_{it}+\beta_2 SBS_{it}+\beta_3 DCS_{it}+\beta_4 GES_{it}+\beta_5 RPS_{it}+\beta_6 GCS_{it}+\beta_7 PMIS_{it}+\beta_8 PTS_{it}+\beta_9 TABS_{it}+\beta_{10} ECS_{it}+\beta_{11} RIS_{it}+\beta_{12} GDPPC_{it}+\beta_{13} TRDOPN_{it}+\beta_{14} logLABF_{it}+\varepsilon_0 \quad (2)$$

Where;
FDI=Foreign direct investment inflows
DBS=Doing business score
SBS=Starting a business score
DCS=Dealing with construction permits score
GES=Getting electricity score
RPS=Registering property score
GCS=Getting credit score
PMIS=Protecting minority investors score
PTS=Paying taxes score
TABS=Trading across borders score
ECS=Enforcing contracts score
RIS=Resolving insolvency score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
LogLABF=Availability of labour force
α=Constant associated with regression models
$\beta 1$–$\beta 14$=Coefficient estimates of independent variables
ε_0=Error term associated with regression models
i=Stands for various countries in the panel
t=Stands for different periods in the panel.

4. ANALYSIS AND FINDINGS

4.1. Summary Statistics

The summary (Table 1) contained 12 countries from the years 2004 through 2017 making 168 observations for each variable except trade openness that exhibited 156 observations. The mean was used to indicate the arithmetic averages and the standard deviation to show the extent of variations from the mean.

4.2. Data Normality Tests

H_0: Sample data was not drawn from a normally distributed population
H_a: Sample data was drawn from a normally distributed population.

The study employed Shapiro-Wilk test to test whether the sample data was drawn from a normally distributed population. According to the results in Table 2, we fail to reject the null hypothesis and conclude that the sample data was not drawn from a normally distributed population.

4.3. Test for Data Stationarity

H_0: Sample data contains a unit root (non-stationery)
H_a: Sample data does not contain any unit root (stationery)

In statistics, panel data is a combination of both time series and cross section. Time series properties make the data either stationery i.e., mean and variance remain constant over time or

Table 1: Summary statistics

Variable	Obs	Mean±Standard deviation	Min.	Max.
Country	168	6.5±3.462373	1	12
Year	168	2010.5±4.04318	2004	2017
FDI	168	447.5526±619.2313	0.0315939	3988.953
DBS	168	29.68054±26.74517	1	77.69
SBS	168	58.05381±23.28129	1	94.51
DCS	168	44.91857±27.03595	0	86.52
GES	168	32.31071±31.64981	0	89.71
RPS	168	48.97964±19.44805	1	92.67
GCS	168	27.44792±22.08794	0	90
PMIS	168	37.98048±21.58151	1	83.33
PTS	168	57.4575±26.81823	1	91.92
TABS	168	42.5578±27.57162	0	87.6
ECS	168	52.51292±15.04149	1	69.58
RIS	168	27.00429±19.94041	0	72.04
GDPPC	168	2240.952±3841.824	1	15504.46
TRDOPN	156	−1.009396±19.52408	−191.0244	91.00069
logLABF	168	13.37249±5.20112	0	17.75612

Table 2: Tests for normality, stationarity and multicollinearity

Test for data normality:- Shapiro-wilk test for normal data results						Test for data stationarity:- Levin-Lin-Chu test results			Tests for multicollinearity	
Variable	Obs	W	V	z	Prob>z	Unadjusted t	Adjusted t*	P value	VIF	1/VIF
FDI	168	0.70618	37.686	8.276	0.00000	−7.6131	−3.9069	0.0000		
DBS	168	0.89003	14.105	6.035	0.00000	−4.1567	−2.2232	0.0131	9.76	0.102435
SBS	168	0.95273	6.063	4.110	0.00002	−25.0683	−257264	0.0000	7.51	0.13312
DCS	168	0.90039	12.777	5.810	0.00000	−26.5346	−24.8155	0.0000	5.1	0.196088
GES	168	0.90396	12.318	5.726	0.00000	−4.7468	−2.4929	0.0063	4.43	0.22587
RPS	168	0.89242	13.799	5.985	0.00000	−51.1081	−50.9233	0.0000	4.34	0.230318
GCS	168	0.92040	10.210	5.298	0.00000	−8.1918	−2.9281	0.0017	4.27	0.234209
PMIS	168	0.97602	3.076	2.562	0.00520	−43.1332	−42.6079	0.0000	3.83	0.260985
PTS	168	0.85738	18.293	6.628	0.00000	−2.0e+02	−2.2e+02	0.0000	3.11	0.321561
TABS	168	0.93300	8.594	4.905	0.00000	−19.6142	−19.0915	0.0000	3.08	0.324762
ECS	168	0.80520	14.986	7.339	0.00000	−45.3769	−46.0198	0.0000	2.99	0.33485
RIS	168	0.93423	8.437	4.863	0.00000	−10.9216	−6.8994	0.0000	2.92	0.342189
GDPPC	168	0.55668	56.862	9.214	0.00000	−4.2307	−3.0209	0.0013	2.6	0.384759
TRDOPN	156	0.46528	64.347	9.460	0.00000	−10.0575	−4.5307	0.0000	2.36	0.423989
logLABF	168	0.66481	42.993	8.577	0.00000	−4.2627	−4.5149	0.0000	1.07	0.932022

non-stationery. Non-stationarity of data is problematic as it causes tests to produce spurious results (Bosire, 2019).

Therefore, this study adopted Levin-Lin-Chu test to establish whether the sample data was stationery. According to the results reflected in Table 2, all variables except Trade openness were stationery at level and hence we reject the null hypothesis and conclude that the sample data was stationery at level. However, trade openness was not stationery at level hence first differencing of the variable trade openness, which turned it stationery.

4.4. Test for Multicollinearity

In regression analysis, multi collinearity arises when predictor variables lacks independence. It affects estimation of parameters since it inflates their variances leading to mis-identification of predictors, which are relevant in a statistical model (Dormann et al., 2012).

To test for multi collinearity the study used the VIF as proposed by Farrar and Glauber (1967). According to Myles (1990), VIFs should range between 1 and 10. Otherwise, VIFs above 10 and those <1 indicate the presence of collinearity between explanatory variables. Test results derived from Table 2 indicate, all variables had their VIFs lie between 1 and 10 hence conclude that sample data was devoid of collinearity problems.

4.5. Test for Heteroscedasticity

H_0: Sample data is homoscedastic
H_a: Sample data is heteroscedastic

Linear models assume that errors should be independently and identically distributed, meaning that they should be homoscedastic (Klein et al., 2016). Otherwise, they are heteroscedastic. When the assumption of homoscedasticity is violated, OLS estimates remain unbiased but turn out to be inefficient thus biased standard errors leading to improper inferences (Klein et al., 2016).

To test for heteroscedasticity, the study made use of Whites general test as proposed by White (1980). As per the test results in Table 3, ($\chi^2(119) = 141.02$, $P = 0.08$) which is not significant at 0.05 level, hence fail to reject the null hypothesis and conclude that the sample data is homoscedastic.

4.6. Test for Autocorrelation

H_0: No first order autocorrelation
H_a: First order autocorrelation exists

Generally, although regression coefficients remain unbiased in the presence of autocorrelation, the OLS model is inefficient and standard errors are wrongly estimated. Therefore, to check if sample data was uncorrelated, the study ran Woodridge test for autocorrelation and Table 4 produced. We assumed a null hypothesis that sample data had no first order autocorrelation which was established by the test results ($P = 0.1420$) > 0.05 significance level, thus conclude absence of first order autocorrelation.

4.7. Granger Non-Causality Test

Using Dumitrescu and Hurlin, (2012) the study established (Table 5) causality from *DBS–FDI* ($P \leq 0.01$), *SBS–FDI* ($P = 0.04$), *FDI–DCS* ($P \leq 0.01$), *GCS–FDI* ($P \leq 0.01$), *FDI–PMIS* ($P \leq 0.01$), *FDI–TABS* ($P \leq 0.01$), *FDI–RIS* ($P = 0.04$) and *FDI–GDPPC* ($P = 0.04$).

4.8. Correlation Analysis

In linear models, correlation analysis measures the association between two or more quantitative variables. It also shows the strength and the direction of the said relationship (Gogtay and Thatte, 2017). This study employed pairwise Pearson correlation as proposed by Pearson (1896) at 0.05 significance level. As exhibited in Table 6, *DBS*, *GES*, *RPS*, *GCS*, *PMIS*, *PTS*, *TABS*, *ECS*, *RIS* and *logLABF* were positively and significantly correlated with *FDI* (0.2363, $P = 0.002$; 0.2571, $P = 0.0008$; 0.1843, $P = 0.0168$; 0.2357, $P = 0.0021$; 0.2081, $P = 0.0068$; 0.1673, $P = 0.0302$; 0.1581, $P = 0.0406$; 0.2911, $P = 0.0001$; 0.2298, $P = 0.0027$; and 0.3525, $P \leq 0.01$ respectively). However, note that the relationship between the variables is moderate with 35% correlation reported as the highest.

4.9. Selection of an Estimation Method

Table 7 portrays results on the selection of estimation method. To choose between fixed effects and random effects model, the study

Table 3: White's test for heteroscedasticity results

Source	χ^2	df	P
Heteroscedasticity	141.02	119	0.0822
Skewness	16.41	14	0.2889
Kurtosis	2.19	1	0.1385
Total	159.63	134	0.0648

Table 4: Test for autocorrelation

Wooldridge test for autocorrelation in panel data
F (1, 11)=2.502
Prob>F=0.1420

Table 5: Granger causality test

Variable	W-bar	Z-bar	P value	Z-bar tilde	P value
DBS-FDI	2.5137	3.7077	0.0002	2.0219	0.0432
SBS-FDI	1.8314	2.0364	0.0417	0.9302	0.3523
FDI-DCS	2.8669	4.5730	0.0000	2.5871	0.0097
GCS-FDI	4.2845	8.0454	0.0000	4.8553	0.0000
FDI-PMIS	2.9562	4.7918	0.0000	2.7300	0.0063
FDI-TABS	2.2630	3.0936	0.0020	1.6207	0.1051
FDI-RIS	1.8532	2.0900	0.0366	0.9652	0.3344
FDI-GDPPC	1.8572	2.0997	0.0358	0.9715	0.3313

assumed a null hypothesis that differences in coefficients are not systematic. This was tested using hausman test, (χ^2 (14) = 15.64, P = 0.3360) > 0.05 significance level, hence fail to reject the null hypothesis and conclude that random effects exist.

4.9.1. Selection between random effects and pooled OLS

Consequently, to choose between random effects and OLS, Breusch and Pagan Lagrangian Multiplier test for random effects, which assumed a null hypothesis that OLS residues do not contain individual specific error components, was used. From results in Table 8 (chibar2 (01) = 0.00, P-value = 1.0000), we fail to reject the null hypothesis and conclude that Pooled OLS is preferred to random effects.

4.10. Regression Analysis

Having met the assumptions of OLS regression models, the study employed Pooled OLS Regression to estimate the relationship between foreign direct investments into eastern Africa region and ease of doing business parameters. Analysis produced Tables 9 and 10.

4.10.1. Relationship between FDI and DBS

This relationship is exhibited by model 1 in Table 9 and model 13 in Table 10. Model 1 relays a direct relationship whereas model 13 relays a controlled relationship.

Model 1 establishes a significant relationship between *FDI* and *DBS* (P = 0.002) <0.05 alpha level. Nevertheless, with a coefficient of determination (R^2 = 0.0558), it is extremely week, explaining just about 6% of the variations around the mean. The coefficients of model one indicate a positive and significant association (5.4715, P = 0.002), an indication that one unit increase in *DBS* will lead to 5.4715 units increase in *FDI*. Thus, equation 3 fits.

$$FDI = 285.1568 + 5.4715\ DBS \quad (3)$$

Sig. = (0.002)

R^2 = 0.0558

Where;
FDI=Foreign direct investment inflows
DBS=Doing business score.

On the other hand the controlled model 13, also establishes a significant relationship between *FDI* and *DBS* (P ≤ 0.01) < 0.05 alpha level. The model has a coefficient of determination (R^2 = 0.1855) explaining about 19% of the variation around the mean. The coefficients of *DBS* and *logLABF* (4.6390, P = 0.013 and 52.2814, P ≤ 0.01) are positive and significant indicating one unit increase in *DBS* and *logLABF* triggers an increase in *FDI*. The coefficient of *GDPPC* (0.0141, P = 0.399) is also positive but not significant. That of *TRDOPN* (−1.3329, P = 0.585) is negative and insignificant. Hence, equation 4 fits.

$$FDI = -406.5173 + 4.6390\ DBS + 0.0141\ GDPPC - 1.3329\ TRDOPN + 52.2814\ logLABF$$
Sig. = (0.013) (0.399) (0.585) (<0.01)

R^2 = 0.1855

Where;
FDI=Foreign direct investment inflows
DBS=Dong business score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=log of labour force.

4.10.2. Relationship between FDI and SBS

This relationship is explained by model 2 in Table 9 and model 14 in Table 10. Model 2 presents a direct relationship whereas 14 presents a controlled relationship.

According to the results from model 2, the relationship between *FDI* and *SBS* (P = 0.1443) >0.05 alpha level hence not significant. The coefficient of determination (R^2 = 0.0128) explaining just below 2% of the variations around the mean is extremely week. The coefficient of *SBS* (3.0089, P = 0.144) is positive but not significant. Therefore, equation 5 fits.

$$FDI = 272.8725 + 3.0089 SBS \quad (5)$$

Sig. = (0.144)

R^2 = 0.0128

Where;
FDI=Foreign direct investment inflows
SBS=Starting business score.

Test results from the controlled model 14, indicate a significant relationship between *FDI* and *SBS* (P = 0.0001) <0.05 alpha level. The coefficient of determination (R^2 = 0.1517) explains about 15%

Table 6: Correlation matrix

	FDI	*DBS*	*SBS*	*DCS*	*GES*	*RPS*	*GCS*	*PMIS*	*PTS*	*TABS*	*ECS*	*RIS*	*GDPPC*	*TRDOPN*	*logLABF*
FDI	1.0000														
DBS	0.2363*	1.0000													
	0.0020														
SBS	0.1131	0.5482*	1.0000												
	0.1443	0.0000													
DCS	0.1370	0.4592*	0.4737*	1.0000											
	0.0765	0.0000	0.0000												
GES	0.2571*	0.8960*	0.3886*	0.4409*	1.0000										
	0.0008	0.0000	0.0000	0.0000											
RPS	0.1843*	0.5808*	0.5903*	0.6617*	0.5241*	1.0000									
	0.0168	0.0000	0.0000	0.0000	0.0000										
GCS	0.2357*	0.4186*	0.5339*	0.4795*	0.4147*	0.5622*	1.0000								
	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000									
PMIS	0.2081*	0.5255*	0.7292*	0.6030*	0.4120*	0.5895*	0.5789*	1.0000							
	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000								
PTS	0.1673*	0.5077*	0.5565*	0.6909*	0.4095*	0.6799*	0.3566*	0.7724*	1.0000						
	0.0302	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000							
TABS	0.1581*	0.5912*	0.5315	0.7556*	0.4885*	0.5763*	0.3923*	0.7509*	0.7463*	1.0000					
	0.0406	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
ECS	0.2911*	0.1920*	0.4215*	0.1381	0.2438*	0.4483*	0.3962*	0.3583*	0.4396*	0.1924*	1.0000				
	0.0001	0.0126	0.0000	0.742	0.0015	0.0000	0.0000	0.0000	0.0000	0.0124					
RIS	0.2298*	0.3433*	0.4567*	0.4166*	0.2458*	0.3383*	0.4413*	0.4649*	0.5250*	0.5338*	0.4049*	1.0000			
	0.0027	0.0000	0.0000	0.0000	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
GDPPC	−0.1314	0.2531*	0.3048*	0.3069*	0.2362*	0.1923*	0.1561*	0.3839*	0.3147*	0.4769*	0.0462	0.4858*	1.0000		
	0.0896	0.0009	0.0001	0.0001	0.0021	0.0125	0.0433	0.0000	0.0000	0.0000	0.5520	0.0000			
TRDOPN	−0.0132	−0.0971	−0.1459	−0.0145	−0.0788	0.0877	−0.0075	−0.1119	−0.0568	−0.0384	−0.0380	−0.0559	−0.1856*	1.0000	
	0.8703	0.2277	0.692	0.8574	0.3279	0.2763	0.9261	0.1642	0.4815	0.6345	0.6379	0.4885	0.0203		
logLABF	0.3525*	−0.0395	0.0323	−0.0152	−0.0705	−0.0225	0.2374*	−0.0565	−0.0548	−0.1721*	0.1431	0.0388	−0.6660*	0.1450	1.0000
	0.0000	0.6111	0.6776	0.8447	0.3639	0.7724	0.0019	0.4670	0.4807	0.0257	0.0643	0.6172	0.0000	0.0710	

*significant at 0.05 level

Table 7: Selection of an estimation method

Variables	Pooled OLS		Fixed effects		Random effects		Hausman test	
	Coef.	P>|t|	Coef. (b)	P>|t|	Coef. (B)	P>|t|	Difference (b-B)	Sqrt (diag (V_b-V_B)
DBS	3.0314	0.562	−0.2761	0.950	3.0314	0.561	−3.3076	
SBS	−7.7296	0.037	−2.1019	0.602	−7.7296	0.035	5.6277	1.6433
DCS	3.3101	0.340	2.6468	0.521	3.3101	0.338	−0.6634	2.2221
GES	3.0764	0.424	3.4315	0.296	3.0764	0.423	0.3551	
RPS	0.7732	0.874	−7.9558	0.131	0.7732	0.873	−8.7190	1.9416
GCS	−7.8551	0.028	−9.2425	0.015	−7.8551	0.026	−1.3875	1.2357
PMIS	13.7356	0.008	17.4267	0.005	13.7356	0.007	3.6910	3.4859
PTS	−11.5130	0.006	−16.7627	0.000	−11.5130	0.005	−5.2497	1.3963
TABS	0.7759	0.826	12.6904	0.001	0.7759	0.825	11.9145	0.8589
ECS	15.7815	0.005	−0.4580	0.951	15.7815	0.004	−16.2395	5.0552
RIS	7.6998	0.045	1.1223	0.825	7.6998	0.043	−6.5775	3.3389
GDPPC	−0.01495	0.528	0.0539	0.344	−0.0150	0.527	0.0688	0.0515
TRDOPN	−1.4563	0.536	−0.0458	0.980	−1.4563	0.535	1.4105	
logLABF	44.5878	0.003	6.3692	0.706	44.5878	0.003	−38.2187	8.1685
_cons	−748.2162	0.016	581.4208	0.116	−748.2162	0.015		
Obs	156		Obs	156	Obs	156	χ^2 (14)	15.64
F (14, 141)	4.63		F (14, 130)	4.21	Wald χ^2 (14)	64.76	Prob > χ^2	0.3360
Prob>F	0.0000		Prob>F	0.0000	Prob>χ^2	0.0000		
R^2	0.3147		R^2 overall	0.0003	R^2 overall	0.3147		
Adj R^2	0.2467		R^2 between	0.0785	R^2 between	0.5940		
			R^2 within	0.3121	R^2 within	0.1009		

Table 8: Breusch pagan LM test for random effects

Parameter	Var	sd=sqrt (Var)
FDI	401973.8	634.014
e	165124.3	406.3549
u	0	0
	Test: Var (u)=0	
	chibar2 (01)	0.00
	Prob>chibar2	1.0000

of the variations around the mean. Moreover, the coefficients of *SBS* (−0.3258, p = 0.900) and *TRDOPN* (−1.7241, p = 0.490) are negative and not significant. Whereas *GDPPC* (0.0278, p = 0.136) is positive but not significant and that of *logLABF* (58.2813, P ≤ 0.01) is positive and significant at 0.05 alpha level. Thus, equation 6 fits.

FDI=−350.6413−0.3258*SBS*+0.0278 *GDPPC*
Sig.= (0.900) (0.136)
−1.7241*TRDOPN*+52.2814*logLABF* (6)
(0.490) (<0.01)

R^2 = 0.1517

Where;
FDI=Foreign Direct Investment Inflows
SBS=Starting business score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=log of labour force.

4.10.3. Relationship between FDI and DCS

Model 3 Table 9 and model 15 in Table 10 explains this relationship. Model 3 is a direct relationship whereas model 15 is a controlled relationship.

Results from model 3 indicate a non-significant relationship (P = 0.0765) >0.05 alpha level and its coefficient of determination (R^2 = 0.0188) explains >2% of the variations around the mean. The coefficient of *DCS* (3.1390, P = 0.076) is positive but not significant at 0.05 alpha level. Hence, equation 7 fits.

FDI=306.5547+3.1390*DCS* (7)

Sig. = (0.076)

R^2 = 0.0188

Where;
FDI=Foreign direct investment inflows
DCS=Dealing with construction permits score.

The controlled model 15, on the other hand presents a significant relationship between *FDI* and *DCS* (P ≤ 0.01). In addition, its coefficient of determination (R^2 = 0.1526) explains about 15% of the variations around the mean. The coefficients of *DCS* (0.9097, P = 0.665) and *GDPPC* (0.0233, P = 0.196) are positive but non-significant. However, *TRDOPN* (−1.7375, P = 0.484) is negative and non-significant and that of *logLABF* (56.1491, P ≤ 0.01) is positive and significant indicating that one unit increase in *logLABF* will lead to an increase in *FDI* by 56 units. This leads to equation 8.

FDI=−375.6287+0.9097*DCS*+0.0233*GDPPC*−1.7375*TRDOPN*
Sig. = (0.665) (0.196) (0.484)
+56.1491*logLABF* (8)
(<0.01)

R^2=0.1526

Where;
FDI=Foreign direct investment inflows
DCS=Dealing with construction permits score
GDPPC=Gross domestic product per capita

Table 9: OLS regression results

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
DBS	5.4715											7.6688
	(0.002)											(0.141)
SBS		3.0089										−9.5468
		(0.144)										(0.006)
DCS			3.1390									4.5468
			(0.076)									(0.230)
GES				5.0300								−0.7663
				(0.001)								(0.842)
RPS					5.8680							−0.4878
					(0.017)							(0.909)
GCS						6.6086						−0.9159
						(0.002)						(0.787)
PMIS							5.9722					11.0817
							(0.007)					(0.032)
PTS								3.8633				−6.9871
								(0.030)				(0.084)
TABS									3.5515			−3.5017
									(0.041)			(0.326)
ECS										11.9837		14.1655
										(0.0000)		(0.002)
RIS											7.1378	4.9091
											(0.003)	(0.131)
_cons	285.1568	272.8725	306.5547	285.0308	160.1399	266.1614	220.7269	225.5751	296.408	−181.7454	254.802	−82.6660
	(0.000)	(0.035)	(0.001)	(0.000)	(0.212)	(0.000)	(0.021)	(0.046)	(0.001)	(0.278)	(0.001)	(0.657)
Obs	168	168	168	168	168	168	168	168	168	168	168	168
F (1, 166)	9.82	2.15	3.18	11.75	5.84	9.77	7.52	4.78	4.26	15.37	9.26	3.18
Prob>F	0.0020	0.1443	0.0765	0.0008	0.0168	0.0021	0.0068	0.0302	0.0406	0.0001	0.0027	0.0006
R^2	0.0558	0.0128	0.0188	0.0661	0.0340	0.0556	0.0433	0.0280	0.0250	0.847	0.0528	0.1832
Adj R^2	0.0502	0.0069	0.0129	0.0605	0.0281	0.0499	0.0376	0.0221	0.0191	0.0792	0.0471	0.1256

Table 10: OLS regression results - controlled

Variables	Model 13	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21	Model 22	Model 23	Model 24
DBS	4.6390											3.0314
	(0.013)											(0.562)
SBS		−0.3258										−7.7296
		(0.900)										(0.037)
DCS			0.9097									3.3101
			(0.665)									(0.340)
GES				4.7240								3.0764
				(0.002)								(0.424)
RPS					3.8159							0.7732
					(0.259)							(0.874)
GCS						1.9070						−7.8551
						(0.455)						(0.028)
PMIS							4.8423					13.7356
							(0.084)					(0.008)
PTS								2.2688				−11.5130
								(0.332)				(0.006)
TABS									3.8799			0.7759
									(0.077)			(0.826)
ECS										11.3899		15.7815
										(0.004)		(0.005)
RIS											6.6900	7.6998
											(0.048)	(0.045)
GDPPC	0.0141	0.0278	0.0233	0.0140	0.0213	0.0206	0.0104	0.0191	0.0086	0.0160	−0.0056	−0.0150
	(0.399)	(0.136)	(0.196)	(0.389)	(0.207)	(0.257)	(0.578)	(0.287)	(0.650)	(0.325)	(0.807)	(0.528)
TRDOPN	−1.3329	−1.7241	−1.7375	−1.3884	−1.5386	−1.7044	−1.4743	−1.6998	−1.9647	−1.4987	−1.8798	−1.4563
	(0.585)	(0.490)	(0.484)	(0.564)	(0.535)	(0.492)	(0.549)	(0.493)	(0.425)	(0.535)	(0.444)	(0.536)
logLABF	52.2814	58.2813	56.1491	53.4046	55.1929	52.6953	50.697	54.6135	52.6690	49.6776	41.6575	44.5878
	(0.0000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.003)
_cons	−406.5173	−350.6413	−375.6287	−437.4884	−515.1932	−335.5695	−426.7235	−441.8446	−429.3656	−844.0647	−259.6951	−748.2162
	(0.033)	(0.091)	(0.056)	(0.021)	(0.030)	(0.086)	(0.029)	(0.036)	(0.028)	(0.001)	(0.187)	(0.016)
Obs	156	156	156	156	156	156	156	156	156	156	156	156
F (4, 151)	8.60	6.75	6.80	9.62	7.12	6.91	7.64	7.02	7.68	9.31	7.91	4.63
Prob>F	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2	0.1855	0.1517	0.1526	0.2031	0.1587	0.1547	0.1683	0.1569	0.1691	0.1978	0.1733	0.3147
Adj R^2	0.1639	0.1292	0.1302	0.1819	0.1365	0.1323	0.1462	0.1346	0.1471	0.1766	0.1514	0.2467

TRDOPN=Trade openness
logLABF=Log of labour force.

4.10.4. Relationship between FDI and GES

This relationship is evidenced by model 4 in Table 9 and 16 in Table 10. Model 4 is a representation of a direct relationship between *FDI* and *GES* whereas model 16 is a representation of a controlled relationship.

Results in model 4 indicate a significant relationship between *FDI* and *GES* (p = 0.0008) and a coefficient of determination (R^2 = 0.0661) explaining about 7% of the variations around the mean. The coefficient of *GES* (5.0300, P = 0.001) is positive and significant meaning that one unit increase in *GES* leads to an increase in *FDI*. This leads to equation 9.

$$FDI = 285.0308 + 5.0300GES \quad (9)$$

Sig.= (0.001)

R^2 = 0.0661

Where;
FDI=Foreign direct investment inflows
GES=Getting electricity score.

Results from the controlled model 16 also indicate a significant relationship between *FDI* and *GES* ($P \leq 0.01$) and a coefficient of determination (R^2 = 0.2031) explaining about 20% of the variations around the mean. The coefficients of *GES* (4.7240, P = 0.002) and *logLABF* (53.4046) are positive and significant indicating a unit increase causes an increase in *FDI*. Coefficient of *GDPPC* (0.0140, P = 0.389) is positive but not significant whereas that of *TRDOPN* (−1.3884, P = 0.564) is negative and insignificant indicating it is not one of the predictors of *FDI*. Equation 10 hence fits.

$$FDI = -437.4884 + 4.7240GES + 0.0140GDPPC - 1.3884TRDOPN + 53.4046logLABF \quad (10)$$
Sig. = (0.002) (0.389) (0.564) (<0.01)

R^2 = 0.2031

Where;
FDI=Foreign direct investment inflows
GES=Getting electricity score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=Log of Labour Force.

4.10.5. Relationship between FDI and RPS

This relationship is evidenced by model 5 in Table 9 and model 17. Model 5 is a representation of a direct relationship between *FDI* and *RPS* and model 17 is a representation of a controlled relationship between *FDI* and *RPS*.

Results from Table 9, and model 5 indicate a significant relationship (P = 0.0168) between *FDI* and PRS with a coefficient of determination (R^2 = 0.0340) explaining just about 3% of the variations around the mean. The coefficients of *RPS* (5.8680, P = 0.017) indicate a positive and a significant relationship, meaning that one unit increase in *RPS* causes an increase in *FDI* by about 5.9 units. From this, equation 11 is fits.

$$FDI = 160.1399 + 5.8680RPS \quad (11)$$

Sig.= (0.017)

R^2 = 0.0340

Where;
FDI=Foreign direct investment inflows
RPS=Registering property score.

Model 17 represent a controlled relationship between *FDI* and *RPS*. Table 10 and model 17 indicate a significant relationship between *FDI* and *RPS* ($P \leq 0.01$) and the coefficient of determination (R^2 = 0.1587) explains about 16% of the variations around the mean. The coefficients of RPS and *GDPPC* show a positive but not significant relationship (3.8159, P = 0.259 and 0.0213, P = 0.207) where as that of *logLABF* indicate a positive a significant relationship (55.1929, $P \leq 0.01$). On the other hand, the coefficients of *TRDOPN* show a negative and non-significant relationship (−1.5386, P = 0.535). This give rise to equation 12.

$$FDI = -515.1932 + 3.8159RPS + 0.0213GDPPC - 1.5386TRDOPN + 55.1929logLABF \quad (12)$$
Sig. = (0.259) (0.207) (0.535) (<0.01)

R^2 = 0.1587

Where;
FDI=Foreign direct investment inflows
PRS=Registering property score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=Log of Labour Force.

4.10.6. Relationship between FDI and GCS

This relationship is explained by model 6 in Table 9 and model 18 in Table 10. Model 6 is a representation of a direct relationship whereas model 18 is a representation of a controlled relationship between *FDI* and *GCS*.

According to the results from model 6, there exists a significant relationship (P = 0.0021) between *FDI* and *GCS* and its coefficient of determination (R^2 = 0.0556) explaining about 6% of the variations around the mean. The coefficient of *GCS* depict a positive and a significant relationship (6.6086, P = 0.002) indicating that one unit increase in *GCS* leads to an increase *FDI* inflows. Equation 13 is thus fits.

$$FDI = 266.1614 + 6.6086\ GCS \quad (13)$$

Sig. = (0.002)

$R^2 = 0.0556$

Where;
FDI=Foreign direct investment inflows
GCS=Getting credit score.

Consequently, results from model 18 indicate a significant relationship between *FDI* and *GCS* ($P \leq 0.01$) and its coefficient of determination ($R^2 = 0.1547$) explains about 15% of the variations around the mean. The coefficients of *GCS* and *GDPPC* are positive but not significant (1.9070, P = 0.455 and 0.0206, P = 0.257 respectively). On the other hand, the coefficient of *TRDOPN* is negative and insignificant (−1.7044, P = 0.492) and that of *logLABF* is positive and significant (52.6953, $P \leq 0.01$). This relationship begets equation 14.

$$FDI = -335.5695 + 1.9070\,GCS + 0.0206\,GDPPC - 1.7044\,TRDOPN + 52.6953\,logLABF \quad (14)$$

Sig.= (0455) (0.257) (0.492) (<001)

$R^2 = 0.1547$

Where;
FDI=Foreign direct investment inflows
GCS=Getting credit score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=Log of labour force

4.10.7. Relationship between PMIS and FDI

This relationship is explained by model 7 in Table 9 and model 19 in Table 10. Model 7 is a representation of a direct relationship between *FDI* and *PMIS* whereas model 19 is a representation of a controlled relationship.

According to the results in model 7, there exist a significant relationship between *FDI* and *PMIS* (P = 0.0068) and its coefficient of determination ($R^2 = 0.0433$) explains about 4% of the variations around the mean. The coefficient of *PMIS* is positive and significant indicating that one unit increase in *PMIS* leads to a significant increase in *FDI* inflows. Thus, equation 15 fits.

$$FDI = 220.7269 + 5.9722\,PMIS \quad (15)$$

Sig. = (0.007)

$R^2 = 0.0433$

Where;
FDI=Foreign direct investments
PMIS=Protecting minority investors score.

Further, the controlled relationship as depicted in model 19 show a significant relationship between *FDI* and *PMIS* ($P \leq 0.01$) and its coefficients of determination ($R^2 = 0.1683$) can explain about 17% of the variations around the mean. The coefficients of *PMIS* and *GDPPC* (4.8423, P = 0.084, and 0.0104, P = 0.578 respectively) are positive but not significant at 0.05 alpha level, whereas that of *TRDOPN* (−1.7044, P = 0.492) is negative and not significant at 0.05 alpha level. The coefficient of *logLABF* (50.697, P = <0.01) is positive and significant at 0.05 alpha level indicating that one unit increase in *PMIS* leads to an increase in *FDI* inflows by at least 50 units. Hence, equation 16 fits.

$$FDI = -426.7235 + 4.8423\,PMIS + 0.0104\,GDPPC - 1.4743\,TRDOPN + 50.697\,logLABF \quad (16)$$

Sig. = (0.084) (0.578) (0.549) (<0.01)

$R^2 = 0.1683$

Where;
FDI=Foreign direct investment inflows
PMIS=Protecting minority investors score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=log of labour force.

4.10.8. Relationship between FDI and PTS

This relationship can be explained using results from model 8 in Table 9 and model 20 from Table 10. Model 8 represents a direct relationship between *FDI* and *PTS* whereas model 20 presents results for a controlled relation between *FDI* and *PTS*.

According to the results in model 8, there exist a significant relationship between *FDI* and *PTS* (P = 0.0302) at 0.05 alpha level. Its coefficient of determination ($R^2 = 0.0280$) explains about 3% of the variations around the mean. Moreover, the coefficient of *PTS* (3.8633, P = 0.030) is positive and significant indicating that one unit increase in *PTS* leads to an increase in *FDI* inflows. Therefore, equation 17 fits.

$$FDI = 225.5751 + 3.8633\,PTS \quad (17)$$

Sig. = (0.030)

$R^2 = 0.0280$

Where:
FDI=Foreign direct investment inflows
PTS=Paying taxes score.

According to the results presented in model 20, there exist a significant relationship ($P \leq 0.01$) between *FDI* and *PTS* with a coefficient of determination ($R^2 = 0.1569$) explaining about 16% of the variations around the mean. The coefficients of *PTS* and *GDPPC* (2.2688, P = 0.332 and 0.0191, P = 0.287 respectively) are positive and non-significant whereas that of *TRDOPN* (−1.6998) is negative and non-significant. Nevertheless, that of *logLABF* (54.6135, P = <0.01) is positive and significant. Thus, equation 18 fits.

$$FDI = -441.8446 + 2.2688\,PTS + 0.0191\,GDPPC - 1.6998\,TRDOPN + 54.6135\,logLABF \quad (18)$$

Sig. = (0.332) (0.287) (0.493) (<0.01)

$R^2 = 0.1569$

Where;
FDI=Foreign direct investment inflows
PTS=Paying taxes score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=log of labour force.

4.10.9. Relationship between FDI and TABS

Model 9 in Table 9 and model 21 in Table 10 present results for the relationship between *FDI* and *TABS*. Model 9 is a presentation of a direct relationship between the two whereas model 21 is a presentation of a controlled relationship.

According to the results from model 9, there exist a significant relationship between *FDI* and *TABS* (P = 0.0406) with a coefficient of determination (R^2 = 0.0250) explaining about 2.5% of the variations around the mean. The coefficient of *TABS* (3.5515, P = 0.041) is positive and significant indicating that one unit increase in *TABS* leads to an increase in *FDI* inflows. Therefore, equation 19 fits.

$$FDI = 296.408 + 3.5515\ TABS \quad (19)$$

Sig.= (0.041)

$R^2 = 0.0250$

Where;
FDI=Foreign direct investment inflows
TABS=Trading across borders.

When this relationship is controlled by GDP per Capita, Trade openness and availability of labour force, it remains significant ($P \leq 0.01$) at 0.05 alpha level with a coefficient of determination ($R^2 = 0.1691$) explaining about 17% of the variations around the mean. The coefficients of *TABS* and GPCPC (3.8799, P = 0.077 and 0.0086, P = 0.650 respectively) are positive but not significant. On the other hand, the coefficient of *TRDOPN* (−1.9647, P = 0.425) is negative and insignificant, indicating that one unit increase in *TABS* leads a decrease in *FDI*. The coefficient of *logLABF* (52.6690, $P \leq 0.01$) is positive and significant, indicating that one unit increase in *logLABF* leads to an increase in *FDI* inflows. This then leads to equation 20.

$$\begin{array}{l} FDI = -429.3656 + 3.8799\ TABS + 0.0086\ GDPPC \\ \text{Sig. =} \qquad\qquad (0.077) \qquad\quad (0.650) \\ -1.9647\ TRDOPN + 52.6690 logLABF \\ \qquad (0.425) \qquad (<0.01) \end{array} \quad (20)$$

$R^2 = 0.1691$

Where;
FDI=Foreign direct investment inflows
TABS=Trading across borders score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=log of Labour Force.

4.10.10. Relationship between FDI and ECS

This relationship is represented by results in model 10 under Table 9 and model 22 under Table 10. Model 10 is a representation of a direct relationship whereas model 22 represents a controlled relationship.

According to the results from model 10, there exists a significant relationship between *FDI* inflows and *ECS* (P = 0.0001) with a coefficient of determination ($R^2 = 0.847$) explaining about 8% of the variations around the mean. The coefficient of *ECS* (11.9837, P = <0.01) is positive and significant meaning that one unit increase in *ECS* leads to an increase in *FDI* inflows by about 12 units. Hence, equation 21 fits.

$$FDI = -181.7454 + 11.9837 ECS \quad (21)$$

Sig. = (<0.01)

$R^2 = 0.847$

Where;
FDI=Foreign direct investment inflows
ECS=Enforcing contracts score.

According to the results from the controlled relationship model 22, there exist a significant relationship between *FDI* and *ECS* ($P \leq 0.01$) with a coefficients of determination ($R^2 = 0.1978$) explaining about 20% of the variations around the mean. The coefficients of *ECS* and *logLABF* (11.3899, P = 0.004 and 49.6776, P = <0.01 respectively) indicate a positive and significant relationship. Meaning that one unit increase in *ECS* and *logLABF* leads to an increase in *FDI* inflows. The coefficient of *GDPPC* (0.0160, P = 0.325) is positive but not significant while that of *TRDOPN* (−1.4987, P = 0.535) is negative but not significant. Thus, equation 22 fits.

$$\begin{array}{l} FDI = -844.0647 + 11.3899\ ECS + 0.0160\ GDPPC \\ \text{Sig =} \qquad\qquad (0004) \qquad\quad (0325) \\ -1.4987\ TRDOPN + 49.6776 logLABF \\ \qquad (0535) \qquad (<0.01) \end{array} \quad (22)$$

$R^2 = 0.1978$

Where;
FDI=Foreign direct investment inflows
ECS=Enforcing contracts score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=log of labour force.

4.10.11. Relationship between FDI and RIS

This relationship is presented in model 11 under Table 9 and model 23 under Table 10. Model 11 is a representation of a direct relationship between *FDI* and *RIS* whereas model 23 is a representation of a controlled relationship.

According to results from model 11, there exist a significant relationship between *FDI* and *RIS* (P = 0.0027) at 0.05 alpha level. Its coefficient of determination (R^2 = 0.0528) explains about 5% of the variations around the mean. The coefficient of *RIS* (7.1378, P = 0.003) is positive and significant, an indication that one-unit increase in *RIS* leads to an increase in *GFDI* inflows by about seven units. Therefore, equation 23 fits.

$$FDI = 254.802 + 7.1378\ RIS \quad (23)$$

Sig. = (0.003)

R^2 = 0.0528

Where;
FDI=Foreign direct investment inflows
RIS=Resolving insolvency score.

Results from the controlled model 23 indicate a significant relationship between *FDI* and *RIS* (P ≤ 0.01). Its coefficient of determination (R^2 = 0.1733) explains about 17% of the variations around the mean. The coefficients of *RIS* and *logLABF* (6.6900, P = 0.048 and 41.6575, P = 0.004 respectively) are positive and significant indicating that one unit increase leads to a significant increase in *FDI* inflows. On the other hand, coefficients of *GDPPC* and *TRDOPN* (−0.0056, P = 0.807 and −1.8798, P = 0.444 respectively) are negative and non-significant. Thus, equation 24 fits.

$$FDI = -259.6951 + 6.6900\ RIS - 0.0056\ GDPPC - 1.8798\ TRDOPN + 41.6575\ logLABF \quad (24)$$

Sig. = (0.048) (0.807) (0.444) (0.004)

R^2 = 0.1733

Where;
FDI=Foreign direct investment inflows
ECS=Enforcing contracts score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
logLABF=Log of labour force.

4.10.12. The relationship between FDI and ease of doing business (overall model)

This relationship is evidenced by model 12 in Table 9 and model 24 in Table 10. Model 12 is an illustration of a direct relationship between *FDI* and ease of doing business whereas model 24 is an illustration of a controlled relationship.

Results from model 12, show a significant relationship between *FDI* and ease of doing business (P = 0.0006). Its coefficient of determination (R^2 = 0.1832) explains about 18% of the variations around the mean. The coefficients of *PMIS* and *ECS* (11.0817, P = 0.032 and 14.1655, P = 0.002 respectively) are positive and significant whereas those of *DBS*, *DCS* and *RIS* (7.6688, P = 0.141; 4.5468, P = 0.230 and 4.9091, P = 0.131 respectively) are positive but not significant. On the other hand, the coefficient of *SBS* (−9.5468, P = 0.006) is negative but significant. In addition, the coefficients of *GES*, *RPS*, *GCS*, *PTS* and *TABS* (−0.7663, P = 0.842; −0.4878, P = 0.909; −0.9159, P = 0.787; −6.9871, P = 0.084 and −3.5017, P = 0.326 respectively) are negative and non-significant. Hence, equation 25 fits.

$$FDI = -82.6660 + 7.6688DBS - 9.5468SBS + 4.5468DCS - 0.7663GES - 0.4878RPS - 0.9159GCS + 11.0817PMIS - 6.9871PTS - 3.5017TABS + 14.1655ECS + 4.9091RIS \quad (25)$$

Sig. = (0.141) (0.006) (0.230) (0.842) (0.909) (0.787) (0.032) (0.084) (0.326) (0.002) (0.131)

R^2 = 0.1832

Where;
FDI=Foreign direct investment inflows
DBS=Doing business score
SBS=Starting a business score
DCS=Dealing with construction permits score
GES=Getting electricity score
RPS=Registering property score
GCS=Getting credit score
PMIS=Protecting minority investors score
PTS=Paying taxes score
TABS=Trading across borders score
ECS=Enforcing contracts score
RIS=Resolving insolvency score.

Results from the controlled model 24 indicate a significant relationship between *FDI* and Ease of Doing Business (P ≤ 0.01), and its coefficients of determination (R^2 = 0.3147) explains about 31% of the variations around the mean. The coefficients of *PMIS*, *ECS*, *RIS* and *logLABF* (13.7356, P = 0.008; 15.7815, P = 0.005; 7.6998, P = 0.045 and 44.5878, P = 0.003 respectively) are positive and significant. An indication that one unit increase in *PMIS*, *ECS*, *RIS* and *logLABF* leads to a significant increase in *FDI* inflows. The coefficients of *DBS*, *DCS*, *GES*, *RPS* and *PTS* (3.0314, P = 0.562; 3.3101, P = 0.340; 3.0764, P = 0.424; 0.7732, P = 0.874 and 0.7759, P = 0.826 respectively) are positive but not significant. On the other hand, the coefficients of *SBS*, *GCS* and *PTS* (−7.7296, P = 0.037; −7.8551, P = 0.028 and −11.5130, P = 0.006) are negative and significant. In addition, the coefficients of *GDPPC* and *TRDOPN* (−0.0150, P = 0.528 and −1.4563, P = 0.536 respectively) are negative and insignificant. Thus, equation 26 fits.

$$FDI = -748.2162 + 3.0314DBS - 7.7296SBS + 3.3101DCS + 3.0764GES + 0.7732RPS - 7.8551GCS + 13.7356PMIS - 11.5130PTS + 0.7759TABS + 15.7815ECS + 7.6998RIS - 0.0150GDPPC - 1.4563TRDOPN + 44.5878logLABF \quad (26)$$

Sig = (0.562) (0.037) (0.340) (0.424) (0.874) (0.028) (0.008) (0.006) (0.826) (0.005) (0.045) (0.528) (0.536) (0.003)

R^2 = <0.3147

Where;
FDI=Foreign direct investment inflows
DBS=Doing business score

SBS=Starting a business score
DCS=Dealing with construction permits score
GES=Getting electricity score
RPS=Registering property score
GCS=Getting credit score
PMIS=Protecting minority investors score
PTS=Paying taxes score
TABS=Trading across borders score
ECS=Enforcing contracts score
RIS= Resolving insolvency score
GDPPC=Gross domestic product per capita
TRDOPN=Trade openness
LogLABF=Availability of labour force.

5. CONCLUSIONS AND POLICY IMPLICATIONS

Premised on the findings, this section makes a brief conclusion and recommends actions to foster increased inflow of foreign direct investments into the eastern Africa region.

5.1. Conclusions

The purpose of this study was to establish the link between foreign direct investment inflows and ease of doing business. Using pooled OLS regression for 12 eastern Africa region countries for the period 2004 through 2017, the paper used direct and controlled relationships. From direct models, it was established that ease of doing business significantly influence the flow of foreign direct investments into the eastern Africa region. Specifically, all other variables defining ease of doing business (doing business, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts and resolving insolvency) were found to be significant in explaining the flow of foreign direct investments into the eastern Africa region, except two (starting business and dealing with construction permits). On the other hand, when the relationship between foreign direct investments and ease of doing business was controlled by GDP per capita, trade openness and labour force, the overall model established a significant influence. All specific variables explaining ease of doing business significantly influence the flow of foreign direct investments into the eastern region. Therefore, reforming the business regulatory environment is a very important factor in determining the flow of *FDI*. Other factors like economic growth as defined by GDP per capita, ease of importation and exports and availability of affordable and quality labour force determine the flow of *FDI*. This paper thus supports the proposition that *FDI* follows the size and quality of the market, and production efficiency.

5.2. Policy Implications

Business regulatory climate is a very important aspect for both entrepreneurship development and national competitiveness and productivity. Moreover, economic activity thrives when regulations are vibrant, articulate, proficient, implementable and accessible to its subjects. Therefore, it behoves governments to ensure adequate regulations that foster the development of the private sector are in place.

Entrepreneurship supplements the modern sector of the economy in job creation. Therefore, the process of starting a business should be made clear, easy, faster and cost effective in order to motivate job seekers to become job creators. In this regard, both public officers handling business registration and entrepreneurs should adequately be informed and continuously trained.

Electricity is one of major drivers of economic growth and development. However, most African countries are suffering from under electrification, unreliability and exorbitant tariffs. In addition, the supply side is hampered by vices such as technical hitches in connections process, faulty wiring and installation, and lack of accreditation of electricians. This occurrence affects business operations in a negative way and hence slow economic growth. Thus, there is need for lowering electricity tariffs and enhancing reliable supply to all corners of the economy. Besides, robust guidelines on qualifications and accreditation of electricians, regular check-ups and introduction of liability clauses in case of faulty electrification causes loses.

The role of an independent judiciary to economic growth and development cannot be over emphasised. A good process of enforcing contracts and resolving insolvency issues largely depend on how streamlined the judiciary is to supporting the commercial sector in an expeditious and efficient manner. Therefore, continuous training of judicial officers, staff and other stakeholders on the fundamentals of justice will not only enhance public confidence on the courts, but also permit uniformity and predictability of judicial decisions. In this regard, there is need to guarantee the judiciary adequate financial resources.

Comprehensive construction regulations that supports sustainable buildings is not only key in improvement of occupation health and safety but also in saving human lives and preservation of productive investments. It enables the business world, safeguards property rights and protects people from the dangers of faulty buildings. Therefore, there is need to streamline regulations governing the constructions sector through public-private partnerships. In addition, there should be strict enforcement of qualifications code for construction professionals, appropriate oversight/monitoring and evaluation mechanisms and proper guidelines on conflict of interest.

Taxation is one of the most favoured sources of revenue for both national governments and devolved units. The capacity of businesses to invest and grow is not only hampered by the size of the cost of taxation but also by the efficacy of the tax administration process. Convoluted tax systems stimulate an upsurge of the informal sector, tax evasion, reduced investments and high corruption. Therefore, the tax system should strive to increase tax collection, reduce taxpayer compliance costs and administrative costs.

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