# Macro-economic Factors and Foreign Direct Investment Flows into Eastern Africa Region

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**ABSTRACT**

The flow of capital across borders is one of the pillars that is greasing the wheels of globalization due to its benefits in technology transfer. Since developing nations are unable to put together adequate savings to take care of their investments needs, foreign direct investments come in to bridge the gap. However, some of these nations experience many structural challenges such as unstable macro-economic conditions which inhibit inflow of foreign direct investments. This makes it necessary for investors to scan environments before deciding where to invest. Using panel data from 12 eastern Africa countries from 2004 through 2016 and GLS estimation method, this study examined the effects of macro-economic factors (economic growth, interest rates, exchange rates and inflation) on foreign direct investment (FDI) inflows. From the study, it was then established that economic growth, exchange rate and inflation have a positive but non-significant effect on FDI flows into eastern Africa region but interest rates had a negative and non-significant relationship. Governments are then advised to formulate policies that ensure stable macro-economic conditions to attract more foreign direct investments.

**Keywords:** Foreign Direct Investments, Economic Growth, Interest Rates, Inflation, Exchange Rates
**JEL Classifications:** F21, C33, E22, E31, E43, F31

## 1. INTRODUCTION

Globalization has removed barriers to trade and capital flows leading to expansion of markets and creation of new opportunities for both business and economic development (UNCTAD, 2017). Capital flows across borders come with benefits such as technology transfer and promotion of research and development activities which enable host countries to grow (KNBS, 2015). Since developing countries are faced with challenges of inadequate investments due to insufficient savings, need for foreign direct investments are imperative (Epaphra and Massawe, 2017). However, keen investors' scan through environments to select the best location for their investments (Shahzad and Al-Swidi, 2013) because different locations possess different capabilities such as resource endowments, governance issues and favourable macro-economic conditions which are necessary for businesses to thrive (Alquist et al., 2014; Hussain, 2012).

Investments in different sectors of the economy will enable the world achieve to its sustainable development goals such

as eradication of extreme poverty, creation of decent jobs and attaining both industrial and infrastructure development by the year 2030. Similarly, for Africa to achieve its agenda 2063, especially aspiration number 1, which seeks to embrace inclusive growth and sustainable development, both domestic and foreign investments will be a necessity. Each individual country within the region has also curved their specific development blue prints which they seek to implement and attain by a specified period. For example, Kenya's vision 2030 seeks to transform the country into an industrialized, middle income nation which affords its citizens a high quality of life by 2030. For ease of implementation, the government of Kenya has now prioritized key areas known as the big four agenda which specifically identifies universal health, affordable housing, food security and manufacturing as key areas of focus for economic growth and development.

However, Africa as a continent has continued to suffer from a huge deficit in domestic savings hence unable to adequately cover its investment plans. Notably, sub Saharan Africa faces an infrastructure funding gap of more than US$ 100 billion, which

affect economic activities negatively (BCG, 2017). Therefore, there is need for foreign direct investments to bridge the gap. But, according to the World Bank (2017), sub-Saharan Africa has suffered from a slow growth in investments from approximately 8% recorded in 2014 to about 0.6% in 2015. This was partly attributed to sluggish commodity prices in the region which saw a reduction in foreign direct investments by almost 15% (UNCTAD, 2017).

In 2015, Africa received foreign direct investments worth US$ 61,495. Out of which eastern Africa region received the second least, managing only about US$ 6,284 million, after central Africa region which received the least at US$ 6,003 million. Other regions like North Africa received about US$ 14,472 million, West Africa received about US$ 10,189 million and Southern Africa got the highest at US$ 26,039 (Figure 1). In 2016 however, eastern Africa region recorded slight improvements in foreign direct investment (FDI) inflows, which went up by 13% to reach US$ 7.1 billion, but some economies such as Kenya continued to display distressing trends in FDI inflows from about US$ 1450 million in 2011 to about US$ 394 million in 2016.

These reduced investments leave the region at risk of lagging behind in not only social-economic growth but also illuminates the possibility that targets of sustainable development goals, Africa agenda 2063 and specific country development blueprints like vision 2030 for Kenya, might not be achieved effectively. This is exhibited by bulging rates of unemployment within the region and low levels of development.

## 2. THEORETICAL AND EMPIRICAL LITERATURE REVIEW

This section gets a glimpse of theoretical underpinnings behind foreign direct investments and macroeconomic factors and also digs into prior literature around the subject matter.

### 2.1. Theoretical Underpinnings

A theory is a carefully reasoned out concept which has been supported by evidence over time and helps to explain why a phenomena behaves in a certain way and not the other (Kombo and Tromp, 2009).

### 2.1.1. Internalization theory

This theory was conceptualized by Buckley and Casson in 1976 as an extension of Coase's theory of 1937. It has received further attention by Buckley (1982; 1988) and it alludes to the fact that firms endeavor to come up with their own markets internally whenever business can be carried out at a minimal cost. It encompasses integration where new activities and operations, otherwise carried out by some intermediate markets are brought under a direct management of the firm. Firms involve themselves in internalization whenever the external market is seen to be imperfect and costly. To this extent FDI is preferred when its advantages are seen to be more than the costs incurred.

### 2.1.2. Market segmentation theory of interest rates

This theory was developed by Horst Kliemann in 1928 and later articulated by Smith in 1956. It postulates that markets are sub divided based on buyer preferences. An entity subdivides its market with a view to expanding it. Markets for financial assets are fragmented based on their maturity periods. The demand for and the supply of such assets within each segment will influence the interest rates prevailing. The yield curve slope within each segment will be influenced by the relationship between the rates in that segment of the market, liquidity preference, inflation and the supply and demand in both short and long-term segments. It is not affected by the expected returns on other assets that possess different maturity periods (Gilman, 2006). This theory assumes that assets with different maturity period are not substitutes of each other and therefore the return of one asset will not affect the demand of the asset with a different maturity period. Institutional pressure within the market will influence the shape of the yield curve. Because of both behavioral and legal restrictions, lenders will tend to prefer maturity ranges within their area of operation.

### 2.1.3. Costs push theory of inflation

Some economists have contended with the fact that inflation can also be caused by supply side factors like a push in the cost of production. A push up in the cost of production will cause inflation to move towards the same direction. This is because when the cost of production goes up the producers will tend to increase the prices of commodities for them to remain profitable. This increase in prices will cause an increase in inflation (Javeed et al., 2010). This happens most especially when powerful trade unions cause employers to increase the wages considerably which constitute a greater part of the cost of production. This is then translated to an

**Figure 1:** Foreign direct investment inflows into Africa, 2016
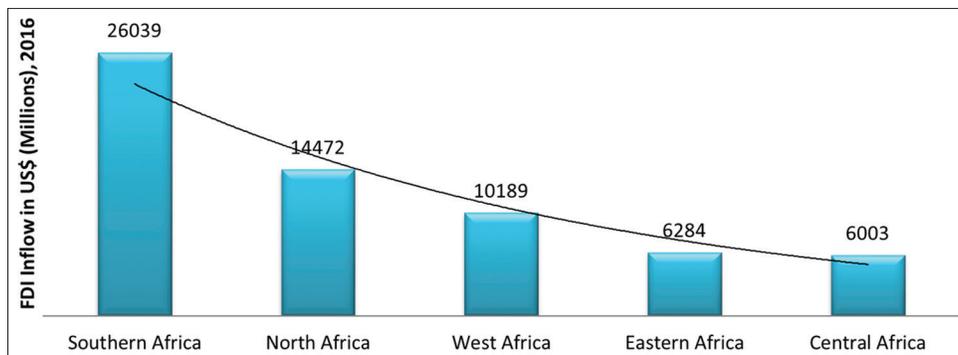


Source: UNCTAD, 2017

increase in prices to cover these increased costs. And when prices go up then inflation follows suit. Javeed et al. (2010) states that big business enterprises in the market commanding a monopoly power can also cause cost push inflation in that when they raise the prices of commodities, they cause an increase in the cost of living which in turn breads a fertile ground for workers to demand for a wage increase for them to make up for the decrease in their standards of living. This eventually gives business entities a good excuse for them to raise their prices again.

### 2.1.4. Purchasing power parity in exchange rates

Developed by Cassel in 1918, purchasing power parity states that, ordinarily in the absence of transactional costs similar goods should trade at a similar price despite their location. According to Taylor and Taylor (2004), this theory contends that the nominal rate of exchange between two currencies should be equated to the aggregate price levels ratio between those two currencies so that at the end one unit of one country's currency will have a similar purchasing power even in the foreign economy. The purchasing power parity is anchored in the idea of international goods arbitrage which is related to the law of one price. The law of one price contends that internationally traded goods should have the same price anywhere in the world. Purchasing power parity comes in two senses namely the absolute purchasing power parity and relative PPP. Absolute PPP comes into effect when the purchasing power of one unit of a currency is the same both in the domestic market and in the foreign market once it has been converted into that foreign currency at the exchange rate that is prevailing in the market. Whereas relative PPP contends that in each period the percentage change in the rate of exchange should offset the differences in inflation in the two countries in question. It has been argued that if absolute PPP holds then relative PPP should also hold but if relative PPP holds then absolute PPP does not hold necessarily (Taylor and Taylor, 2004).

## 2.2. Empirical Literature Review

Macroeconomic theory has received a lot of attention as to its role in attracting foreign direct investments. Unfortunately, most findings are conflicting as some studies confirm its significance while others negate. Back into years, economic growth has been fluctuating globally. For example, in 2013 the global economic growth dropped from 3.4% recorded in 2012 to 3.3%. This was reversed in 2014 as growth went up to 3.4%. Similarly, in sub-Saharan Africa, growth went down from 5.5% experienced in 2011 to 4.9 in 2012 and 4.4 in 2013 but improved slightly in 2014 to reach 5.0%. These fluctuations have been attributed to reduced investment flows across borders and low demand for commodities (KNBS, 2015).

Using time series data, Shahzad and Al-Swidi (2013) did a study in Pakistan on the effects of macro-economic factors on the flow of foreign direct investments and established that economic growth as represented by GDP growth rate is a significant factor in influencing the flow of foreign direct investments into Pakistan. This view was supported by Niazi et al. (2011) and Saifullah and Qaiser (2013) who also did a study in Pakistan and established that economic growth has a positive relationship with FDI flow. However, this finding was contradicted by Siddiqui and

Aumeboonsuke (2017) who found out that economic growth does not have any significant influence on the flow of foreign direct investments into Thailand, Indonesia, Philippines, Malaysia and Singapore.

After carrying out a study in Pakistan on the possibility of inflation influencing the flow of foreign direct investments, Niazi et al. (2011) came to the conclusion that inflation has a negative relationship with FDI flows which means that as inflation increases, foreign direct investments decreases. These findings were confirmed by Otieno and Njuguna (2016) who established a negative relationship between inflation and FDI flows into Kenya. But Saifullah and Qaiser, (2013) established a significant positive relationship between inflation and FDI flows. This was also supported by Ezeoha and Cattaneo (2011) who did their study in sub Saharan Africa countries and established a positive and significant effect of inflation in FDI flows. Aw and Tang (2010) also established a significant effects of inflation on foreign direct investments in Malaysia.

Siddiqui and Aumeboonsuke (2017) conducted a study in 5 ASEAN countries namely, Thailand, Indonesia, Philippines, Malaysia and Singapore and established that interest rates have a significant influence on the flow of foreign direct investments. However, these findings were contradicted by Otieno and Njuguna (2016), who did their study in Kenya and established that interest rates have a negative and non-significant relationship with FDI flows. This is confirmed by Nonnemberg and Mendonca (2004) who conducted their study in developing countries and established that interest rates have a negative relationship between the cost of funds and the flow of foreign direct investments. Anna et al. (2012) also found out that interest rates have no significant effect on the flow of foreign direct investments into Zimbabwe.

Saifullah and Qaiser (2013) found a positive and significant relationship between exchange rates and FDI flows into Pakistan. Jayasekara (2013) found that exchange rate volatility has a statistically significant relationship with FDI flows in Srilank for the period 1978 through 2012. Chi-Chi and Eze (2013) found a positive but non-significant relationship between exchange rates foreign investments in Nigeria and Otieno and Njuguna (2016) found a non-significant relationship between exchange rates and FDI flows into Kenya.

## 2.3. Conceptual Framework

Figure 2 displays relationships between the independent variables and the dependent variables as the study conceives them. The study assumes a direct influence of macroeconomic factors on FDI inflows because a favourable economic environment indicates prospects of high productivity which is associated with high returns. High returns will then attract investments.

This conceived relationship in Figure 2 motivated the study to test the following hypotheses.

$Ha_1$: Economic Growth has a significant effect on foreign direct flows into the eastern Africa region countries

$Ha_2$: Interest Rate has a significant effect on FDI flows into the eastern Africa region countries

$Ha_3$: Exchange Rate has a significant effect on FDI flows into the eastern Africa region countries

**Figure 2:** Conceptual framework
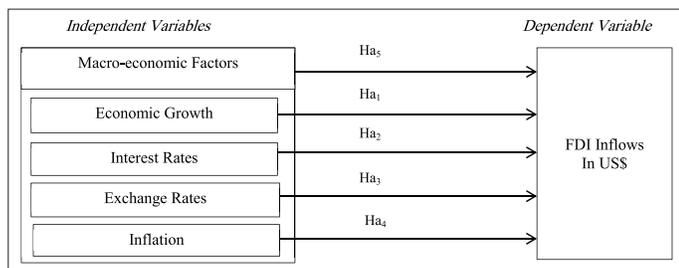


Ha$_4$: Inflation has a significant effect on FDI flows into the eastern Africa region countries.

Ha$_5$: Macroeconomic factors have a significant effect on direct investment flows into the eastern Africa region countries.

## 3. RESEARCH METHODOLOGY

This section explains the methodology used to establish the relationship between foreign direct investments inflows and macro-economic factors.

### 3.1. Data Sources

The study sought secondary data for macroeconomic factors (annual average economic growth rates, annual average real interest rates in percentage, annual average official exchange rate (local currency per US$) and annual average percentage of consumer prices (Inflation)) and FDI inflows in US$ into the 12 eastern Africa countries (Kenya, Tanzania, Uganda, Rwanda, Burundi, Comoros, Djibouti, Ethiopia, Eritrea, Madagascar, Mauritius and Seychelles) for the years 2004 through 2016. For FDI inflows, the study relied upon Annual average FDI inflows in US$, generated from UNCTAD statistics database, 2017. Annual average economic growth rates, Annual Average of real interest rates in percentage, annual average official exchange rate (Local currency per US$) and annual percentage of consumer prices were obtained from the world development indicators database by the World Bank, 2017.

### 3.2. Model Specification

To ensure that sample data was consistent with ordinary least square assumptions, the study conducted various data diagnostic tests including, tests for normality by the use of Shapiro-Wilk test, unit-root test for data stationarity using Levin-Lin-Chu method, multi collinearity tests using variance inflation factors (VIFs), Pearson Product moment correlation analysis and auto correlation tests using Woodridge test for autocorrelation, heteroscedasticity tests using whites general test and Hausman test for determining between fixed and random effects. Heteroscedasticity and random effects were established hence the study adopted GLS panel data estimation method of the following form.

$$FDI = \beta_0 + \beta_1 EconomicGrowth_{it} + \beta_2 InterestRate_{it} + \beta_3 ExchangeRate_{it} + \beta_4 Inflation_{it} + \varepsilon_0 \qquad (1)$$

Where;

FDI = Foreign direct investment inflows

EconomicGrowth = Annual average economic growth rate

InterestRate = Annual average % real interest rates

ExchangeRate = Annual average official exchange rate (local currency per US$)

Inflation = Annual average percentage of consumer prices

$\beta_1$–$\beta_4$ = Coefficient estimates of independent variables

$\beta_0$ = Constant associated with regression models

$\varepsilon_0$ = Error term associated with regression models

i = stands for various countries in the panel

t = stands for different time periods in the panel.

## 4. RESEARCH FINDINGS AND DISCUSSIONS

This section exhibits results from the analysis, interpretations and discussions of such results.

### 4.1. Descriptive Statistics

To get a glimpse of what the data is communicating, descriptive statistics were run as exhibited in Table 1. To this extent, the mean was used to report arithmetic averages of the data, standard deviation to show variations of each variable from the mean. Minimum and maximum indicate the lowest and the highest values of each variable respectively. Skewness of any statistical data shows asymmetry from normal distribution and hence can either be negatively skewed (to the left) or positively skewed (to the right). On the other hand Kurtosis simply describes how data is distributed around the mean.

### 4.2. Tests for Normality-Shapiro–Wilk Test

To test if the sample used for the study was drawn from a normally distributed data, Shapiro-wilk test was employed as shown in Table 2. The study assumed a null hypothesis that the sample was not drawn from a normally distributed data and this was confirmed from the test as FDI produced a W = 0.7637 and P = < 0.0001 which is significant at 0.05 level. Therefore, the study fails to reject the null hypothesis and conclude that the sample for FDI was not drawn from a normally distributed population. Economic growth (W = 0.9603 and P = 0.0003 < 0.05 significance level) hence concluded that the sample for economic growth was not drawn from a normally distributed population. Interest rates portrayed the same trend (W = 0.9542 and P = 0.0003 < 0.05 significance level) hence conclude that the sample for interest rates was not drawn from a normally distributed population. Exchange rates (W = 0.9617, P = 0.0003 < 0.05 significance level) an indication that the sample was not drawn from a normally distributed data. Finally, inflation recorded (W = 0.9551, P = 0.0002 < 0.05 significance level an indication that the sample was not drawn from a normally distributed population.

With a finding that the sample is not normally distributed, the study finds solace in Mugenda and Mugenda (2003) who established that the conditions for normality in statistics may be violated without necessarily jeopardizing the accuracy of generalizing the results of the study. Additionally, non-normality of the sample is not a serious problem when variables are weakly exogenous (Ahmed, 1999).

**Table 1: Descriptive statistics**

| Variable | Mean | Standard deviation | Minimum | Maximum | Observations | | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|
| FDI | | | | | | | | |
| Overall | 424.96 | 544.895 | 0.03 | 3196.39 | N | 156 | 1.955 | 7.528 |
| Between | | 412.679 | 5.535 | 1242.974 | n | 12 | | |
| Within | | 373.887 | −487.414 | 2722.193 | T | 13 | | |
| Economic growth | | | | | | | | |
| Overall | 69.6 | 39.022 | 2 | 138 | N | 150 | 0.048 | 1.855 |
| Between | | 25.034 | 30.615 | 109.539 | n | 12 | | |
| Within | | 30.87 | −11.938 | 161.1 | T | 12.5 | | |
| Interest rates | | | | | | | | |
| Overall | 63.58 | 35.737 | 2 | 124 | N | 125 | −0.019 | 1.799 |
| Between | | 19.403 | 20.6 | 88.75 | n | 11 | | |
| Within | | 31.762 | −4.166 | 141.96 | T-bar | 11.364 | | |
| Exchange rates | | | | | | | | |
| Overall | 65.981 | 36.377 | 2 | 134 | N | 154 | 0.158 | 1.982 |
| Between | | 32.519 | 12.231 | 116.846 | n | 12 | | |
| Within | | 18.407 | −14.866 | 130.442 | T | 12.83 | | |
| Inflation | | | | | | | | |
| Overall | 67.77 | 38.705 | 2 | 135 | N | 138 | 0.029 | 1.806 |
| Between | | 14.188 | 41.083 | 85.75 | n | 11 | | |
| Within | | 36.284 | −0.982 | 128.768 | T | 12.55 | | |

FDI: Foreign direct investment

## 4.3. Test for Stationarity – Unit Root Test - Levin-Lin-Chu

Time series data can either be stationery or non-stationery. In statistics it is assumed that time series data is stationery which means that properties like mean, autocorrelation and variance remain constant over time and lack of seasonality. Normally, non-stationery data is not predictable and cannot be forecasted or modelled, meaning that results from such data may be spurious indicating a relationship between two specified variables when in essence there is no relationship. Performing a Levin-Lin-Chu unit root test, the study assumed a null hypothesis that data is not stationery hence contains a unit root. From Table 3, FDI produced (adjusted t statistic = −3.1087, P = 0.0009) which is significant at 0.05 level. Therefore reject the null hypothesis and conclude that the series is stationery. Economic growth (adjusted t statistic = −6.3770, P = < 0.0001) which is significant at 5% level. Therefore, reject the null hypothesis and conclude that the series is stationery. Inflation produced (adjusted t statistic = −4.6277, P = < 0.0001) which is significant at a 5% level hence reject the null hypothesis and conclude that the series is stationery. However interest rate and exchange rate produced (adjusted t statistic = −1.1836 and 1.9605 respectively and P = 0.1183 and 0.9750 respectively) which are significant under 0.05 significance level hence fail to reject the null hypothesis and conclude that the series are non-stationery. This was later remedied by first differencing the variables interest rate and exchange rate which then produced significant results as shown in Table 3.

### 4.4. Tests for Multi-Collinearity

To test for collinearity of the sample data the study used the VIFs. Conventionally, VIF results are supposed to lie between 1 and 10 for them to be acceptable as lacking multicollinearity. Otherwise a VIF which is >10 is a serious cause of alarm. According to Table 4, the mean VIF was 1.03 with the lowest recording a VIF of 1.02 and the highest recording a VIF of 1.04. Therefore, conclude that the sample data does not contain multi collinearity.

**Table 2: Shapiro Wilk test for normality results**

| Variable | Obs | w | v | z | Prob>z |
|---|---|---|---|---|---|
| FDI | 156 | 0.7637 | 28.441 | 7.605 | 0.00000 |
| Economic growth | 150 | 0.9603 | 4.623 | 3.471 | 0.00026 |
| Interest rate | 125 | 0.9542 | 4.566 | 3.410 | 0.00033 |
| Exchange rate | 154 | 0.9617 | 4.563 | 3.446 | 0.00028 |
| Inflation | 138 | 0.9551 | 4.869 | 3.573 | 0.00018 |

FDI: Foreign direct investment

## 4.5. Correlation Analysis

To establish the level of association between variable, the study carried out a Pearson product moment correlation analysis which indicates the relations between variables, the degree of association and the direction of association, i.e., whether positive or negative as exhibited in Table 5. This indicates that there exist a significant relationship between FDI and economic growth (P = 0.0119) with a moderately 20.48% correlation, and FDI and Inflation (P = 0.0083) with a moderate correlation of 22.40%. Other variables do not seem to have a significant relationship and possess low correlation with each other. Some other variables exhibited a negative correlation with each other, such as FDI and interest rate (−5%), FDI and exchange rate (−5%), economic growth and exchange rate (−6%), and exchange rate and inflation (−11%).

## 4.6. Tests for Auto-correlation

To test for auto correlation, the study employed Woodridge test for autocorrelation as exhibited below. The study assumed a null hypothesis that the sample data has no first order autocorrelation which was confirmed by test results, P = 0.2610 > 0.05 significance level hence fail to reject the null hypothesis and conclude that the sample data does not have first order auto correlation.

Wooldridge test for autocorrelation in panel data
$H_0$: No first order autocorrelation
$F (1, 10) = 1.420$
Prob > F = 0.2610.

## 4.7. Tests for Heteroscedasticity

To test for heteroscedasticity, the study employed whites general test for heteroscedasticity and made an assumed a null hypothesis that the sample data is homoscedastic. This was however, disapproved by the test results below indicating ($\chi^2$ (14) = 24.16, P = 0.0438) < 0.05 significance level hence reject the null hypothesis and conclude that the sample data is heteroscedastic (Table 6).

To remedy the problem of heteroscedasticity, the study estimated the model using generalized linear squares (GLS) which has the advantage of correcting for heteroscedasticity.

## 4.8. Housman Test – Fixed Effects and Random Effects

Since the sample data is heteroscedastic, the study conducted hausman test to check for fixed effects and random effects and then be able to determine the most appropriate model to adopt. The study assumed a null hypothesis that difference in coefficients are not systematic which was confirmed by the test results in Table 7, ($\chi^2$ (4) = 1.53, P = 0.8218) which is not significant at 0.05 level hence fail to reject the null hypothesis and conclude that random effects exist. This then necessitates the study to adopt a GLS model.

## 4.9. Regression Analysis

To ascertain the association between the independent variables and FDI and to deal with the problems of heteroscedasticity, the study carried out a GLS to estimate the models of the study as follows.

**Table 3: Levin-Lin-Chu unit root test results**

| Variable | Model | Lags | Adjusted t statistic | P value |
|---|---|---|---|---|
| FDI | Original | 1 | −3.1087 | 0.0009 |
| Economic growth | Original | 1 | −6.3770 | 0.0000 |
| Interest rate | Original | 1 | −1.1836 | 0.1183 |
|  | 1st - diff | 1 | −3.4396 | 0.0003 |
| Exchange rate | 1st - diff | 1 | −3.3529 | 0.0004 |
|  | Original | 1 | 1.9605 | 0.9750 |
| Inflation | Original | 1 | −4.6277 | 0.0000 |

FDI: Foreign direct investment

**Table 4: VIF results**

| Variable | VIF | 1/VIF |
|---|---|---|
| Economic growth | 1.04 | 0.959244 |
| Interest rates | 1.03 | 0.974969 |
| Exchange rates | 1.02 | 0.977647 |
| Inflation | 1.02 | 0.981255 |
| Mean VIF | 1.03 |  |

VIF: Variance inflation factor

**Table 5: Correlation analysis matrix**

|  | FDI | Economic growth | Interest rate | Exchange rate | Inflation |
|---|---|---|---|---|---|
| FDI | 1.0000 |  |  |  |  |
| Economic growth | 0.2048* | 1.0000 |  |  |  |
|  | 0.0119 |  |  |  |  |
| Interest rate | −0.0536 | 0.1589 | 1.0000 |  |  |
|  | 0.5524 | 0.0768 |  |  |  |
| Exchange rate | −0.0556 | −0.0607 | 0.0337 | 1.0000 |  |
|  | 0.4933 | 0.4603 | 0.7090 |  |  |
| Inflation | 0.2240* | 0.0136 | 0.0136 | −0.1155 | 1.0000 |
|  | 0.0083 | 0.8821 | 0.8821 | 0.1772 |  |

*Significant at 0.05 significance level. FDI: Foreign direct investment

### 4.9.1. Relationship between FDI and economic growth

Results from Table 8 indicate (Wald $\chi^2$ (2) = 0.03, P = 0.9859) which is not significant at 0.05 level. The coefficient of determination $R^2$ = 0.0845, indicating that economic growth only explains about 8% of the variations in FDI, which is a week relationship. The coefficients of economic growth indicate a positive relationship which is not significant though. This means, one unit increase in economic growth has a 1.8% possibility of positively influencing FDI inflows. Therefore, the study failed to accept $Ha_1$ at a 95% confidence level and concludes that Economic growth has no significant influence on FDI inflows into the eastern Africa region countries. From these results, model 2 was fitted.

$$FDI = 4.4808 + 0.0184 EconomicGrowth \qquad (2)$$
$$Sig = 0.866$$
$$R^2 = 0.0845$$

Where;

FDI = Foreign direct investment inflows
EconomicGrowth = Economic Growth
4.8808 = Constant associated with regression models.

These findings are not a stand-alone, they have been collaborated by Siddiqui and Aumeboonsuke (2017) who found out that economic growth has no significant effect on the flow of foreign direct investments into Thailand, Indonesia, Philippines and Singapore.

### 4.9.2. Relationship between FDI and interest rates

To ascertain the association between FDI and Interest rates, Table 9 provides GLS results indicating (Wald $\chi^2$ (2) = 0.28, P = 0.871) which is not significant at 5% level. Similarly, the coefficient of determination $R^2$ = 0.0053 means that Interest rates are able to explain only about 0.53% of the variations in FDI inflows, which is a very weak relationship. The coefficients of interest rates reveal a negative relationship which is not significant. This means that one unit increase in interest rates has a 5.23% potential of negatively influencing FDI inflows. Therefore, the study fails to accept $Ha_2$ at a 95% confidence interval and concludes that Interest rates do not have a significant relationship with FDI inflows into the eastern Africa region countries. From these results, model 3 was fitted.

$$FDI = 4.8109 − 0.0523 \text{ Interest Rates} \qquad (3)$$
$$Sig = 0.599$$
$$R^2 = 0.0053$$

Where:

FDI = Foreign direct investment inflows

InterestRate = Annual average interest rate

4.8109 = Constant associated with regression models.

Other scholars from the past have also come up with the same conclusion, for example, Otieno and Njuguna (2016) established that interest rates have a negative and non-significant relationship with foreign direct investments in Kenya. Nonnemberg and Mendoca (2004) found that the cost of funds have a negative relationship with the flow of foreign direct investments into developing countries. Anna et al. (2012) also came up with a conclusion that interest rates do not have any significant effect on the flow of foreign direct investments into Zimbabwe.

### 4.9.3. Relationship between FDI and exchange rates

Table 10 provides results from a GLS regression estimation indicating (Wald $\chi^2$ = 1.05, P-value = 0.5904) which is not

significant at 0.05 level. The coefficient of determination $R^2$ = 0.0805 which means that Exchange rates can only explain about 8% of the variations in FDI inflows, which is also a weak association. The coefficients of exchange rate indicate a positive relationship which is non-significant. This means, one unit increase in Exchange rates has a 28% possibility of influencing foreign direct investments positively. Therefore, the study fails to accept Ha$_3$ at a 95% confidence interval and conclude that Exchange rates do not have a significant relationship with FDI inflows into the eastern Africa region countries. From these results, model 4 was fitted.

$$FDI = 3.4662 + 0.2803 ExchangeRates \qquad (4)$$
$$Sig = 0.305$$
$$R^2 = 0.0805$$

Where;

FDI = Foreign direct investment inflows

ExchangeRate = Annual average exchange rate

3.4662 = Constant associated with regression models.

Otieno and Njuguna (2016), conducting their study in Kenya collaborated the findings of this study by concluding that exchange rates do not have a significant relationship with the flow of foreign direct investments. Additionally, Chi-Chi and Eze (2013) established that exchange rates have a positive but non-significant relationship with foreign investments.

### 4.9.4. Relationship between FDI and inflation

Table 11 exhibits results for the association between FDI and Inflation. (Wald $\chi^2$ (2) = 1.52, P = 0.7701) which is not significant

**Table 6: Heteroscedasticity test results**

| Ho: Homoscedasticity | | | |
|---|---|---|---|
| Ha: Unrestricted heteroscedasticity | | | |
| $\chi^2$ (14)=24.16 | | | |
| Prop>$\chi^2$=0.0438 | | | |
| Cameron and Trivedi's decomposition of IM-test | | | |
| Source | $\chi^2$ | df | P |
| Heteroscedasticity | 24.16 | 14 | 0.0438 |
| Skewness | 21.71 | 4 | 0.0002 |
| Kurtosis | 4.67 | 1 | 0.0001 |
| Total | 50.55 | 19 | 0.0001 |

**Table 7: Hausman test results**

| Variables | (b) Fixed | (B) random | (b-B) difference | Sqrt (diag (V_b-V_B)) S.E |
|---|---|---|---|---|
| logiEconomic growth | 0.2325 | 0.2671 | −0.0346 | |
| logInterest Rate | −0.1231 | −0.1181 | −0.005 | |
| logExchange Rate | 0.3302 | 0.5873 | −0.2571 | 0.1488 |
| logInflation | 0.08 | 0.0647 | 0.0153 | |
| b=Consistent under Ho and Ha; obtained from xtregar | | | | |
| B=Inconsistent under Ha, efficient under Ho; obtained from xtregar | | | | |
| Test: Ho: Difference in coefficients not systematic | | | | |
| $\chi 2$ (4)=(b-B)'[(v_b-v_B)^(-1)](b-B) | | | | |
| =1.53 | | | | |
| Prop>$\chi^2$=0.8218 | | | | |
| (v_b-v_B is not positive definite) | | | | |

**Table 8: Relationship between FDI and economic growth**

| R-squared | Within | 0.0014 | | Number of Obs | 150 |
|---|---|---|---|---|---|
| | Between | 0.3435 | | Wald $\chi^2$ (2) | 0.03 |
| | Overall | 0.0845 | | Prop>$\chi 2$ | 0.9859 |
| **Theta** | | | | | |
| **Min** | **5%** | **Median** | **95%** | **Max** | |
| 0.6528 | 0.6528 | 0.7065 | 0.7065 | 0.7065 | |
| **logFDI** | **Coefficient** | **SE** | **z** | **P>\|z\|** | **(95% confidence interval)** |
| logEconomic Growth | 0.0184 | 0.1087 | 0.17 | 0.866 | −0.1947–0.2315 |
| _cons | 4.4808 | 0.7487 | 5.99 | 0 | 3.0134–5.9481 |
| rho_ar | 0.6002 | (Estimated autocorrelation coefficient) | | | |
| sigma_u | 2.0324 | | | | |
| sigma_e | 0.9978 | | | | |
| rho_fov | 0.8058 | (Fraction of variance due to u_i) | | | |

FDI: Foreign direct investment

at 5% level. Similarly, the coefficient of determination $R^2 = 0.0109$, indicating that Inflation is only able to explain about 1% of the variations in FDI inflows. The coefficients of Inflation indicate a positive relationship which is not significant meaning, 1 unit increase in inflation causes has a 7% possibility of positively influencing FDI inflows in eastern Africa region. Therefore, the study fails to accept $Ha_4$ at a 95% confidence interval and concludes that inflation do not have a significant relationship with FDI flows into the eastern Africa region countries. From these results, model 5 was fitted.

$$FDI = 4.375 + 0.0698 \text{Inflation} \qquad (5)$$
$$Sig = 0.47$$
$$R^2 = 0.0109$$

Where;
FDI = Foreign direct investment inflows
Inflation = Annual average inflation rates
4.375 = Constant associated with regression models.

These findings have also been collaborated by Otieno and Njuguna (2016), who established that Inflation does not have any significant relationship with FDI flows into Kenya. However, their coefficients were negative. Additionally, Niazi (2011) also established a non- significant relationship between Inflation and foreign direct investments in Pakistan. The study also had negative coefficients.

### 4.9.5. The overall model (relationship between FDI and macro economic factors)

Looking at the overall model containing all variables, Table 12 shows the results of a regression analysis of Macroeconomic factors against FDI (Wald $\chi^2$ (5) = 6, P = 0.3064) which is not significant at 0.05 level. The coefficient of determination, $R^2 = 0.2005$, which means that Macro economic factors can only explain about 20% of the variations in FDI inflows. This is a weak model. The coefficients of each variable indicate a positive relationship which is not significant, (Economic growth = 0.2671, P = 0.079 > 0.05 significance level, Exchange rate = 0.5873, P = 0.065 > 0.05 significance level and Inflation = 0.0647, P = 0.559 > 0.05 significance level.) this means that one unit increase in economic growth, Exchange rate and Inflation has a 26.7%, 58.7% and 6% respectively, potential of positively influencing FDI inflows in eastern Africa region. On the other hand, Interest rates show a negative relationship (−0.1181, P = 0.294) which is not significant at 0.05 level, an indication that one unit increase in interest rates has a 11.8% of negatively influencing FDI inflows in eastern Africa region. Therefore, the study fails to accept $Ha_5$ at a 95% confidence level and concludes that macroeconomic factors do not have a significant relationship with FDI inflows into the eastern Africa region countries. From these results, model 6 was fitted.

$$FDI = 1.3878 + 0.2671 \text{EconomicGrowth} - 0.1181 \text{InterestRates} + 0.5873 \text{ExchangeRates} + 0.0647 \text{Inflation} \qquad (6)$$
Sig = for each specific variable, EconomicGrowth, InterestRates, ExchangeRates, and Inflation respectively.

**Table 9: Relationship between FDI and interest rates**

| R-squared | Within | 0.005 | | Number of Obs | 125 |
|---|---|---|---|---|---|
| | Between | 0.0038 | | Wald $\chi^2$ (2) | 0.28 |
| | Overall | 0.0053 | | Prop>$\chi^2$ | 0.871 |

| Theta | | | | | |
|---|---|---|---|---|---|
| **Min** | **5%** | **Median** | **95%** | **Max** | |
| 0.6377 | 0.6377 | 0.6377 | 0.6377 | 0.7377 | |

| logFDI | Coefficient | SE | z | P>\|z\| | (95% confidence interval) |
|---|---|---|---|---|---|
| logInterest Rate | −0.0523 | 0.0995 | −0.53 | 0.599 | −0.2472–0.1427 |
| Constant | 4.8109 | 0.7906 | 6.08 | 0.000 | 3.2613–6.3605 |
| rho_ar | 0.5828 | | | (Estimated autocorrelation coefficient) | |
| sigma_u | 2.1814 | | | | |
| sigma_e | 0.9875 | | | | |
| rho_fov | 0.8299 | | | (Fraction of variance due to u_i) | |

FDI: Foreign direct investment

**Table 10: Relationship between FDI and exchange rates**

| R-squared | Within | 0.0333 | | Number of Obs | 154 |
|---|---|---|---|---|---|
| | Between | 0.0984 | | Wald $\chi^2$ (2) | 1.05 |
| | Overall | 0.0805 | | Prop> $\chi^2$ | 0.5904 |

| Theta | | | | | |
|---|---|---|---|---|---|
| **Min** | **5%** | **Median** | **95%** | **Max** | |
| 0.6948 | 0.6948 | 0.7131 | 0.7131 | 0.7131 | |

| logFDI | Coefficient | SE | z | P>\|z\| | (95% confidence interval) |
|---|---|---|---|---|---|
| logExchange Rate | 0.2803 | 0.273 | 1.03 | 0.305 | −0.2548–0.8155 |
| Constant | 3.4662 | 1.2333 | 2.81 | 0.005 | 1.049–5.8834 |
| rho_ar | 0.5844 | | | (Estimated autocorrelation coefficient) | |
| sigma_u | 1.9765 | | | | |
| sigma_e | 0.9783 | | | | |
| rho_fov | 0.8032 | | | (Fraction of variance due to u_i) | |

FDI: Foreign direct investment

**Table 11: Relationship between FDI and inflation**

| R-Squared | Within | 0.0023 | | Number of Obs | 138 |
|---|---|---|---|---|---|
| | Between | 0.072 | | Wald $\chi^2$ (2) | 1.52 |
| | Overall | 0.0109 | | Prop>$\chi^2$ | 0.7701 |
| **Theta** | | | | | |
| **Min** | **5%** | **Median** | **95%** | **Max** | |
| 0.7069 | 0.7069 | 0.7152 | 0.7152 | 0.7152 | |
| **logFDI** | **Coefficient** | **SE** | **z** | **P>\|z\|** | **(95% confidence interval)** |
| logInflation | 0.0698 | 0.0965 | 0.72 | 0.47 | −0.1194–0.2589 |
| Constant | 4.375 | 0.7802 | 5.61 | 0.000 | 2.8459–5.9041 |
| rho_ar | 0.6259 | | | (Estimated autocorrelation coefficient) | |
| sigma_u | 2.1511 | | | | |
| sigma_e | 0.9667 | | | | |
| rho_fov | 0.832 | | | (Fraction of variance due to u_i) | |

FDI: Foreign direct investment

**Table 12: Relationship between FDI and macro-economic factors**

| R-Squared | Within | 0.0701 | | Number of Obs | 121 |
|---|---|---|---|---|---|
| | Between | 0.2278 | | Wald $\chi^2$ (5) | 6 |
| | Overall | 0.2005 | | Prop>$\chi^2$ | 0.3064 |
| **Theta** | | | | | |
| **Min** | **5%** | **Median** | **95%** | **Max** | |
| 0.5573 | 0.5828 | 0.6875 | 0.6969 | 0.6969 | |
| **logFDI** | **Coefficient** | **SE** | **z** | **P>\|z\|** | **(95% confidence interval)** |
| logEconomic Growth | 0.2671 | 0.1521 | 1.76 | 0.079 | −0.0309–0.5652 |
| logInterest Rate | −0.1181 | 0.1125 | −1.05 | 0.294 | −0.3387–0.1025 |
| logExchange Rate | 0.5873 | 0.3183 | 1.84 | 0.065 | −0.0366–1.2112 |
| logInflation | 0.0647 | 0.1107 | 0.58 | 0.559 | −0.1522–0.2817 |
| Constant | 1.3878 | 1.6479 | 0.84 | 0.400 | −1.842–4.6177 |
| rho_ar | 0.5444 | | | (Estimated autocorrelation coefficient) | |
| sigma_u | 1.8137 | | | | |
| sigma_e | 1.0312 | | | | |
| rho_fov | 0.7557 | | | (Fraction of variance due to u_i) | |

FDI: Foreign direct investment

0.079 0.294 0.065 0.559

$R^2 = 0.2005$

Where;

FDI = Foreign direct investment inflows
EconomicGrowth = Economic growth
InterestRate = Annual average interest rates
ExchangeRate = Annual average exchange rates
Inflation = Annual average inflation rates.
1.3878 = Constant associated with regression models.

# 5. CONCLUSION AND POLICY RECOMMENDATIONS

This section makes conclusions from the findings and proposes possible policy implementations necessary to attract foreign direct investments into eastern Africa region.

## 5.1. Conclusion

From the findings in section 4 above, this study concludes that overall macro-economic factors do not have a significant relationship with FDI flows into the eastern Africa region. This means that investors take little attention at macro-economic factors when deciding on investing in the eastern Africa. Looking at each specific variable making the macro-economic factors it has been established that economic growth, exchange rates and inflation have a positive relationship with foreign direct investments but a relationship which is not significant. In essence this means that one unit increase in economic growth, exchange rate and inflation has a minimal positive effect on FDI flows. On the other hand, interest rates have been found to have a negative and insignificant relationship with FDI flows which means that one unit increase on interest rates have a minimal negative effect on FDI flows into eastern Africa.

## 5.2. Policy Recommendations

Based on the findings of this study and the benefits that accrue from foreign direct investments, eastern Africa countries are hereby advised to formulate policies that ensure stable macro-economic conditions since they positively influence the flow of foreign direct investments. A stable economic growth means higher productivity which translates into higher profitability and wealth maximization of establishments. This in turn attracts foreigners to invest locally. On the other hand, high interest rates means higher cost of funds for investments which makes establishments to shy away. Therefore, governments are advised to keep interest rates in check.

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