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EFFECT OF EXCHANGE RATE VOLATILITY ON FOREIGN DIRECT INVESTMENT IN EAST AFRICA

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research Project contains no material previously published or written by another person except where due reference is made in the Research Project itself.

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This Research Project has been submitted for examination with my approval as the Supervisor.

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ABSTRACT

The aim of this study was to determine the impact of exchange rate volatility on Foreign Direct Investment (FDI) inflows into the East African region. The countries studied include Kenya, Uganda, Tanzania and Rwanda. The study period was 2001-2016. The Generalised Autoregressive Conditional Heteroscedasticity (GARCH) model was used to obtain the exchange rate volatility while the Vector Error Correction Model (VECM) was used to study the relationship between exchange rate volatility and FDI. The results reveal that in the short-run, exchange rate volatility and FDI have a negative significant relationship. However, in the long-run, the relationship is positive but insignificant. Other factors such as infrastructure are found to have a positive relationship with FDI both in the short-run and in the long-run. However, the relationship is only significant in the long-run. Trade-openness is found to have a negative and significant relationship with FDI. Political stability, Interest rates and GDP exhibit an insignificant relationship with FDI. The main policy recommendation from this research is that the governments of East African countries should aim to maintain low exchange rate volatility in the short-run. It is also important for policy makers to coordinate the policies promoting trade openness and those promoting competitiveness of local products so as to attract FDI.

Keywords: **Exchange rate volatility, FDI**

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List of Abbreviations

ARCH- Autoregressive Conditional Heteroscedasticity

EAC- East African Community

FDI- Foreign Direct Investment

GARCH- Generalised Autoregressive Conditional Heteroscedasticity

GDP- Gross Domestic Product

GFCF- Gross Fixed Capital Formation

IMF- International Monetary Fund

INT- Interest Rates

M- Imports

MNE- Multinational Enterprises

PolS- Political Stability

TO-Trade Openness

UNCTAD- United Nations Conference on Trade and Development

VOLE- Exchange Rate Volatility

VECM- Vector Error Correction Model

1. INTRODUCTION

1.1. BACKGROUND

1.1.1. Role of FDI in Development in East Africa

Foreign Direct Investment has been a key driver of economic growth and development in the recent past. It has become particularly important to developing countries that depend on this type of investment to achieve the set economic goals. According to Broll (2009), Multinational Enterprises (MNEs) and Foreign Direct Investment are important elements of global commerce and factor mobility. Increase in FDI inflow into a country has several benefits to the host country. According to Boahen and Oteng (2014), the host country serves to benefit through increased employment opportunities providing locals with a source of income and consequently improving their standards of living and alleviating poverty. Broll (2009) finds that FDI contributes to increased competition among businesses which results in higher quality goods and services being produced and offered, which further contributes to an increase in the overall standards of living of the population. Moreover, it leads to knowledge transfers which serve to increase development. Not only does FDI contribute to increased standards of living, it also promotes domestic investment through linkages since the foreign companies are likely to require certain domestically available products that will be supplied to them by locals (Boahen, 2014). This leads to growth of various local industries and economic growth in general. According to Broll (2009), the home country benefits through more efficient allocation of resources from investing firms hence leading to higher productivity and increasing profits.

In East Africa, FDI has been a major driver of growth. The region has been deemed by the International Monetary Fund (IMF) as one of the fastest growing in the world in the period 2015-2016, recording economic growth rates well above world average of 3.1%. FDI has been instrumental in this growth and has set East Africa on the path to achieving the Millennium Development Goals (MDGs) which will further enable the region to catch up with the rest of the world in pursuing the new Sustainable Development Goals (SDGs). This study focuses on Kenya, Uganda, Rwanda and Tanzania.

Kenya

According to the World Economic and Financial Surveys conducted by the IMF, Kenya has one of the fastest growing economies in Africa. FDI has played a key role in this growth. Some of the projects that have been funded using FDI include the construction of the Standard Gauge Railway, the expansion of the Thika- Nairobi Highway and the on-going construction of the Lamu port. These projects have been undertaken through private public partnerships. International firms such Carrefour, Game, IBM among others have also invested in the country by establishing facilities. According to the United Nations Conference on Trade and Development (UNCTAD) database, FDI inflow into Kenya in 2015 totalled $1,437M up from $1,051M in 2014. Despite this increase, FDI inflow remains relatively low compared to other developing countries with similar underlying fundamentals globally. FDI is set to continue to play a critical role in the next stages of the country's development as outlined in its development blueprint, Vision 2030. With Kenya striving to be a newly industrializing country by 2030, FDI is crucial in fulfilling this goal. Key sectors that are set to benefit greatly from FDI include; infrastructure, exploitation of the newly discovered oil resources as well as other minerals such as titanium, renewable energy sector, manufacturing as well as the real estate sector with the development of resort cities.

Uganda

Statistics collected by the United Nations Conference on Trade and Development (UNCTAD) show that Uganda has been a popular destination for FDI with reported FDI inflows of $1,057M in 2015. Just like Kenya, Uganda has a development blueprint which will require heavy FDI investment to achieve the development goals set forth. The key sectors that have been outlined in the development plan include; infrastructure e.g. construction of oil refineries, the power sector as well as the agricultural sector particularly in agro-exports.

Tanzania

Tanzania is East Africa's largest country by population size. According to the UNCTAD database, FDI inflows into the country were at $ 1,532M in 2015 which was a decline from $2,049M recorded the previous year. Despite a stable macroeconomic and political environment, Tanzania's FDI inflows have been low. Like the other two East African

countries, Tanzania's development goals would require a substantial amount of FDI to achieve. The key sectors focused on in the development plan include agriculture, infrastructure and exploitation of the country's vast mineral wealth.

Rwanda

Rwanda is the fastest growing economy in East Africa. According to the World Bank, Rwanda recorded a 6.9% increase in its GDP in 2015 which was well above the regional and world average. The latest Rwanda Economic Update by the World Bank projects that the country's positive growth will continue and it is expected to exceed the global and regional growth rates in 2017. In order to propel its growth, Rwanda has acknowledged the importance of FDI in its development blueprint, Vision 2020. According to the UNCTAD database, FDI inflows into Rwanda totalled $380M in 2015 which was a $79M decline from the previous year. However, the government of Rwanda launched a new investment code in 2015 in the hopes of attracting FDI into tourism, energy and new technologies sector.

Generally, the East African region is heavily dependent on FDI inflows. The development and planning authorities in all three countries have set ambitious development goals that will require increased and sustained foreign direct investment to be accomplished fully and successfully.

1.1.2. Relationship between FDI and the level of exchange rate

Froot and Stein (1991), established that there is indeed a relationship between the level of FDI into a country and the exchange rates. Based on research, the authors found that depreciation in the currency of the host country would increase inward flow of FDI. This was attributed to the fact that the depreciation in currency would result in decreased cost of acquiring assets in the country hence encouraging foreign investors to do so. Benassy-Quere (2001), further suggest that there are two relationships that can be observed between FDI and exchange rates. According to Cushman (1988), the first is where an investor aims to serve the local market. The key assumption here is that trade and/or nontrade barriers make entry into the market difficult. In this case, an appreciation in the host country currency will increase inflow of FDI since the consumers will have higher purchasing power and therefore leading to increased consumption. FDI is then a substitute for trade.

In the second scenario, output from FDI is re-exported to the home country as well as to other countries worldwide. FDI is therefore complementary to trade. According to Benassy-Quere (2001), an appreciation of the host currency in this case leads to decreased competitiveness of the company's goods abroad hence discouraging FDI flows. The authors therefore highlight the possible ambiguity of the relationship between foreign direct investment and exchange rates. However, it is important to note that the data available on the intentions of firms is not available hence aggregate data has been used in prior research which reinforces the conclusion by (Stein, 1991) that depreciation of the host currency leads to an increase in FDI.

1.1.3. Exchange-rate volatility

According to Ozturk (2006), exchange-rate volatility is defined as the risk associated with unexpected movements in the exchange rate. Generally, exchange rate volatility can be attributed to monetary shocks especially in the financial markets. According to Russ (2012), one of the main factors that contribute to these particular monetary shocks is interest volatility. In the event that the interest rates have high volatility and there is free capital movement into and out of the markets, then short-term exchange rate volatility is likely to be high as foreign portfolio investors inject and withdraw their money in response to the interest rates.

1.1.4. Relationship between exchange-rate volatility and FDI

Past studies have looked at exchange rate and the role it plays in determining the level of FDI into or out of a country. However, with increasing globalization as well as economic and financial integration worldwide, exchange rate volatility has become a factor of interest in studies related to FDI. The exact relationship between exchange-rate volatility and FDI remains ambiguous. Some scholars have found a positive relationship while others have found a negative relationship between the two factors. Literature has identified two key motivations for FDI; market-orientation and cost reduction. Cushman (1988), stipulates that for a company that has been traditionally exporting goods to the potential host country, an increase in exchange rate volatility is likely to stimulate the use of direct investment as a partial substitute for trade to secure their revenue streams. This is the market-orientation perspective. On the flip side is the cost reduction motivation for FDI.

Kolstad (1995), concludes that exchange rate movements influence production costs. This is in line with the conclusion that FDI is determined by the host country's relative factor competitiveness which is in turn influenced by exchange rate volatility (Cushman, 1988). Costs of production then have a direct impact on a company's profits. High exchange rate volatility in this case means high uncertainty in the cost a company is likely to incur and as a result high uncertainty of the profit levels. Dixit and Pindyck (1994), find that a firm seeking to invest has three options; invest, wait, do not invest. The firm which has a profit-maximizing objective will therefore evaluate their investment opportunities based on their future profitability. With these in mind, a firm seeking to enter a foreign market and begin business operations is likely to be concerned about the certainty of its future profits. If it is due to operate in an environment with high exchange-rate volatility, it is likely to postpone its investment in the host country or choose not to invest at all. In this case the relationship between exchange rate volatility and FDI is negative.

1.2. Problem Statement

According to the World Economic and Financial Surveys published by the International Monetary Fund (IMF), East Africa was noted to be one of the fastest growing regions worldwide in the period 2015-2016 recording economic growth rates averaging 5% which was well above the global economic growth rate of 3.1%. This growth has been fuelled to a large extent by foreign direct investment. In order for East Africa to achieve its full potential and realize the various development goals stipulated in the different countries development handbooks, an increase in FDI will be necessary.

However, with an increase in worldwide economic and financial integration, exchange-rate volatility has become a key concern for foreign investors worldwide. Kenya, Uganda, Tanzania and Rwanda are members of the East African Community which is a trading bloc for East African countries. With the East African Community moving towards becoming a more deeply integrated trading bloc by eliminating barriers of trade among the member countries so as to promote free flow of goods and factor mobility within the bloc, it is very important to understand the dynamics of exchange rate volatility within the region and how they interact so as to influence investors' sentiment about prospective investment opportunities within the region. This knowledge becomes even more

imperative as the debate about whether or not the trading bloc should adopt a common currency continues.

Past studies have been conducted on the impact of exchange rate volatility on foreign direct investments in countries all over the world. According to Benassy-Quere (2001), the relationship between exchange rate volatility and FDI remains ambiguous with some scholars finding a positive relationship between the two while others find a negative relationship. Therefore, there is no generally acceptable theory that can be used in all instances and for all countries. Moreover, very few studies have been conducted to investigate the impact of exchange rate volatility on FDI flows into African countries. Most studies on this subject have only looked at the relationship in Nigeria and South Africa. Fewer still have investigated the impact of this volatility on FDI inflows into a particular region where the countries in the region form a trading bloc and the joint effect of the constituents' volatility on direct investment in the bloc. Greenway, Kneller & Zhang (2012) look at the impact of exchange rate volatility on the behaviour of multinational firms in the European Union. The study finds that the relationship in this case depends on the motive of the firm i.e. whether it is market-seeking or export-oriented. However, the study does not look at cumulative effect of the individual countries' volatilities on overall investment in the region.

This study seeks to establish if indeed exchange rate volatility influences foreign direct investment inflows into East Africa and if so what kind of relationship it is and how it can be exploited for the benefit of the region. The knowledge from this study could serve to ensure that appropriate strategies and policies are developed and implemented so as to ensure continuity of foreign direct investment into the region to facilitate continued growth and to further the integration goals of the EAC.

1.3. Research Objectives

1. To determine the effect of exchange-rate volatility on foreign direct investment inflows into East Africa.
2. To determine the long-run and short-run relationship between exchange-rate volatility and foreign direct investment in East Africa.

1.4. Research Questions

1. Does exchange-rate volatility have an impact on foreign direct investment inflows into East Africa?
2. What is the long-run and short-run relationship between exchange rate volatility and foreign direct investment?

1.5. Scope of the Study

FDI is an important driver of growth and development in East Africa. However, with increased regional integration, an understanding of how exchange-rate volatility and foreign direct investment interact in the region is important in the development of policies that govern regional integration and in the strengthening of regional cooperation so as to increase investment inflows into East Africa. The countries that make up the EAC include; Kenya, Uganda, Tanzania, Rwanda, Burundi and South Sudan.

However, this study focuses on Kenya, Uganda, Tanzania and Rwanda because these countries the biggest economies in the East African Community and therefore the results from this analysis are likely to be a good representative of the entire trading bloc. The other two countries in the bloc, i.e. Burundi and South Sudan do not have adequate reliable data on the variables needed to conduct the analysis.

1.6. Significance of the Research

This research can be used by the ministries responsible for industries and development in the respective countries so as to develop the right incentives for foreign direct investment in light of the results.

It can also be beneficial to the central banks in the respective countries which are responsible for the development of monetary policy. This study is likely to provide guidance as to what measures to put in place to influence the exchange rate so as to control the exchange rate volatility in a way that will boost foreign direct investment into the country.

The Sectoral Committees of the East Africa Community can use this study to conceptualise programmes for the community that will promote foreign direct investment in the region.

Lastly, researchers can benefit from this study by giving them a foundation upon which they can further research on the level of exchange rate as well as the amount of exchange rate volatility that is necessary to achieve optimal foreign direct investments in the region. It can also help researchers understand the opportunity cost of a floating vs. a fixed exchange rate regime.

2. LITERATURE REVIEW

This is a literature review on the effect of exchange rate volatility on Foreign Direct Investment. This review looks at the general theories underlying FDI before focusing on the empirical evidence relating exchange rate volatility to FDI. It also highlights the similarities observed across literature and attempts to explain the differences in results and conclusions.

2.1. Theoretical Background

According to Smith (1909-14), all nations would gain simultaneously if they practiced free trade and specialised in accordance with their absolute advantage. According to Hymer (1960), Foreign Direct Investment is not necessarily about the transfer of capital but rather the international transfer of proprietary and intangible assets such as technology, business techniques and skilled personnel. In this way, FDI is an extension of trade.

There are two main theories that have been used to explain the existence of FDI; the internalisation theory and the eclectic paradigm. Other theories that have been discussed include the macroeconomic approach and the product cycle theory.

2.1.1. The Internalisation Theory

The internalisation theory formulated by Buckley and Casson (1976) suggests that the imperfections in the market for knowledge make internalisation the most efficient way to exploit a proprietary advantage. According to Casson (1987), internalization is the replacement of an arm's length contractual relationship by managerial co-ordination within the firm. This could involve the shifting of assets between subsidiaries. This theory builds on the work of Hymer (1960) which finds that that existence of FDI is due to the imperfections of international markets for these intangible assets. The author finds that a firm overcomes or internalises these imperfections through foreign direct investment. Firms prefer to keep their knowledge and exploit it themselves rather than license it to independent local producers. The firm performs a cost-benefit analysis and only proceeds to internalise if the benefit of internalising outweighs the cost. Buckley and Casson (1976) pose that managers make the decision to internalise based on two main principles. The first principle is the comparison of external transaction costs and internal agency costs.

The second is that managers aim to reduce agency costs because a decrease in agency costs results in an increase in the scope of managerial control.

Buckley and Casson (1976) also discuss some of the benefits as well as the possible costs associated with internalisation. These benefits include; pricing power in internal markets which allows the corporation to fully exploit its market power, bilateral concentration of market power which eliminates instability, inequalities of knowledge between buyers and sellers eliminated as they become one and the same and reduction of tax liability on international transactions due to internal transfer pricing. The costs discussed by the authors include; a rise in communication costs within the internal market due to physical distance, risks associated with establishment of a facility in a foreign country which could take the form of political instability and an increase in managerial complexity associated with operating multiple plants all with different dynamics and potentially operating in different currencies.

2.1.2. The Eclectic Paradigm

The eclectic paradigm developed by Dunning (1979) postulates that a firm engages in FDI if the following 3 conditions hold i.e. it possesses net ownership advantages as compared to firms from other countries, it is beneficial to internalize those advantages rather than to use the market to pass them through to foreign firms and the firm derives benefit from locating its facility abroad rather than at home. This theory attempts to explain the determinants of the levels and patterns of international production. In the eclectic paradigm, the concept of ownership is greatly emphasised as a key driver of the benefits obtained from foreign direct investments. Ownership in this case as Dunning (2001) clarified refers to competitive advantages which firms of a particular country possess over those of another. These advantages are not just firm specific but could also be as a result of the institutions present in the home country of the firm. Initially, the author divided the ownership advantage into 3 parts. These were; advantage that firms have over other firms operating in the same location, advantage of being part of an enterprise with multiple plants arising from economies of scale and advantage that is a direct result of multinationality of a firm due to wider range of opportunities and the ability to exploit differences in endowments and markets across international borders. The last two types

of ownership advantages were enjoyed by firms that were part of a multinational group. The internalisation advantage heavily borrows from the internalisation theory where firms decide internalising their foreign transactions will result in greater value addition as compared to outsourcing activities. According to Dunning (1979), there were two incentives driving internalisation. The first was to avoid the disadvantages of imperfections in the external market while the second was to capitalise on them. According to Eden (2003), imperfections were characterised into two; structural imperfections and cognitive imperfections. Structural imperfections were those arising due to barriers to competition as well as high transaction costs. Cognitive imperfections were those characterised by unavailability of information and high costs of acquiring available information. Locational advantages take into consideration the benefits of locating a facility in a foreign country. These could be in terms of the availability of inputs as well as the cost of these inputs.

2.1.3. The Macroeconomic Approach

The macroeconomic approach is another approach that has been used to explain FDI. The main idea underlying this theory is that FDI should originate in the home country's comparatively disadvantaged industry which is potentially a comparatively advantage industry in the host country (Kojima, 1982). According to Kojima (1982), pro-trade FDI and international trade are complementary. Dunning (1993) further builds on this theory by posing that the role of FDI is to exploit the home country's advantages in intermediate inputs that are used in products whose final stages of production give the host country a comparative advantage.

2.1.4. The Product Cycle Theory

The product cycle theory is another theory that has been instrumental in giving insights about FDI. In this theory, technology development is the source of changes of the intensity of factors of production hence changing the comparative advantage of countries. This theory also considers the impact of demand. Linder (1961) argues that domestic demand stimulates innovation while international demand encourages exports. According to Vernon (1966), technology and trade barriers have made MNEs the institutions with the

highest capability to efficiently organise the production and distribution of goods with an international demand whereby the production location is changing over time.

2.2. Empirical Evidence

The theoretical assumption underlying this study as summarised by the literature is that trade flows such as foreign direct investment decrease in response to exchange rate risk and increase in response to higher exchange rate levels and/or expectations. This is from the perspective of the investing agent. Black (1977), suggests that the treatment of foreign direct investment is like that of foreign portfolio investment in that it is reduced by exchange rate risk.

According to Zis (1989), exchange rate volatility leads to an increase in business uncertainty because of uncertain future profit inflows. As a result, producers are unwilling to undertake long-term commitments to expand their productive capacities hence decreasing the amount of FDI.

However, conclusions of recent studies relating to the impact of exchange rate volatility on foreign direct investment have been ambiguous with some academicians finding a positive relationship while others find a negative relationship. Others still have found that there is no significant relationship between exchange rate volatility and FDI.

According to Cushman (1985), the effect of real exchange rate risk on FDI was founded upon four key firm decisions. They are; the place where inputs were bought, where production took place, where financial capital was acquired and the market where the products were sold.

Scholars have attempted to analyse the effect of exchange rate volatility on FDI by examining the duration of the volatility, the risk preference of the firm, the motives of FDI i.e. diversification, market seeking or export oriented and whether a firm is a first-time entrant into the foreign market or a repeat investor in the foreign market.

2.2.1. Short-term volatility vs. Long-term misalignments

Tavlas and Bailey (1991) view the effect of exchange rate volatility on FDI based on whether the volatility is short-term or long-term. Short-term volatility involves daily, weekly, monthly etc. fluctuations in the exchange rate. Short-term volatility generally

involves fluctuations over a short period of time. According to Tavlas (1991), long-term misalignments are mostly subjective. It is defined as involving a departure over a substantial amount of time of the exchange rate from its 'fundamental equilibrium value' rate that yield cyclically adjusted current account balance equal to normal private capital flows. Tavlas and Bailey (1991) note that firms are faced with two decisions; short-run and long-run decisions. In the short-run, the firm sells goods by exporting. The decision to locate a production facility in a foreign country is a long-run decision. In addition to this the authors noted that in the short-run, exchange rate volatility lead to an increase in the cost of doing business. The firm therefore chooses larger volumes of trade to deal with this risk. In the long-run however, focus is on the location of production. In this case, the company is more concerned with future repatriation of profits and investment. Therefore, its decision to invest or not is affected more by long-term misalignment rather than short-term volatility. Therefore, Tavlas (1991) concluded that short-term volatility has no real effect on the investment decisions of firms seeking to invest abroad.

2.2.2. Risk Aversion of the Firm

Rugman (1977), noted that an increase in bilateral exchange risk would cause a foreign subsidiary's market risk to increase hence lowering the desired portion of foreign real assets to be held which would consequently lead to a decrease in FDI.

According to Dixit (1994), firms have three options when faced with an investment decision. They could either fail to invest, hold off on investing (wait option) or invest. In the case of an investment in a country that faces high exchange rate volatility, a risk averse firm would rather wait rather than invest hence decreasing the amount of FDI inflow to the host country (Campa, 1993). This is especially so where sunk costs are high.

According to Kohlhagen (1977), future uncertainties in the exchange rate cause uncertainties in the expected future cash flows thereby influencing the firm's decisions to enter a market. The extent to which a firm is risk averse could deter the firm from entering the market altogether. Kolstad (1995) conclude that high exchange rate volatility reduces the firm's certainty equivalent of expected profits hence making investments in such areas relatively unattractive.

Benassy-Quere (2001) suggests that firms should indeed be worried about exchange rate variability because they cannot hedge against it at their horizon (long-term and expected to be perpetual) and they are mainly concerned with macro variables such as relative labour costs or purchasing power. In connection to Brainard (1997), they also pose that a firm's location decisions will be based primarily on comparative costs of production and proximity to market. High exchange rate variability leads to higher variability of costs over the short run which could prove expensive for the firm hence lowering the cost advantage motive of choosing to locate production facilities abroad. The conclusion from the study was that exchange rate volatility is discourages foreign direct inflows.

According to Darby (1999), exchange rate volatility has a direct impact on the opportunity cost of choosing to wait rather than invest hence influencing the firms' decision. A low level of volatility is likely to increase the opportunity cost of waiting hence prompting risk averse firms to pursue investment projects rather than to wait. However, if the volatility is high, the opportunity cost of waiting is much lower hence encouraging the firm to wait or defer the investment altogether.

According to Kolstad (1995), the risk aversion argument is more convincing under short-term volatility. In this case we consider a firm that has already set up in the host country. In the short-run, the firm's factors of production are fixed. Tavlas and Bailey (1991) suggested that short-term volatility is likely to increase the cost of doing business hence leading to a decrease in FDI flows into the host country.

2.2.3. Production Flexibility

According to Aizenman (1992), FDI is driven by producer's attempt to increase flexibility of production. Flexibility in this case refers to a firm's ability to reallocate production resources towards a plant that is either operating at higher efficiency or is cheaper to use for production. The author goes on to say that in the absence of uncertainty, there would be no need to own more than one plant. In the presence of uncertainty however, diversification is necessary to stabilize output. The conclusion is that in the presence of high exchange rate volatility, firms that have diversified their production by locating their production facilities are better off. This is because in such a circumstance, the option value to reallocate production to a more productive and cheaper location increases.

According to Sung and Lapan (2000),when exchange rate volatility increases, the value to the firm of the option obtained by opening both plants also increases. The study concludes that if sunk costs are large but similar across plants and there is low exchange rate variability between the host country and home country, then only the home plant will be opened. However, if sunk costs of the plants are relatively similar or have small differences and there is high exchange rate variability, then production facilities will be opened in both the home and the host country in the interest of diversification.

Clark (2004) notes that firms cannot quickly adjust factor inputs to take advantage of any relative price changes. In this case, price changes refer to the exchange rate. Greenway (2012) builds on this and postulates that a firm operating internationally is better placed to exploit these temporary shifts in relative price and therefore concludes that an increase in exchange rate volatility can increase FDI.

2.2.4. Market-Oriented FDI vs. Export-Oriented FDI.

According to Cushman (1988), FDI can be used as a substitute for exports. This type of FDI has been referred to as market-oriented FDI or horizontal FDI. An increase in exchange rate volatility is likely to lead to increased FDI. The firm seeking to invest in the foreign market seeks to sell its products to the host's citizens. This form of FDI essentially serves to smooth out the revenues/ profits the firm makes. It is therefore primarily driven by increased exchange rate volatility. Brainard (1997) concludes that trade and FDI are substitutes for serving overseas market in support of David Cushman's earlier conclusion.

However, in the case of FDI being for the sole purpose of exporting back to the home country, then the opposite is true. The primary purpose of this type of FDI is to increase the cost competitiveness of the firm. According to Benassy-Quere (2001), an increase in the exchange-rate variability is likely to lead to a decrease in the firm's cost advantages and consequently its competitiveness. This will therefore discourage the firm from investing leading to decreased foreign direct investment.

2.2.5. First-time foreign investors Vs. Repeat foreign investors.

According to Russ (2012), interest volatility and exchange rate volatility are positively correlated. The author views the impact of exchange rate volatility on FDI from the perspective of interest rate volatility and suggests that the impact of exchange rate volatility on FDI varies depending on whether the firm is a first-time foreign investor or a repeat foreign investor. In this case, a repeat foreign investor is one who has already established a production facility in the host country before. The conclusion from this study is that increased interest rate volatility in the host country, which translates into increased exchange rate volatility, is likely to encourage first time entrants. However, the opposite is true for repeat foreign investors or veteran-cross border investors. Entry costs of new entrants is a combination of foreign (home) and domestic (host) costs while that of a veteran consists of domestic takeover or acquisitions cost, an increase in the host country's interest rate volatility is likely to lead to higher sunk costs for the veteran than for the new entrant. Russ (2012), argues increased exchange rate volatility is likely to drive up sunk costs hence decreasing the option value of investing.

2.3. Similarities across literature

Even though there appears to be opposing views as to the impact of exchange rate volatility on FDI, there are a few facets that all scholars seem to agree on. The first being that exchange rate volatility influences the location of production facilities (Kolstad, 1995). The location is chosen based on its comparative costs of production and its proximity-concentration trade-off (Brainard, 1997). Therefore, all profit-maximising firms would seek to allocate their resources more efficiently by producing where their costs are relatively low. Impact of exchange rate volatility on investment sunk costs appears to be a key factor in the decision of firms to invest or to wait. The destination of the goods produced is also deemed to be an important factor in determining the relationship between FDI and exchange rate volatility (Benassy-Quere, 2001).

2.4. Attempts to explain the ambiguous relationship

Russ (2012) attempts to shed light on the reasons behind the ambiguity in the relationship between exchange rate volatility and FDI. The author finds that this ambiguity could be because of differences in the sample characteristics. These differences could be because

of the variations of the sample periods, the country samples and the methods used to measure volatility chosen by the various researchers. In the study, volatility is modelled using the part of standard deviation that is not explained by the law of one price which Russ (2012) argues should be known hence does not create uncertainty. The conclusion is that FDI exhibits lower sensitivity to the adjusted/altered standard deviation than it does to the absolute standard deviation prior to any alterations. According to Russ (2012), FDI to different sectors do exhibit different sensitivities to exchange rate risk which is measured by the volatility. Lastly, Russ (2012) suggests that the relationship could be ambiguous because it varies depending on whether the firm is a first-time entry or a repeat investor.

2.5. Conceptual Framework

In this research, FDI is the dependent variable. The main focus is on inward FDI. The factors that have been found to affect FDI have been broadly categorised into political stability, policy framework, economic stability and market size.

According to Asiedu (2006), political stability, a large market size, favourable government policies on trade, low inflation, good infrastructure and political stability are promoters of FDI. GDP can be a proxy for market size since it can be used to infer the demand for goods and services in a country. Favourable policies with regards to trade openness encourage FDI by increasing the ease of doing business.

Economic stability is a function of the interest rates which are affected by inflation, the currency exchange rate and infrastructure. Interest rates provide a benchmark for the return an investor is likely to get from their investment in the host country. A high return is likely to make attract investors hence increasing FDI. This is however in conjunction with all the other factors discussed. The relationship between FDI and currency stability however is not as direct. Scholars remain divided about the effect exchange rate volatility has on investment. Good infrastructure promotes FDI by increasing the ease of doing business by reducing production costs.

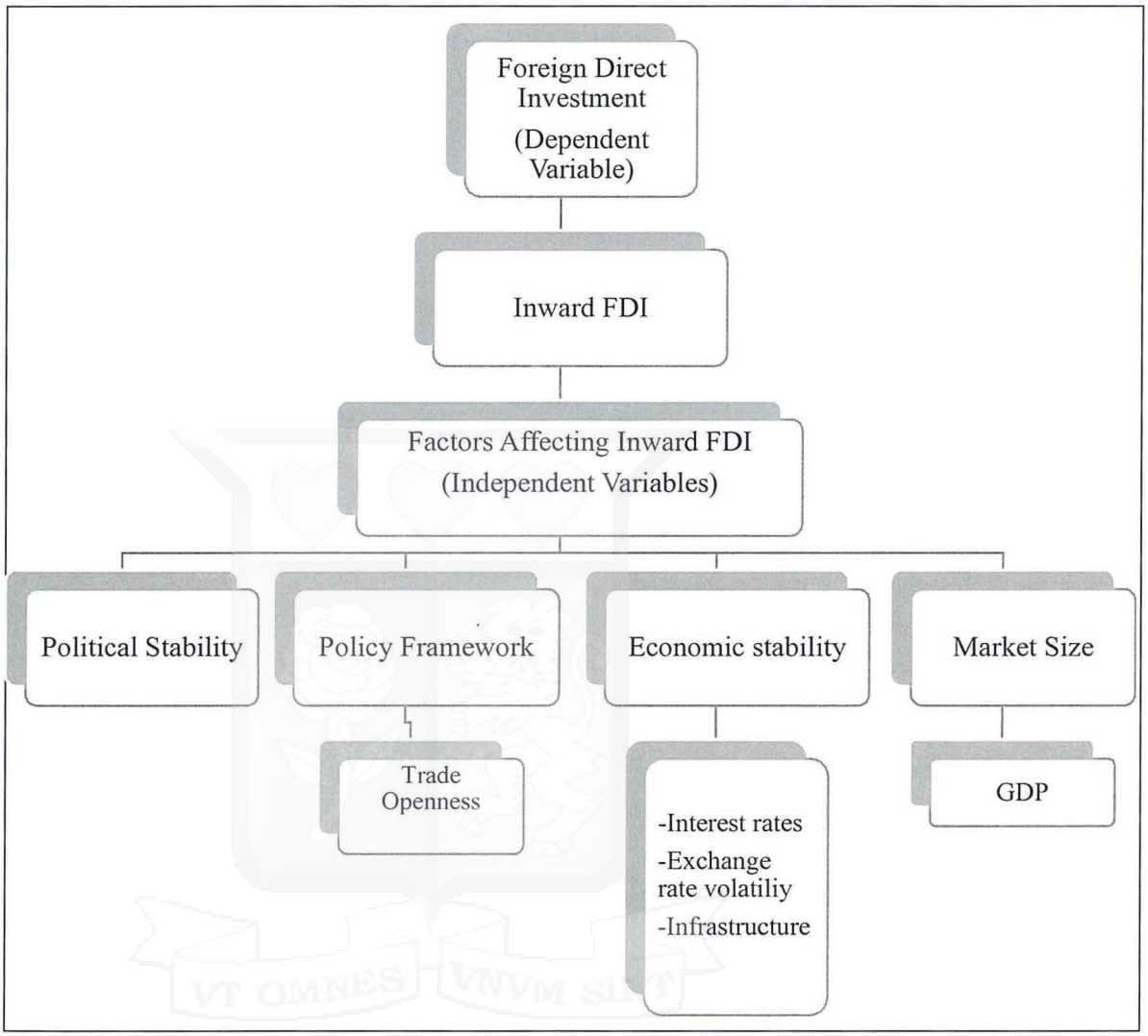

Figure 1: Conceptual Framework

3. RESEARCH METHODOLOGY

3.1. Research Design

The purpose of this study was to investigate the relationship between exchange rate volatility and foreign direct investment inflows. This study therefore adopted an explanatory design as it attempted to explain how exchange rate volatility, which is the independent variable affects FDI. The study was quantitative in nature and the data was analysed using statistical methods. The other variables the study included as drivers of FDI include interest rates, GDP, trade openness, infrastructure and political stability.

3.2. Population and Sampling

The countries chosen to represent the East African region were Kenya, Uganda, Tanzania and Rwanda. This is because these four are the biggest economies East Africa as well as in the East African Community and therefore the results from this analysis were likely to be a good representative of the entire region and trading bloc. Lack of adequate data on South Sudan and Burundi also contributed to their exclusion from the sample.

The sample period chosen was 2001-2016.The choice of sample period was primarily dictated by the availability of data. Reliable data on daily exchange rates, interest rates and infrastructure were only available as from 2001. Daily exchange rates were required to calculate the exchange-rate volatility. The sampling interval was annual.

3.3. Data Collection

The data in use was organised to form a panel data set. Panel data results in a large number of unique observations, which increase the degrees of freedom to explore explanatory variables and relationships. Another advantage of using panel data was that it allowed for comparison between the individual components i.e. Kenya, Uganda, Tanzania and Rwanda as well as showing the difference in individual observations overtime. The data was secondary quantitative data. The variables for which data was required include; FDI, exchange rates, interest rates, GDP, trade openness, infrastructure and political stability.

The sample period contains data for each variable from 2001-2016. The main sources of data were the Central Bank of Kenya, The Bank of Uganda, The Bank of Tanzania, The National Bank of Rwanda, World Bank Database, IMF Database, the United Nations

Conference on Trade and Development (UNCTAD) Database and the National Bureau of Statistics for the individual countries.

Table 1: Description of Variables

Variable	**Description**
Foreign Direct Investment Inflows	This was a measure of foreign direct investment inflows into Kenya, Uganda, Tanzania and Rwanda. This data was reported in dollars ($) and was recorded on an annual basis. FDI is the dependent variable in this study.
Exchange rates	The exchange rate of the individual countries' currency against the dollar was used to calculate the exchange rate volatility which is a key input in the model. The dollar was the foreign currency of choice in the model because it is the most common foreign currency traded in foreign markets in Kenya, Uganda and Tanzania. Daily exchange rates were used in the calculation of the exchange-rate volatility. The effect of exchange rate volatility on FDI inflows has been found to be ambiguous with some studies resulting in a positive relationship while others depict a negative relationship.
Interest rates	This was used as a benchmark of the returns an investor was likely to make by investing in the host countries. An average 1-year treasury bill rate was used. It is hypothesised that an increase in the

	interest rate is likely to lead to an increase in FDI inflows as the return to be generated form an investment venture is likely to be higher.
GDP	Real GDP was used as a measure of the level of economic activity in the market and could therefore serve as a proxy for market attractiveness. GDP data in use is annual. According to Blonigen (1997), an increase in GDP in the host country is likely to lead to an increase in supply of FDI.
Gross fixed capital formation	This was a measure of infrastructure development. The data is annual. It has been hypothesised that increased infrastructure increases the level of FDI.
Sum of imports and exports as a percentage of GDP	According to UNCTAD this measure is used as a trade openness indicator. An open economy is one that has few restrictions imposed on imports and exports. As a result a good percentage of the GDP is attributed to external trade. The hypothesis is that the more open an economy is, the higher the likelihood of FDI flowing into the country.
Political stability	This was obtained from the World Governance Index courtesy of the World bank. The more politically stable a country, the higher the likelihood of FDI flowing into the country.

3.3. Data analysis

The analysis of the data began by obtaining estimates for exchange rate volatility from the exchange rates data. The data on all the variables was then tested for stationarity. Once the data was determined to be non-stationary, a test for co-integration was carried out. The test for cointegration then justified fitting of the VECM model. The Granger Causality test was then carried out to test for causality between the variables. Also impulse response functions were carried out to determine the impact of a shock in exchange rate volatility on the independent variables in the system of equations used in the estimation. Below is a simple regression model illustrating the relationship between the dependent variable and the independent variables:

$$LOGFDI_{it} = aLOGVOL_{it} + bLOGGDP_{it} + cLOGGFCF_{it} + dINT_{it} + eTO_{it} + fPolS_{it} + \varepsilon_{it}$$

Where:

- a-f are the coefficients showing the magnitude and direction of the relationship between the dependent variable and the respective independent variables.
- i represents the cross-section.
- t represents the time period.

3.3.1. Measuring Exchange Rate Volatility

The first step however was to obtain exchange rate volatility which is an independent variable in the analysis. The model used to obtain a measure of exchange rate volatility was the Generalised Autoregressive Conditional Heteroscedasticity (GARCH) model which was an improvement of the Autoregressive Conditional Heteroscedasticity (ARCH) model. According to Arize (2000), this model can distinguish between predictable and unpredictable elements in the real exchange rate and is therefore not prone to overstating volatility. According to Engle (1982), the standard deviation is not appropriate to measure volatility in this case because it is an unconditional measure which fails to consider the relevant information on the random process generating the exchange-rate. Below is an illustration of the GARCH model;

$$\sigma_t = \gamma + \alpha\varepsilon_{t-1} + \beta\sigma_{t-1} + \varepsilon_t$$

Where;

- γ represents the constant
- α represents the portion that the previous period shock contributes to the current period's volatility.
- β represents the portion that the previous period volatility contributes to current period volatility.

3.3.2. Test for Unit Root

According to (Boahen, 2014) , macroeconomic data usually exhibit unit root i.e. non-stationary behaviour.

Therefore, the first step is to test the stationarity of the panel data using the Levin-Lin-Chu test. The null hypothesis is that the data contains a unit root and the alternative hypothesis is that the data is stationary. Below is an illustration of the Levin-Lin-Chu equation;

$$Y_{it} = \rho_i Y_{i,t-1} + \sum_{l=1}^{p_i} \varphi_{i,l} \Delta Y_{i,t-l} + \alpha_i d_i + \varepsilon_{it}$$

Where ;

- Y_{it} – dependent variable
- ρ_i- the portion that the first lag of the dependent variable contributes to the value of the dependent variable.
- $\sum_{l=1}^{p_i} \varphi_{i,l} \Delta Y_{i,t-l}$- represents the cumulative effect that the first differences of lags of the dependent variable have on the value of the dependent variable.
- d_i – represents the individual specific fixed effects.
- α_i - the proportion fixed effects contributes to the dependent variable.

The hypothesis to be tested is;

H_0: $\rho=1$ (null hypothesis)

H_a: $\rho<1$ (alternative hypothesis)

In this case, *i* represents the individual countries and *l* represents the number of lags in the model. The t-static for ρ is then calculated and compared to the critical value of the Dickey-Fuller distribution in order to come up with a conclusion about whether the data

has unit root or not. Failing to reject the null hypothesis means that the data does indeed have unit root and is therefore non-stationary.

3.3.3. Test for Co-integration

The Kao test for integration was used in this case. The main idea behind this test is that upon analysis of the residuals of a spurious regression performed using I (1) variables, the variables will be cointegrated if the residuals are I (0). The null hypothesis is that there is no cointegration meaning that the error terms ε_{it-1} are non-stationary. The residuals are therefore obtained and tested for stationarity to determine whether the variables are cointegrated. Below is an illustration of the cointegration model;

$$\varepsilon_{it} = \rho\varepsilon_{it-1} + u_{it}$$

Where:

- ρ- represents the portion of previous period error term reflected in the current period's error term.
- u_{it}- the portion of the error term that is unexplained by the previous period error term.

We fail to reject the null if $\rho \neq 0$.

3.3.4. Model of Estimation

Due to the non-stationary nature of the data used in the analysis at levels; and the presence of cointegration, the Vector Error Correction model was chosen as the model of choice.

i. The Vector Error Correction Model

The Vector Error Correction Model (VECM) was applied because the data was found to be non-stationary at level. This model incorporates the possibility of endogeneity between the variables. The possibility of endogeneity existing in this model was present because a change in FDI could lead to a change in exchange rate volatility due to the increased flow of foreign currency. Additionally, a change in the exchange rate volatility as a result of the change in FDI induces a change in FDI. According to Boahen (2014), the reverse of FDI affecting exchange rate and interest rate through economic growth provides a battle ground and controversies since there is no strict economic theory for these relationships.

In this analysis, it was assumed that FDI, exchange rate volatility, GDP, infrastructure and interest rates are endogenous while trade openness and political stability are assumed to be exogenous. According to Arriola (2009), political leaders who maintain control over the people using patronage are less likely to be overthrown through a coup. As a result, these countries have higher chances of being politically stable. Based on this, political stability can be considered an exogenous variable since it originates from an outside source. Trade openness on the other hand is considered an exogenous variable because according to Boahen (2014), the choice of a country to liberalize trade is reflected in the policies formulated and FDI cannot affect the tax policies employed.

This model gives insight on both the short-run and long-run dynamics of the relationship between the independent variables and dependent variables. The long-run relationship is estimated on the foundation that the variables are endogenous and co-integrated i.e. there is a long-run stationary relationship between them.

The VECM is developed from the Vector Autoregressive (VAR) model. The Vector Error Correction Model is as illustrated below where *i* represents the number of lags;

$$\begin{pmatrix} \Delta FDI_T \\ \Delta ExRVOL_T \\ \Delta R_T \\ \Delta GDP_T \\ \Delta GFCF_T \end{pmatrix} = \alpha + \Pi \begin{pmatrix} FDI_T \\ ExRVOL_T \\ R_T \\ GDP_T \\ GFCF_T \end{pmatrix} + \Gamma_1 \begin{pmatrix} \Delta FDI_{T-1} \\ \Delta ExRVOL_{T-1} \\ \Delta R_{T-1} \\ \Delta GDP_{T-1} \\ \Delta GFCF_{T-1} \end{pmatrix}_1 + \ldots\ldots + \Gamma_i \begin{pmatrix} FDI_{T-i} \\ ExRVOL_{T-i} \\ R_{T-i} \\ GDP_{T-i} \\ GFCF_{T-i} \end{pmatrix} + \text{TO} + \text{PolS} + \begin{pmatrix} \mathcal{E}_{1T} \\ \mathcal{E}_{2T} \\ \mathcal{E}_{3T} \\ \mathcal{E}_{4T} \end{pmatrix}$$

Where Π, Γ_1, Γ_2, Γ_i are matrices and Γ_1, Γ_i show the short run relationship while Π shows the long-run co-integration. According to (Boahen, 2014), a co-integration analysis when working with the VECM is important for the following reasons;

i. Test for the presence of long-run stationary relationship(s) between the variables.
ii. Estimate long-run parameters β, (co-integration vectors).

iii. Estimate long run coefficients of adjustments α, (loading coefficients).

iv. Employ long-run information to estimate Vector Error Correction Models (VECM) which describes short term dynamics.

The results from this model give insight on whether there is a long-run relationship between exchange rate volatility and FDI as well as what kind of relationship it. It also shows the magnitude of the relationship. The short-run relationship is also highlighted in this model together with the rate of correction of deviation from the equilibrium.

3.3.5. Granger- Causality test

The aim of this test is to determine whether a time series is useful in predicting another. A time series X is said to Granger-cause Y if it can be shown that the lagged values of series X can provide statistically significant information about future values of Y. In this study, granger-causality test was carried out on FDI and exchange rate volatility

The direct granger test is useful in testing the direction of the granger causality as well as its presence.

$$Y_{it} = \sum_{j=1}^{m} \alpha_j \, Y_{t-j} + \sum_{i=1}^{p} \beta_i \, X_{t-i} + D_t + \varepsilon_t$$

Where D_t represents the deterministic term; α_j is the coefficient of lagged values of Y and β_i is the coefficient of lagged values of X. α_j shows the proportion lags of Y contribute to its current value while β_j shows the proportion lags of series X contribute to the current value of Y. ε_t is the portion of Y_{it} that is unexplained by the independent variables in the model.

The hypotheses to be tested are;

H_0: There is no granger-causality

H_a: The variables exhibit granger causality

To come up with a conclusion, an F-test is carried out to examine the null hypothesis of non-causality. For F-test, the unrestricted model includes the lagged values for both independent and dependent variable. However, the restricted model only includes the lagged values for the dependent variable. Once the F-statistic has been calculated, it is

compared to the F-critical value which provides guidance as to whether or not the null hypothesis should be rejected.

3.3.6. Impulse Response Functions

Impulse response functions describe the evolution of the variable of interest along a specified time horizon after an external shock is applied to a variable in the system. An impulse response was conducted to test the response of exchange rate volatility to a shock on the variables in the system. The impulse response function is;

$$Y_{i,\,t+n} = \sum_{i=0}^{\infty} \psi_i \, \varepsilon_{t+n-i}$$

Where $\psi = \frac{\partial Y_{i,t+n}}{\partial \varepsilon_{j,t}}$ represents the change in dependent variable Y_i to a shock in variable Yj. The shock to variable Y_j at time t is represented by $\varepsilon_{j,t}$. This function assumes that only one variable is shocked at a point in time.

CHAPTER 4: EMPIRICAL RESULTS AND ANALYSIS

4.1. Empirical Results

4.1.1. Volatility Analysis

The volatility was obtained for the individual countries using the GARCH model. The results of the analysis are presented below:

Table 2: GARCH results by Country

Country	γ	α	β	p*-value
Kenya	0.00000193	0.115417	0.884603	0.00000
Tanzania	0.00000137	0.237190	0.811044	0.00000
Uganda	0.000000667	0.15654	0.838819	0.00000
Rwanda	0.00000322	0.132757	0.819110	0.00000

*Analysed at 5% level of significance.

The β coefficient shows the persistent effect of previous period volatility on current period volatility. The results reveal that up to 88%, 81%, 84% and 82% of previous period volatility (σ_{t-1}) is carried into current period volatility (σ_t) in Kenya, Tanzania, Uganda and Rwanda respectively. From these results it is possible to conclude that there is indeed a significant relationship between previous period and current period volatility hence we can conclude that exchange rate volatility in East Africa is time dependent. γ represents the portion of current volatility that is not attributed to the dynamics of the previous period. α represents the portion of current volatility attributed to previous period shocks in volatility. Previous period shocks in volatility contribute 11.5%, 23.7%, 15.6% and 13.3% to current period volatility in Kenya, Uganda, Tanzania and Rwanda respectively.

4.1.2. Unit Root Test Results

The Levin, Liu, Chen test was used to test for unit root. The null hypothesis assumed in this test is that there is a unit root hence the data being non-stationary.

Table 3: Levin, Lin, Chu Stationarity Test Results

Variable	p-value at level (5% level)	p-value at 1st difference	Stationary
LogFDI	0.9849	0.0000	I(1)
LogVOLE	0.2137	0.0000	I(1)
LogGDP	1.0000	0.0080	I(1)
LogGFCF	0.9971	0.0036	I(1)
INT	0.6598	0.0000	I(1)
Trade Openness	0.9424	0.0000	I(1)
Political Stability	0.1092	0.0000	I(1)

*p-value analysed at 5% level of significance.

All the variables exhibit a unit root at level but are stationary at 1st difference. Cointegration analysis can therefore be carried out because the first condition of variables being I (1) at levels and stationary at 1st difference has been met.

4.1.3. Cointegration Analysis

This analysis was done with the aim of establishing whether a relationship exists between the variables in the long-run. The Kao Residual Cointegration test was used for this analysis. The null hypothesis of the Kao test is that there is no cointegration between the variables.

Table 4: Cointegration Results

Test	Statistic	Probability
ADF	-4.202238	0.0000
Residual Variance	0.093821	-
HAC Variance	0.072223	-

*Probability analysed at 5% level of significance.

Given that the probability value is below the level of significance, the null hypothesis was rejected and the alternative of presence of cointegration accepted.

4.1.4. Vector Error Correction Model

The Vector Error Correction model show the results of the magnitude, the nature and the significance of both the long-run and short-run relationship between FDI and the other variables.

Long-run relationship

LOGFDI (-1) = -8.0984 + 0.6042LOGVOLE (-1) - 0.2133LOGGDP (-1) + 2.3525LOGGFCF (-1) - 0.0239INT (-1)

Table 5: Long-run relationship results

Variable	Coefficient	t-statistic
C	-8.0984	6.04960
LOGVOLE(-1)	0.6042	1.33096
LOGGDP(-1)	-0.2133	3.33732
LOGGFCF(-1)	2.3525	12.2548
INT(-1)	-0.0239	1.04271

*t-statistic compared to a t-critical value of 1.673 at 95% confidence interval and 55 d.f.

From the results above, exchange rate volatility and interest rate do not have a significant long-run relationship with FDI. However Gross Fixed Capital Formation which is a proxy for infrastructure has a positive and significant long-run relationship with FDI. A 1% change in GFCF will lead to a 2.3525% change in FDI. GDP on the other hand exhibits a negative but significant long-run relationship with FDI. A 1% change in GDP will result in a -0.2133% change in FDI. Due to the exogenous nature of political stability and trade openness, the software does not include them in the calculation of the long-run relationship.

Short-run relationship

D(LOGFDI) = C(1)*(LOGFDI(-1) - 0.6042LOGVOLE(-1) + 0.2133LOGGDP(-1) - 2.3525LOGGFCF(-1) + 0.0239INT(-1) + 8.0984) + C(2)*D(LOGFDI(-1)) + C(3)*D(LOGVOL(-1)) + C(4)*D(LOGGDP(-1)) + C(5)*D(LOGGFCF(-1)) + C(6)*D(INT(-1)) + C(7)*POLITICAL_STABILITY + C(8)*TRADE_OPENNESS

Table 6: Vector Error Correction Model Results

	Coefficient	t-statistic	p-value
C(1)	-0.3329	-2.9006	0.0056
C(2)	-0.0411	-0.3075	0.7598
C(3)	-0.3770	-2.0344	0.0475
C(4)	-0.1604	-0.1091	0.9136
C(5)	0.5462	0.6040	0.5487
C(6)	0.0031	0.2973	0.7675
C(7)	0.0667	0.7676	0.4465
C(8)	-0.0188	-2.7583	0.0082

In the short-run, exchange rate volatility exhibits a negative and significant relationship with FDI. A 1% change in exchange rate volatility is likely to lead to a -0.3770% change in FDI. The results also indicate that trade openness is a significant determinant of FDI in the East African countries though it appears to have a negative relationship with FDI. A 1% change in trade openness will result in a -0.018% change in FDI inflows into the region.

Gross Fixed Capital Formation, Interest rates and Political Stability all exhibit a positive but insignificant relationship with FDI in the short-run. GDP and previous period FDI exhibit a negative but insignificant.

The error correction term is negative and significant indicating that 33.29% of the deviation from the long-run equilibrium is corrected in one year.

4.1.5. Granger Causality Test

The granger causality test was carried out at 5% level of significance to determine the causal relationship between the variables included in the model. From the results displayed below, FDI granger cause interest rates but interest rates do not granger cause FDI. The results also lead to the conclusion there is no granger causality between FDI and GDP, Exchange rate volatility, GFCF, Trade Openness and Political Stability.

Table 7: Granger Causality Results

Null Hypothesis	**p-value**
LOGVOL does not Granger cause LOGFDI	0.2084
LOGFDI does not Granger cause LOGVOL	0.5787
LOGGDP does not Granger cause LOGFDI	0.7542
LOGFDI does not Granger cause LOGGDP	0.0612
LOGGFCF does not Granger cause LOGFDI	0.3793
LOGFDI does not Granger cause LOGGFCF	0.6614
INT does not Granger cause LOGFDI	0.3229
LOGFDI does not Granger cause INT	0.0340
TO does not Granger cause LOGFDI	0.6810
LOGFDI does not Granger cause TO	0.1529
POLS does not Granger cause LOGFDI	0.7981
LOGFDI does not Granger cause POLS	0.1885

4.1.6. Impulse Response Function

The impulse response function shows the impact of a shock in one endogenous variable to the FDI variable in the system over a period of 10 years. A positive shock is assumed. The results are presented below:

Table 8: Impulse Response Function

Response of LOGFDI:					
Period	LOGFDI	LOGVOLE	LOGGDP	LOGGFCF	INT
1	0.273176	0.000000	0.000000	0.000000	0.00000
2	0.212602	-0.019337	0.026150	0.095362	-0.014951
3	0.194433	-0.009570	0.078371	0.107091	-0.010395
4	0.203038	-0.010758	0.087959	0.124118	-0.000410
5	0.208295	-0.023988	0.091783	0.127415	0.003465
6	0.213822	-0.024987	0.090798	0.126546	0.006362
7	0.216849	-0.029009	0.088441	0.124855	0.007250

8	0.217918	-0.028781	0.086756	0.123652	0.007260
9	0.218178	-0.029278	0.085892	0.122698	0.007090
10	0.218021	-0.028732	0.085467	0.122488	0.006860

The impact of a 1% positive shock in FDI will cause a 27% increase in FDI in period 1. A 1% positive shock in exchange rate volatility will have no impact on FDI in the first period. However, it will lead to a 1.93% decrease in the amount of FDI in the second period. The effect of the shock appears to persist and is highest in year 9 at -2.97%. A 1% positive shock in GDP has no effect on FDI in the first period. However, it leads to a 2.6% increase in FDI in the second period and a 7.8% increase in the third period. The impact is strongest in year 5 which translates to a 9.1% increase in FDI. A positive shock in GFCF has no effect on FDI in the first period. It does however cause an increase in FDI over the subsequent 4 periods peaking at a 12.47% increase in FDI in year 5. The effect then begins to die out in year 6. A positive shock in interest rates on the other hand will have no impact in the first period. It will however cause a decrease in FDI in year 2, 3, 4 after which it will have a positive impact on FDI hence causing it to increase.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1. Discussion

5.1.1. Impact of exchange rate volatility on FDI

In response to the first objective, the short-run, exchange rate volatility was found to have a negative effect on FDI in East Africa. These findings are consistent with those of (Boahen, 2014). Kenya, Uganda, Tanzania and Rwanda are net importers. Over the last five years, the region has undergone heavy investment in infrastructure, which has in turn led to increased importation of capital intensive goods which further widens the balance of payment gap and causes depreciation of the respective currencies against the dollar. Therefore the volatility in focus in this region is that involved with currency depreciation. According to Boahen (2014), increase in exchange rate volatility leads to an increase in prices of commodities. Some of these commodities are used as inputs in production thus increasing the cost of production. Exchange rate volatility increases the risks associated with an investment by potentially increasing the cost of production. As a result of this increased uncertainty, foreign investors opt to decrease the amount of money they intended on investing or avoiding the investment altogether.

In the long-run however, exchange rate volatility appears to have a positive though insignificant relationship with FDI. This finding achieves the second objective. According to Markusen (1995), this could suggest that, in the long-run, as exchange rate volatility increases FDI as a result of export substitution which limits the exposure to currency risk. As exchange rate volatility increases, foreign firms will choose to setup production facilities in their markets so as to service them directly rather than through exports. However, the fact that it is insignificant shows that the long-run exchange rate volatility does not warrant export substitution as the costs of international trade do not outweigh the benefits.

5.1.2. Impact of GDP on FDI

In both the long-run and short-run, GDP has a negative relationship with FDI. However, the relationship is significant in the long-run but insignificant in the short-run. This result is consistent with that of (Jensen, 2003). Sasi and Hristos (2015), attempt to explain this result and they suggest that there are two main factors that define this relationship. The

first factor is the type of FDI. For example mergers and acquisitions could increase during an economic downturn as a result of lower labour and capital cost. They also suggest that low economic growth can lead to an increase in FDI if the low economic growth is characterized by underutilized resources, which then translate to more opportunities for future profits. Jensen (2003) postulates that the negative relationship could be a direct result of scaling effects rather than the existent relationship between FDI and GDP. Jensen (2003) argues that economies that grow faster than FDI will experience of a decrease in FDI as a percentage of GDP.

However, these results differ greatly with results from empirical studies carried out by scholars such as (Blonigen, 1997) who determines that GDP has a positive impact on FDI since a large market size contributes to higher cost efficiency as a result of economies of scale.

5.1.3. Impact of Infrastructure on FDI

Gross fixed capital formation which is a proxy for infrastructure has a positive relationship with FDI both in the long-run and the short-run. The relationship is however insignificant in the short-run but significant in the long-run. These findings are similar to those obtained by (Rehman, 2011) in the study of the impact of infrastructure on foreign direct investment in Pakistan. According to Chen (2015), unstable supply of inputs, uncertainty of time required for transport and logistics and electricity shortage are the main threats to sustainability of FDI in Africa. This is mainly because the factors above increase costs of production while reducing efficiency hence making it unattractive to investors.

5.1.4. Impact of Interest Rates on FDI

Interest rates appear to have a short-run positive relationship with FDI but a negative relationship with the latter in the long-run. However, this relationship is insignificant in both cases. This finding of insignificance is consistent with those of (Faroh, 2015). However, short-run positive relationship is in agreement with the findings of Singhania (2011) who found that interest rates which are in essence a rate of return tend to attract FDI when high as investors tend to channel investments from projects generating low returns to those generating higher returns. However, the long-run relationship is in direct

contradiction with (Singhania, 2011). This could be due to the risk-averse nature of firms after the occurrence of the global financial crisis which saw many firms make huge losses.

5.1.5. Impact of Political Stability on FDI

Political stability and FDI have a positive though insignificant relationship. Studies such as (Asiedu, 2006) have found a positive relationship between Political Stability and FDI as the former gives an investor a general idea about the investment environment of the host country. Political stability often signifies a stable economic environment which then attracts foreign investors. However, the apparent insignificance of this relationship in East Africa could be as a result of the new sources of FDI from emerging markets such as China and India. According to Chen (2015), these non-traditional sources are gradually taking over from the EU and US. Chen (2015), further notes that unlike the latter, these emerging markets are more accustomed to less supportive institutional environment hence are not too keen on political stability.

5.1.6. Impact of Trade Openness on FDI

Trade openness and FDI appear to have a negative but significant relationship. These findings are similar to those of (Ahmed, 2012) who found that the relationship between trade openness and FDI could be negative due to high importation in Nigeria. In East Africa, the same conclusion can be drawn. East African countries are heavily reliant on imports which tend to be cheaper than locally produced goods. This then puts locally produced goods at a disadvantage due to the fact that this cheap imports create unfavourable competition. Due to this unfavourable competition, firms that intend to establish production facilities to service the local market are discouraged to invest.

5.2. Policy Recommendations

Policy makers should focus on maintaining stability of exchange-rates in the short-run so as to avoid the negative effect it has on FDI. Formulation and implementation of policies promoting trade-openness should consider the effect of increased trade openness on the competitive dynamics of local products in the country. Policy makers should coordinate trade openness policies and those promoting competitiveness of local products. This is so as to mitigate the problem of adverse competition caused by increased imports which drives away foreign investors into the region. Governments in the East African region

should continue to invest heavily in infrastructure development as the results have revealed that an increase in infrastructure in the region has a positive effect on FDI in the long-run. Political Stability should also be maintained in the region since it does have a positive relationship with FDI despite it being insignificant. Despite the fact that interest rates are found to be insignificant in the study, it is important to maintain a stable interest rate environment since it is an indicator of the degree of risk an investor incurs by investing in the country. Due to the increased risk aversion witnessed after the global financial crisis of 2008, an unstable interest rate environment is likely to discourage investors. With regards to GDP, investment authorities charged with marketing investment opportunities to foreign investors should focus on other attributes of the East African economies such as infrastructure rather than concentrating on the increase in GDP in the region. They should also highlight the investment and growth opportunities by sector so as to remove the notion of reduced opportunities as a result of nation-wide growth.

5.3. Limitations of the Study

The study does not cover all the countries in the East African Region. The countries excluded in the study are South Sudan and Burundi. The main reason for their exclusion is the absence of reliable data for the period under study due to political unrest. The time horizon was also relatively short due to the absence of reliable data on variables like interest rates, gross fixed capital formation and daily exchange rates for the countries prior to the year 2001.

5.4. Areas of further research

It would be interesting to study the impact of exchange rate volatility of FDI not just regionally but in trading blocs. Comparison of the impact exchange rate volatility has had in different trading blocs across Africa is a study that can provide insights as to how exchange rate policies are shaping the attractiveness of the trading blocs to foreign investors. It can also help determine the role regional and economic integration plays in attracting FDI inflows into Africa. Lastly, research into this area can provide insights as to whether centralized policy making within a trading bloc can increase attractiveness of a region.

5.5. Conclusion

The results reveal that in East Africa, short-run exchange rate volatility has a negative significant impact on FDI inflows. However, the long-run exchange rate volatility is not significant. Trade openness is also a significant determinant of FDI though the relationship is negative. GDP and GFCF are significant determinants of FDI in the long-run but are insignificant in the short-run. GDP has a negative relationship with FDI while GFCF has a positive relationship with FDI in both cases. Interest rates and political stability are insignificant in influencing FDI.

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