

**EXCHANGE RATE, FOREIGN DIRECT INVESTMENT INFLOWS, AND
FINANCIAL DEVELOPMENT IN NIGERIA.**

BY

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ABSTRACT

This study examined the relationship among exchange rate movement, foreign direct investment (FDI) inflows and financial development in Nigeria using a vector autoregressive model and a vector error correction model method for the period 1981-2020. The results show that a depreciation of the nominal effective exchange rate decreases FDI inflows in Nigeria; Similarly, a depreciation of the real effective exchange rate decreases FDI inflows in Nigeria. On the contrary, FDI inflows causes an appreciation of the nominal effective exchange rate in Nigeria. The results show that financial development increases FDI inflows in the long run in Nigeria. The causality result shows that there is a bidirectional causality between exchange rate and FDI inflows in Nigeria. The study concludes that a depreciation of the naira to the US dollar reduces FDI inflows in Nigeria while financial development increases FDI inflows in Nigeria. Therefore, the study recommends that there is a need to implement policies that can cause an appreciation of the Nigerian currency to attract more FDI inflows. There is also a need to implement policies that can further develop the financial sector as this would facilitate more FDI inflows.

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Chapter 1

Introduction

The continuous reliance of the Nigerian economy on oil revenue has constantly exposed the Nigerian currency to exchange rate shocks which has been volatile over the years. The impact of this exchange rate instability on foreign investments in Nigeria has in recent times become an issue of concern for the relevant stakeholders such as the Nigerian government, foreign investors, financial institutions, etc. Of particular interest is the increasing number of multinational firms exiting the Nigerian market largely due to unfavourable economic conditions such as the unstable exchange rate, double digit inflationary pressure, infrastructural deficit, etc. Some of the multinational companies such as Procter & Gamble, Unilever, and GSK which have operated in Nigeria for decades have either decided to reduce their operations or exit the Nigerian market.¹

One of the major causal factors for this occurrence is the instability associated with the Nigerian currency which has in recent times depreciated significantly against major currencies such as the US dollar and the British pounds. The Nigerian currency is in a distress evident by a shortage of foreign exchange supply and a growing demand for foreign exchange currency. The continuous currency distress has forced some of the multinationals to take drastic actions. A concrete example is the delisting of PZ Cussons from the Nigerian stock market which the company attributed its decision to growing foreign exchange challenges.

The exchange rate crisis is an issue on the front burner as pointed out by the Central Bank of Nigeria. The Apex financial institution has pointed out that the major cause of the current crisis can be attributed to a significant drop in foreign exchange earnings from oil revenues combined with a growing speculative demand for the US dollar in the Nigerian economy as the relevant stakeholders are fast losing their confidence in the Nigerian currency and by extension the Nigerian economy. One of the relevant stakeholders under this category are the foreign investors seeking to invest and explore the Nigerian market and the foreign investors exiting the Nigerian market amidst the unpalatable economic situation.

Foreign capital inflows have been identified in the literature as critical to the growth of developing countries majorly because these inflows provide the required capital needed for investment which can accelerate economic growth (Siddiqui, 2014). Foreign capital inflows

¹ Source : <https://www.semafor.com/article/12/11/2023/nigeria-dollar-naira-crisis>

also help to deepen the financial markets and increase liquidity in the domestic economy. Thus, developing countries such as Nigeria continue to implement policies aimed at attracting foreign capital inflows which can facilitate the development of the financial sector and boost economic growth.

One of such capital inflows is FDI inflows into Nigeria for which Nigeria happens to be the highest receiver of FDI inflows in West Africa.² Over the years, Nigeria has enjoyed a huge foreign investment patronage due to the presence of natural resources in the Country but multinationals in Nigeria have also invested in other critical sectors of the economy such as investments in the telecommunication sector, financial services, and the agricultural sector.

The inflow of these foreign direct investments in Nigeria has been facilitated by financial sector development. One of the major highlights of financial sector development initiatives in Nigeria is reflected in the continuous efforts of the monetary and fiscal authorities to keep repositioning the financial institutions and markets to attract foreign direct investment. for instance, in 2005, the central bank of Nigeria embarked on a banking sector consolidation exercise to raise the minimum capital base of commercial banks. The consolidation exercise gained a lot of attention from foreign investors even as the commercial banks became better positioned to finance big projects in sectors such as the telecommunication, oil and gas, and manufacturing sectors.³

Unfortunately, some of the gains earlier recorded in the financial sector post consolidation exercise were cancelled out over time particularly because of wrong government policies, foreign exchange crisis, global economic shocks, etc. For instance, in recent years during the covid pandemic which witnessed a crash in oil prices, the central bank of Nigeria imposed restrictions in the foreign exchange market to reduce the adverse effects of forex earnings shortage. This made it difficult for foreign investors in the Nigerian stock market to withdraw their funds from the Nigerian stock exchange market after selling their stakes.

This occurrence discouraged foreign investors from participating in the Nigerian stock market. In 2015, foreign investors accounted for more than 50 percent trading in the Nigerian stock equity market as against a significant drop in the year 2021 which witnessed about 23 percent

² <https://unctad.org/news/investment-flows-africa-reached-record-83-billion-2021>

³ <https://www.euromoney.com/article/b1321xglw5htkz/nigeria-benefits-from-banking-mergers-and-recapitalizations>.

participation of foreign investors due to the restrictions imposed by the central bank of Nigeria.⁴ The issues pointed out so far indicate that Nigeria is still battling with pertinent economic issues which continue to slow down its economic growth and development. These issues are not peculiar to only Nigeria but rather these are issues that are still present as economic problems to both emerging and developing markets and in some instances, some developed countries have also experienced these economic problems especially in the post-covid era.

Therefore, the economic literature has devoted a lot of attention on the relation between exchange rate movements and economic activity; in particular, on the adverse effects excessive exchange rate instability may have on international trade and investment flows as investors respond to the increased exposure in exchange rate risk. The issue had come to the centre stage of academic and policy-making debates in the western world during the 1970's and 1980's in the wake of a series of important events which ended up shaping world economic history.

During the 1960's, the US dollar became overvalued under the Bretton Woods system of fixed exchange rates - mainly due to large and sustained increases in domestic spending in the US and the subsequent inflationary pressures. As the burden of defending a fixed exchange rate became unsustainable for the US economy, the US dollar was withdrawn from the Bretton Woods system, which was eventually dissolved between 1968 and 1973 (Garber, 1993).

The suspension of convertibility of the US dollar into gold led to the general suspension of the gold standard. Following a short-lived and ultimately failed attempt to revive the fixed exchange rates regime, the major currencies began to float against each other, and a flexible exchange rate regime had been firmly established by the end of the decade.⁵ By the end of the 1980's, many countries had also begun to remove barriers on international capital flows and to liberalize their domestic financial markets – despite warnings from many economists who were arguing that free international capital mobility would lead to dramatic increases in the volatility of capital flows and thus in foreign exchange risk with concomitant detrimental effects to economic growth or stability (Devlin, Ffrench-Davis, & Griffith-Jones, 1994).

The predictions about significant increases in the volatility of capital flows and exchange rates came to be true soon enough, especially with respect to countries that had underdeveloped capital markets and inconsistent economic policies. From early 1980's, there was a gradual increase in foreign direct investment (FDI) flows worldwide. This turned into a surge by the

⁴ <https://www.ft.com/content/e3e5ddee-e3c8-4dac-a3c8-ae020ab52980>.

⁵ See (Odell, 1979) pp. 59-81, for an insightful historical overview.

end of the decade, especially regarding FDI flows among developed and industrialized countries such as between France, Canada, Germany, Japan, the United Kingdom, and the United States. During the 1980's, these countries accounted for almost 70% of the FDI outflows and an estimated 57% of FDI inflows. By contrast, the share of FDI flows to developing countries was significantly lower and concentrated mostly among Mexico, Brazil, and the new industrialized countries in Asia (Graham & Krugman, 1994).

The graph below gives a comparative analysis of FDI inflows and outflows in developed and developing countries in the 70's (before the increase in FDI inflows and outflows) and the 80's which witnessed the gradual increase in FDI inflows and outflows and then the surge of FDI inflows and outflows in the 90's upward.

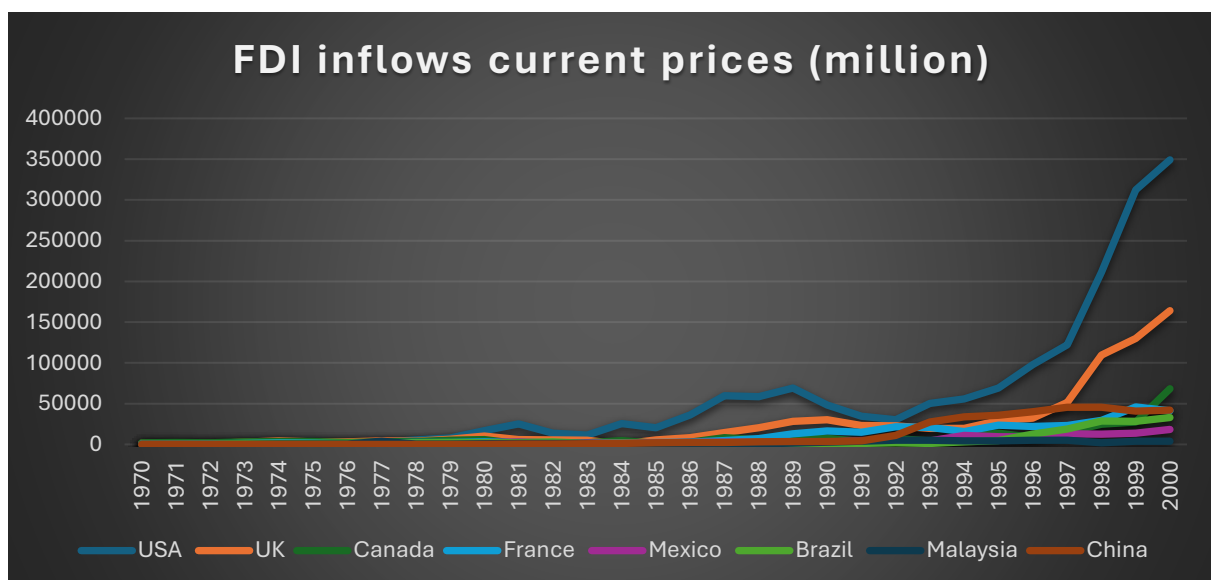


Figure 1: Data sourced from UNCTAD database.

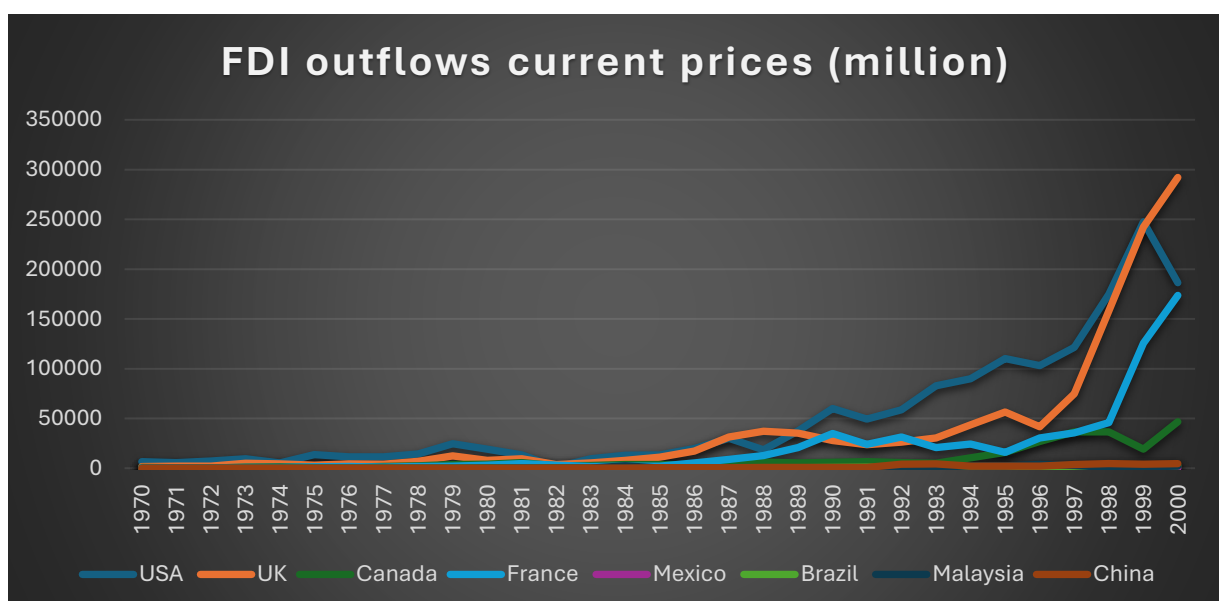


Figure 2: Data sourced from UNCTAD database.

The large FDI flows during the 1980's, and the significant accompanying volatility in exchange rates, induced many prominent economists to study the relationship between them. The imprint of this relationship on economic activity became even more apparent when the increases in international trade flows amongst the developed world of the 1980's were followed by increases in FDI flows during the 1990's as multinationals began to open new foreign production facilities (Wilkins, 1998).

In 1990, there were more than 35,000 multinational organisations with more than 150,000 foreign subsidiaries; the establishment of these facilities accounted for the bulk of the increase in worldwide FDI flows during the 1980's (UNCTAD world investment report, 1992). Most of the FDI activities in this period took place between the regional blocs of the European Union, North America, South Asia, and Japan. By the end of the decade, multinationals had begun to direct their activities also towards newly emerging countries such as China, Mexico, and Brazil.

The issue of how exchange rate instability affects FDI flows started to dissipate from the centre of academic and policy-making analysis only at the turn of the century. By that time, several policy responses that were aimed at addressing other yet related macroeconomic issues, such as high inflation rates, had successfully brought under control many of the structural issues that had led to the collapse of the gold standard. During the 1990's, the focus of monetary economics began to shift from policies aiming to maintain stable interest rates to policies that target low inflation rates. For instance, in Canada, New Zealand, and United Kingdom, measures of fiscal restraint in the public finances, enhanced autonomy for the central bank, and sharp increases in the real interest rate led to significant reductions in the inflation rate (Ammer & Freeman, 1994).

The efficacy of the new monetary policy regime in reducing inflation rates and controlling inflationary expectations meant that, by the end of the 20th century, many countries were able once again to maintain regimes of fixed or at least adjustable exchange rates at relatively low cost to the domestic economy. Examples can be found in the Eurozone, the common currency area within the European Union, or in the francophone zone of Sub-Saharan Africa where several countries (e.g., Senegal, Togo, Benin, Cameroun) have pegged their respective currencies to the Euro while they deposit half of their foreign exchange reserves with the French treasury in a bid to have a continuous access to the French markets.

Yet another factor rendering exchange rate instability increasingly a non-priority issue in the developed world was the rapid development of the financial markets for international capital flows. The introduction of new financial instruments and institutional structures combined with the wider use of existing financial instruments for intermediating funds and managing risks as enabled multinationals to significantly mitigate the impact of exchange rate instability on their activities as pointed out by Chami, Fullenkamp, & Sharma (2010).

As a result, by the turn of the century, many analysts had concluded that exchange rate instability had little significant effect on economic growth in developed countries. However, it continued to effect adversely economic activity and growth in developing countries, especially those with low levels of financial development (Aghion P. , Bacchetta, Romain, & Rogoff, 2006). For instance, in Sub-Saharan Africa (SSA), the level of financial development in most SSA countries, both financial market depth and institutional development are lower than in other developing regions of the world (Mlachila, et al., 2016).

Over the years, successive waves of financial globalization and trade liberalization have resulted in substantial amounts of FDI flows between developed and developing countries; this is especially evident in the increase of FDI flows to Africa. As of 1980, FDI flows to Africa were estimated at 400 million US dollars; by 1990, they had increased to 2,845 billion US dollars; in 2000, they were estimated at 10,382 billion US dollars; by 2010, they had surged to 47,243 billion UD dollars; in 2021, they reached an estimated 82,991 billion US dollars.⁶ However, despite an overall upward trend in FDI inflows, there have been periods when developing countries have experienced dramatic declines in FDI inflows - due to factors such as sharp decreases in commodity prices, especially for crude oil and other mineral resources, or in real aggregate domestic demand.

A major fall in oil prices in 2014 resulted in a dramatic decrease in FDI flows to oil exporting countries in Africa and South America. Nigeria, a significant exporter of crude oil and the largest recipient of FDI inflows in West Africa, experienced a sharp fall in FDI inflows between 2014 and 2018 (see Figures 1 and 2 below). Ghana, a country rich in mineral deposits of gold, experienced a currency crisis between 2013 and 2014 following the collapse of the international price of gold in 2013. The resulting reduction in the revenue from gold exports led to significant

⁶ Source: United Nations Conference on Trade and Development Database (<https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx>).

fiscal deficits, double-digit inflation rates, and the Ghanaian cedis losing over 40 percent of its value in 2014.⁷ And to make matters worse, it also induced a flight of foreign capital as international investors panicked in the face of Ghana's twin (fiscal and terms of trade) deficits. Similarly, FDI flows to Latin American countries fell significantly at the beginning of the century in the aftermath of the fallout from the collapse of the technology and telecommunications bubble in the US stock markets.

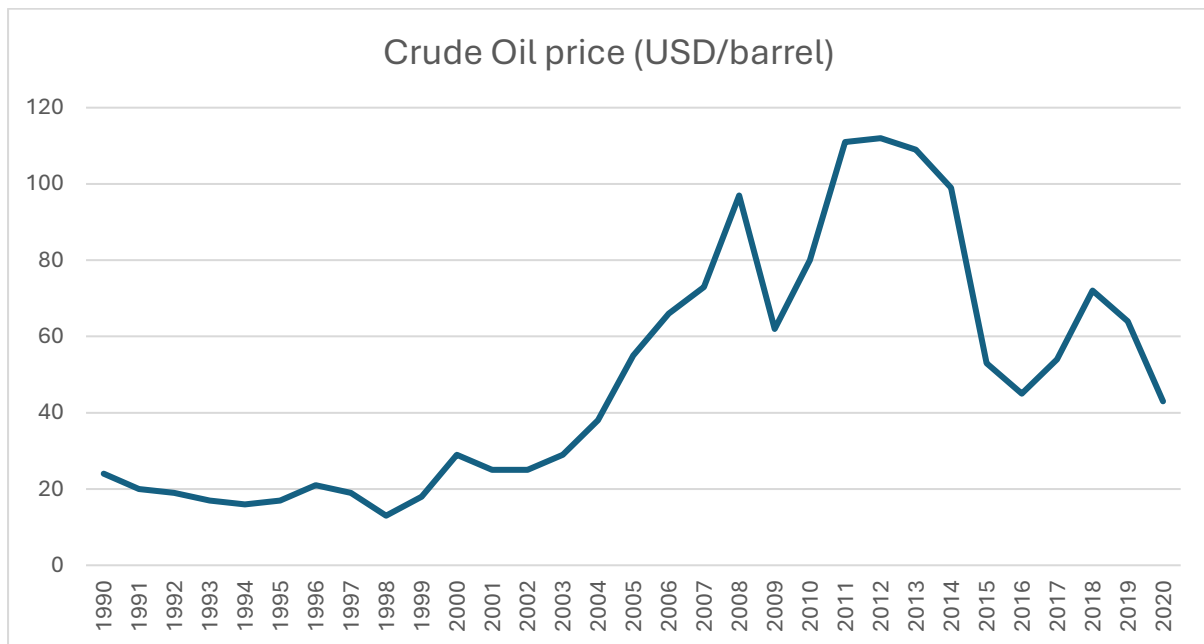


Figure 3: Data sourced from the FRED economic data (ST. LOUIS FED)

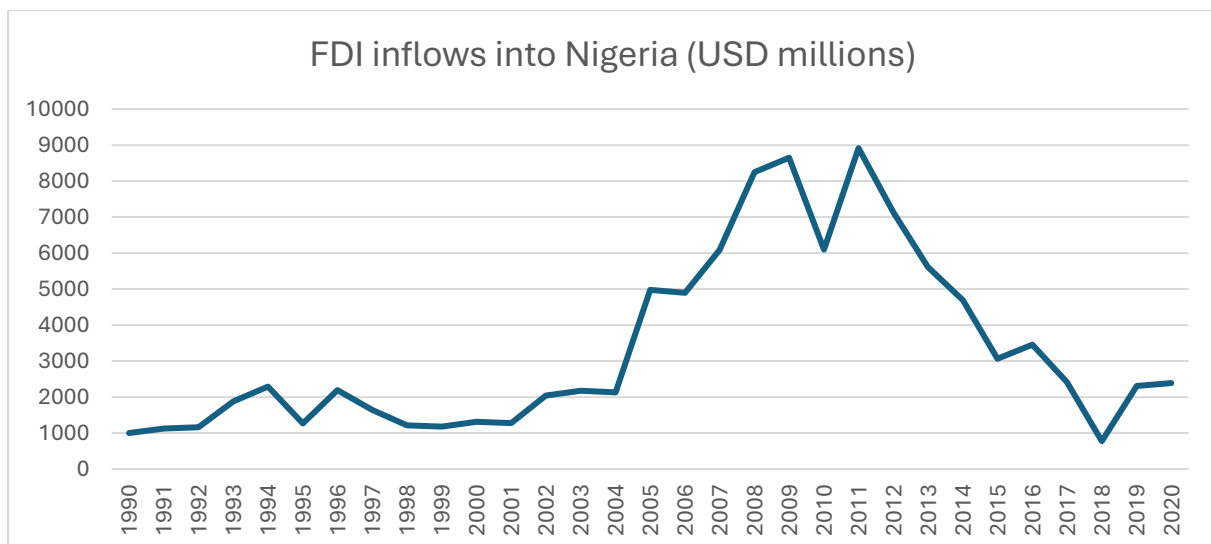


Figure 4: Data sourced from the UNCTAD statistical database.

⁷ Source: Africa Policy Journal, 2015 (<https://apj.hkspublications.org/ghana-in-crisis-how-emerging-africas-posterchild-ended-up-in-the-arms-of-the-imf/>).

The adverse effect of exchange rate instability on FDI inflows has become increasingly relevant for developing countries amidst the recurring phenomenon of global currency crises. This study is timely because Nigeria's currency is currently in a distress as it continues to experience significant depreciation and a rising exodus of foreign investors from the Nigerian market.

1.1 Justification for the study

The empirical literature has devoted a lot of attention to the relationship which exists among exchange rate, foreign direct investment, and financial development; in particular, the focus has been on studying the relationship between exchange rate and foreign direct investment (FDI) on one hand, foreign direct investment, and financial development on one hand, and on another hand exchange rate and financial development even as the relationship among these variables has become increasingly important over the years because of their important role in influencing economic activities among developing, emerging and developed economies. The increase in movements and exchange of goods and services, capital flows, and technology globally over the years has made it even more complex to pinpoint the direction of causality among these variables.

Intuitively it is expected that the variables interact with each other due to their contribution in the scheme of global economic activities. However, this argument cannot be relied on completely without empirical evidence. For instance, Khraiche & Gaudette (2013) opined that the relationship between exchange rate movements and foreign direct investment flows is conditioned on the level of financial development in the host country. They argue that when financial markets are deep, firms can take advantage of the well-developed financial market to hedge against exchange rate instability. A similar argument is put forward by Jehan & Hamid (2017) which argues that the negative effect of exchange rate volatility on foreign direct investment can be reduced by a well-developed financial sector.

Countries with lower levels of financial development and in particular the developing countries continue to experience the adverse effects of exchange rate instability on economic activities and by extension on economic growth as pointed out by Aghion, Bacchetta, Romain & Rogoff (2009).

Froot & Stein (1991) point out that the relationship between exchange rate and foreign direct investment depends on the tightness of credit constraints in the economy. If there are credit constraints because of imperfect information in global markets, a depreciation of exchange rate of the FDI receiving country increases the relative wealth of foreign investors; therefore,

loosening their credit constraints such that investors now have more personal wealth at their disposal as against going for the option of borrowing more funds from the financial markets and institutions.

However, an exchange rate appreciation does not necessarily imply an increase in FDI flows. For instance, during the 90s there was a significant appreciation in the exchange rate of Japanese yen to the US dollar. This period witnessed a significant reduction of FDI flows from Japan to USA due to the financial constraints encountered by Japanese firms. This is supported by empirical findings from Klein, Peek & Rosengren (2002) suggesting that the incident of troubled Japanese banks reduced the number of Japanese FDI projects to USA in the 90's.

The above argument justifies the importance of a stable and effective financial system as a major contributing factor for FDI flows. Thus, it has become a priority for developed and developing countries to develop and keep developing their financial markets and institutions through the introduction of new financial instruments and institutional structures which can enable multinationals, and foreign investors significantly mitigate the adverse effects of exchange rate instability as opined by Coletta (2018) stating that financial sector development can help to dampen exchange rate fluctuations created by FDI inflows.

Equally important is the development of domestic capital markets which has the potential to increase capital inflows particularly because the returns on capital are raised and it facilitates risk diversification (Mishra, Mody, & Murshid, 2001). Similarly, Korgaonkar (2012) argues that the degree of financial development in a host country is identified as a major determinant of FDI inflows because the availability of a well-developed financial system has the potential to increase FDI inflows substantially through the effectiveness and efficiency of financial institutions.

An equally important factor to consider is that foreign investors always seek investment opportunities which is subject to availability of information about such opportunities; however, this is made possible through a well-developed financial sector which facilitates the availability of such information at a cheaper cost while ensuring that investment returns are greatly maximized (Lamouchi & Zouari, 2013).

Empirical evidence shows that many developing countries especially in Sub-Saharan Africa remain financially underdeveloped reflected through the depth and deepening of their financial markets and institutions (Papadavid, Rewilak, & Brighty, 2017). This occurrence has a significant impact on how exchange rate instability affects foreign direct investment inflows.

Access to bank loan remains low in many Sub-Saharan African countries when compared to developed countries and the financial markets are still undergoing several reforms to position them better in the global market.

In addition, developed financial markets in developed countries provide lower borrowing costs unlike what is obtainable in developing countries financial markets. Therefore, a foreign investor operating in a developed country with a developed financial system has access to higher liquidity due to lower borrowing costs and by extension, the need to hedge against exchange rate instability is reduced. This is perhaps one of the reasons why there is a higher volume of FDI inflows to countries with higher levels of financial development.

1.2 Stylized facts about Nigeria

FDI flows have remained one of the largest and constant external sources of finance for developing economies as it continues to be recognised as one of the most important drivers of globalization and economic growth through the transfer of knowledge and modern technology between developed and developing countries. Foreign direct investment plays a significant role in boosting economic activities globally with increasing volumes of FDI flowing from the developed to developing countries. One of the beneficiaries of the global FDI flows across developed, developing, and emerging countries is Nigeria.

Foreign investors have been mainly attracted to the abundance of natural resources in Nigeria taking into consideration that mineral resources such as oil and gas are non-renewable. This explains why as far back as in the mid and late 70's, the Nigerian economy had a larger share of its gross domestic product made up of oil rents. However, this was soon to be reversed in the 80's following the collapse of global crude oil prices. Below is a graphical illustration of oil rents in the 70's versus the 80's.

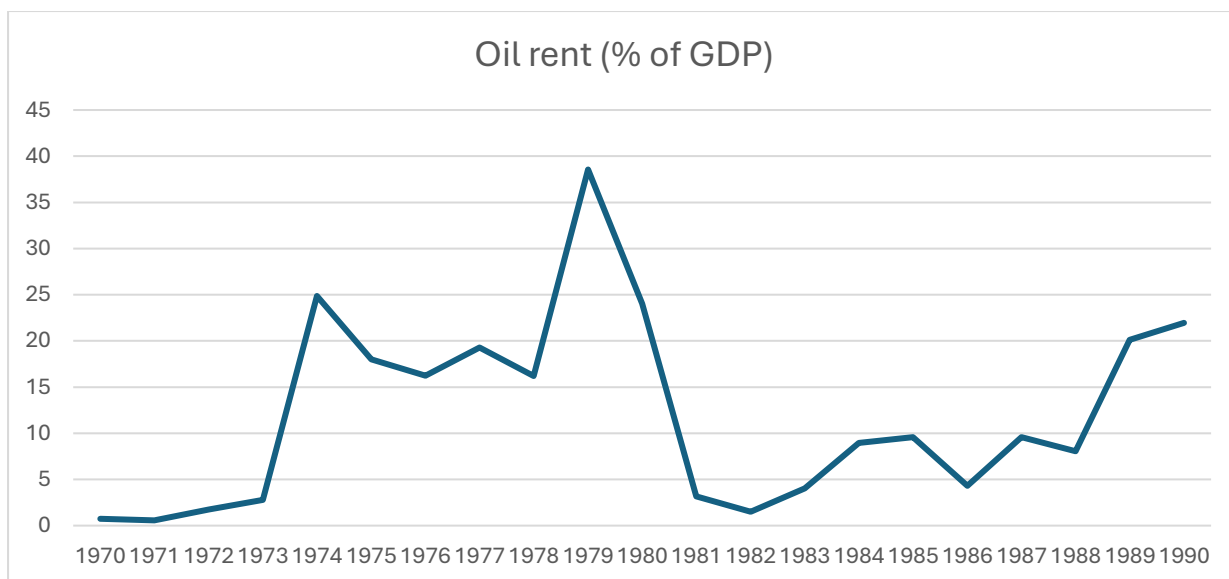


Figure 5: Data sourced from World Bank World Development Indicators.

The Nigerian economy was traditionally an agricultural economy as it relied heavily on agricultural activities to boost economic growth in the 60's. However, following the discovery of oil, attention began to shift away from agriculture with a new focus on the oil and gas sector which attracted foreign investors. In what would follow, the 70's saw an appreciation of the real effective exchange rate of the Nigerian currency and a significant increase in government revenue as foreign exchange earnings from crude oil accounted for the largest share of government revenue. Thus, by the second half of 1975, the Nigerian government had about 77.5% of its revenue from crude oil sales as against about 26% in 1970.⁸

An increase in government revenue led to a huge expansion of public expenditure and consequently there was a shift in the fiscal balance to a deficit from the initial surplus recorded. The Central bank of Nigeria had to intervene to finance the growing deficit which eventually contributed to an increase in money supply and rising inflationary pressures. The oil boom era in the 70's witnessed an implementation of economic policies which could not immediately solve the problem created by the collapse of oil prices in the first half of the 80's. Some of the policies implemented by the government included restricted trade policies, liberalisation of interest rates and capital accounts which began with the establishment of a second tier FOREX market in 1986 to facilitate easier transactions among participants in the FOREX market. The government also implemented industrial policies which was focused majorly on government

⁸ <https://yourbudgit.com/wp-content/uploads/2017/05/An-Analysis-of-Nigerias-Economy-and-Vulnerability-to-Oil.pdf>.

control in the economy, and this had a negative effect on the manufacturing sector by making it uncompetitive.

The effect of oil price collapse would have been minimal if the Nigerian government did not neglect the agricultural sector to focus on the oil and gas sector particularly because the agricultural sector was the mainstay of the economy before the discovery of oil. As an aftermath of the problems created by the collapse of oil prices; in 1986, the Nigerian government introduced and implemented the structural adjustment programme (SAP) which focused on using the private sector to drive economic growth through commercialisation and privatisation of government-controlled enterprises.

The gains from the implementation of SAP manifested in the late 80's and early 90's through the reversal of a negative economic growth trend, liberalisation of the foreign exchange market as economic agents now had an improved access to the foreign exchange market. The government went further to implement the foreign exchange provisions act in 1995 which was aimed at the liberalization of transactions thereby making it easier for multinationals to repatriate profits from Nigeria.

This significantly boosted FDI inflows in the 90's into Nigeria as international investors had a renewed confidence in the Nigerian economy. The graph below shows a comparison of FDI inflows in Nigeria in the 80's and 90's. The 90's experienced a larger volume of FDI inflows due to the policies implemented under the structural adjustment programme.

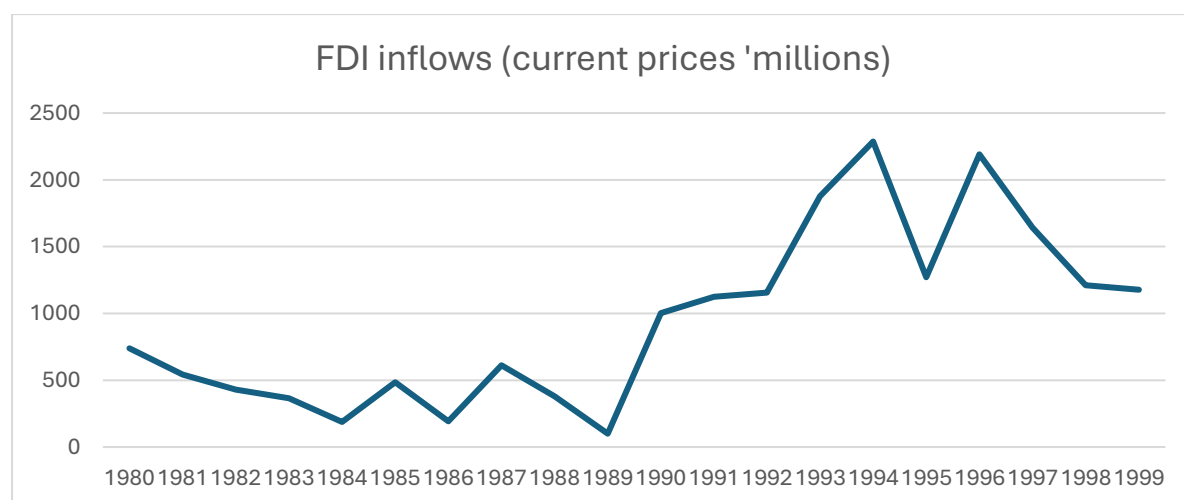


Figure 6: Data sourced from World Bank World Development Indicators.

FDI inflows has become a top priority for the Nigerian economy to boost economic growth and over the years this has led to its emergence as a bright spot for foreign investors seeking to explore the African market. Given a large share of abundant natural resources in the country, Nigeria continues to maintain the top spot for the largest FDI recipient in West Africa and by extension among the top 3 in Africa. In the year 2021, the country saw its FDI inflows multiply in double folds to an estimated 4.8 billion dollars attributed to a renewed investment drive in the oil and gas sectors which includes the construction of the Escravos seaport project estimated at 2.9 billion dollars.⁹

The inflows of FDI into Nigeria can be highlighted under different exchange rate regimes which can be summarised as the exchange rate regulation regime which occurred between 1970 to 1985. The exchange rate regulation regime witnessed a real appreciation of the Nigerian currency particularly in the 70's largely due to the sustained increase in global oil prices and an increase in foreign exchange earnings (Obadan, 1994). On the contrary, the exchange rate deregulation regime which occurred from 1986 upward created by the liberalization of the foreign exchange market in Nigeria in line with the structural adjustment programme was structured to allow for a market-based exchange rate system.

This was at a time when oil prices collapsed in the global market, and this resulted in certain economic consequences for the Nigerian economy majorly because it depended on revenue from crude oil sales to finance a large part of its budget. Of utmost importance among the economic consequences was the depreciation of the Nigerian currency against the US dollar. The distinct nature of the Nigerian economy makes the effective management of exchange rate vital to the economy. Specifically, the Nigerian economy is characterised by commodities export and a huge demand for imported goods which exposes the economy to the volatility of the international foreign exchange market.

Nigeria has witnessed various distinct foreign exchange reforms which date as far back as 1962. These reforms have had different outcomes on the Nigerian economy, particularly on the development of the financial sector and FDI inflows. Some of these reforms include the liberalization of the foreign exchange market under the exchange rate deregulation regime particularly with the implementation of the inter-bank foreign exchange market (IFEM) in

⁹ <https://unctad.org/news/investment-flows-africa-reached-record-83-billion-2021>.

1995, the retail Dutch auction system (RDAS) in 2002 and the wholesale Dutch system (WDAS) in 2006.

The reforms had some positive impacts which include the stability of the naira exchange rate to the US dollar and increasing level of external reserves (Akanji, 2006). In addition, the wholesale Dutch system brought about a significant use of electronic and computer-based transactions in the Nigerian foreign exchange market which further encouraged foreign investors as the foreign exchange market was further liberalized.

The liberalized and deregulated exchange rate regime witnessed an increase in FDI inflows as the exchange rate was determined by the forces of demand and supply in the FOREX market. In addition, investors were convinced to invest more in Nigeria due to the large reforms undertaken by the Nigerian government to liberalize the foreign exchange market. The Nigerian government through the central bank of Nigeria has carried out some financial reforms over the years aimed at a reduction in the degree of financial repression and a financial system deepening (Nzotta & Okereke, 2009).

Some of these reforms include the deregulation of money market interest rate in 1989, liberalization of bank credit market in 1992, restructuring of distressed banks in 1993, liberalization of capital market in 1996, introduction of universal banking in 2001, recapitalization of bank capital in 2005, creation of asset management company in 2010, institutionalization of corporate governance for regulators and operators in 2010.

The banking sector consolidation exercise of 2005 witnessed an unprecedented increase in the minimum capital base of commercial banks in Nigeria to the sum of 25 billion naira. Thus, commercial banks which could not meet up with this requirement had to either merge with other banks or were subsequently acquired by other banks. This development caused a reduction in the number of commercial banks from 89 to 24 commercial banks. There was a significant gain as pointed out by Akanji (2006) who opined that from the beginning of the bank consolidation exercise, there was an increase in capital flows such as FDI inflows into Nigeria (see the graph below).

The various financial sector reforms in Nigeria have played a major role in attracting foreign investors into the financial sector. Some of the foreign participants which have established their presence in the banking sector include the Standard Chartered Bank from South Africa and Citi Bank from the USA.

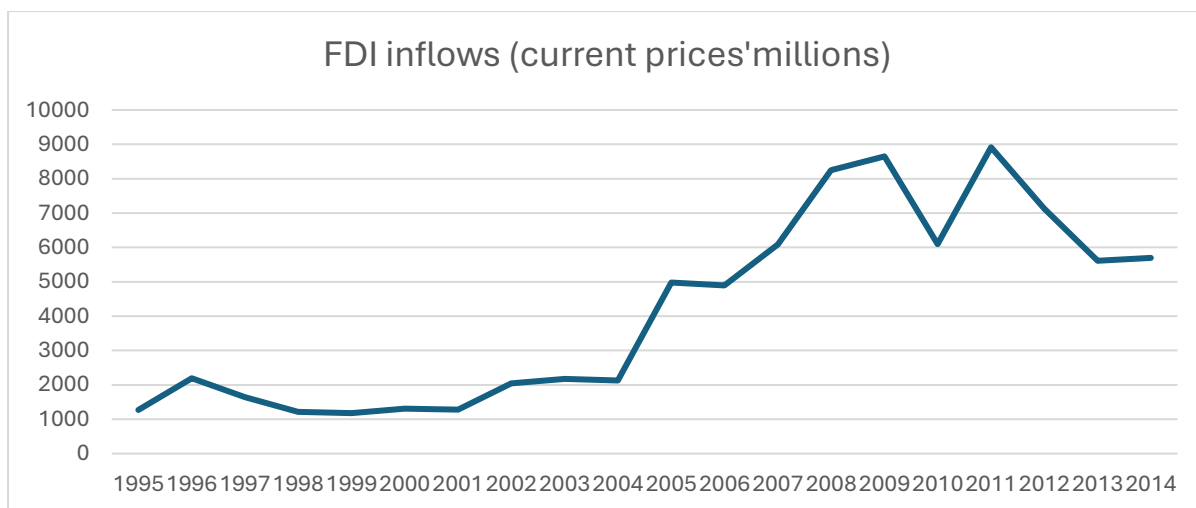


Figure 7: Data sourced from UNCTAD database.

It is pertinent to note that in contrast to the gains recorded from financial domestic reforms and policies implemented to develop the Nigerian financial sector, the Nigerian financial sector has in time past had its own share of financial crisis. Remarkably, the global financial crisis of 2008 had an impact on the sector particularly the stock market. This was at a time when foreign investors were forced to withdraw their funds from the Nigerian stock market due to the credit crunch in their respective countries. The Nigerian stock market at that time recorded an increase in net outflow of about 400 percent and subsequently lost about 70 percent of its value between 2008 and 2009. Nigerian Banks were worst hit by liquidity problems at that point in time because they had granted huge loans to stockbrokers and institutional investors trading in the stock market. These loans were to be classified as bad loans caused by the stock market crash.¹⁰

The central bank of Nigeria introduced more financial reforms to support the liberalization of the foreign exchange market and attract more FDI inflows. In particular, the removal of foreign exchange controls and the deregulation of the financial markets caused a significant change in the business environment and by extension repositioning Nigeria as a suitable option for foreign investors. In 2017 it introduced the investors and exporters foreign exchange window which was expected to cause an increase in foreign exchange supply into the economy of Nigeria.

However, some of these reforms seem not to be achieving the desired objectives. In more recent times foreign companies operating in Nigeria have had trouble repatriating their profits from

¹⁰<http://www.edinburghjournalisminternational.com/business-finance/why-nigeria-largely-escaped-the-global-financial-crisis.html>

Nigeria due to exchange rate crisis. For instance, in 2022 Nigeria blocked the repatriation of foreign airline revenues estimated at 450 million USD.¹¹

An unstable exchange rate continues to cause economic problems for Nigeria, and this has provoked various policy responses from concerned authorities one of which is the central bank of Nigeria. The central bank of Nigeria has implemented different exchange rate regimes which include the fixed regime, floating regime, managed floating, etc. The implementation of these exchange rate regimes was aimed at stabilizing the economy which is constantly exposed to external shocks. However, the losses in the Nigerian forex market have been more than the gains despite the implementation of different exchange rate regimes and policies.

For instance, in recent times in less than a year when there was a removal of the multiple exchange rate system, initially there were gains in the forex market, but these gains did not last long as the naira began to depreciate fast to the point where it reached an all-time low of 1400 naira/ 1 US dollar as at the end of January 2024.¹² One major reason for instability of the Nigerian currency is the non-diversification of the revenue base of the Nigerian government.

The Nigerian government relies heavily on revenue from crude oil and gas sales to finance government expenditure. This makes the Nigerian economy vulnerable to the volatility in the global commodities markets and to the large swings in energy prices. Therefore, the economy is constantly exposed to external shocks in the global oil market considering that the economy relies heavily on oil revenue (Abubakar, 2017). A significant amount of foreign exchange earnings for Nigeria comes from the sale of crude oil. Thus, periods when there have been large unfavourable swings in global energy prices, the Nigerian economy suffered for it evident through reduced forex inflows which in turn puts pressure on the Nigerian currency.

This has been the bane of the Nigerian economy for years as it continues to struggle to meet up with its fiscal responsibilities even though there have been policies geared towards diversifying the economy, these measures are yet to yield substantial economic gains. For instance, the Nigerian economy slid into a recession between Q1, 2016 and Q2, 2017 due to a sharp decline in oil prices. A similar experience was observed during the covid pandemic when

¹¹a. <https://www.reuters.com/world/africa/nigeria-blocking-repatriation-450-mln-foreign-airline-revenue-iata-says-2022-06-19/>

b. <https://centurionlg.com/2022/10/07/inefficacy-of-the-repatriation-regime-a-sore-thumb-in-foreign-investment-in-nigeria>.

¹² <https://www.premiumtimesng.com/news/headlines/663765-naira-hits-all-time-low-at-forex-markets.html>.

the economy experienced negative economic growth blamed on the pandemic and a collapse in oil prices.¹³

Thus, since oil revenue accounts for a significant portion of revenue for the Nigerian economy; it therefore follows that it plays a significant role in determining the foreign exchange rate of the Nigerian currency to the US dollar. This explains why the oil and gas sector in Nigeria has attracted a lot of FDI inflows over the years conditioned on the global demand for oil and gas resources and in recent time as of 2022, there has been a resurgence of investments in the oil and gas sector in Nigeria.¹⁴

Over the years, there has been an influx of FDI inflows in the oil and gas sector in Nigeria considerably because Nigeria has the largest oil and gas reserves in Africa with an estimated 37 million barrels of crude oil and more than 200 trillion cubic feet of gas.¹⁵ The Nigerian government also participates in the sector through the establishment of the Nigerian National Petroleum Corporation (NNPC); an establishment of the Nigerian government created to sell crude oil and gas to earn revenue for the government. The participation of the Nigerian government in the oil and gas sector has created a huge revenue source for the Nigerian government.

The oil and gas sector continues to enjoy a huge patronage from both foreign and local investors. This huge patronage has also caused an increase in the financing activities of the Nigerian financial sector through financial institutions and markets. For instance, the First Bank of Nigeria granted a vessel finance facility estimated at 52 million USD for the purchase of vessels to be leased to Mobil for the execution of a contract with Mobil¹⁶ Similarly, in 2008 the United Bank for Africa along with other commercial banks through a loan syndication provided a refinancing deal estimated at 265 million USD for Exxon Mobil and the NNPC. Thus, the financial sector continues to play a critical role in financing foreign investments in Nigeria despite the setbacks caused by the instability in the exchange rate.

¹³ <https://www.aljazeera.com/news/2020/11/21/nigeria-slips-into-recession-blamed-on-covid-19-and-oil-prices>.

¹⁴ <https://unctad.org/news/investment-flows-africa-reached-record-83-billion-2021>.

¹⁵ <https://www.boi.ng/oil-and-gas/>.

¹⁶ <https://www.vanguardngr.com/2012/05/first-bank-invests-n500bn-in-nigerias-oil-gas-projects/>.

Another issue of concern is the structure of the Nigerian economy. The Nigerian economy is largely import dependent to the extent that the major revenue source for Nigeria which is crude oil is not refined locally, but rather Nigeria exports the unrefined product (raw crude oil). After the product has undergone refining and ready for consumption, Nigeria then imports it back into the country. This cycle of import dependency has become a norm over the years as efforts to make the local refineries in Nigeria work has not yielded positive results.

Nigeria is a major exporter of crude oil and a major importer of refined petroleum products. Thus, this economic dilemma exposes the Nigerian currency to shocks in oil price changes. It is expected that the exchange rate of oil importing nations would depreciate (Buetzer et al, 2012) while for oil exporting nations, an increase in oil prices would make the currency appreciate through an increase in foreign exchange earnings. Theoretically, it is expected that an increase in oil price will transfer wealth from oil importing nations to oil exporting nations and this is pointed out by Abed et al (2016).

In the case of Nigeria, it appears that Nigeria is not benefitting immensely from the availability of its major natural resource commodity since the wealth gotten from exporting crude oil is in turn used to import refined petroleum products and other consumer good items. Thus, Nigeria's case is unique and pertinent to study since it is both a major exporter of raw and primary products and importer of refined and finished products. Therefore, it is constantly exposed to exchange rate shocks both as an importer of refined petroleum products and an exporter of unrefined crude oil.

It is fast becoming a worrisome issue such that last year between January and May 2023, the monetary policy committee of the central bank of Nigeria noted in its meetings that the Nigerian economy is still under the burden of increasing costs of importation which has caused imported inflation and a huge pressure on foreign exchange investments.

The import dependent nature of the Nigerian economy is not limited to the oil and gas sector but rather it cuts across all sectors of the economy. This has caused more harm than good to the economy such as the continuous pressure on the naira due to a high demand for dollars to be used by importers, unfavourable trade balances and terms of trade, etc.¹⁷

The real problem here has to do with stabilizing the exchange rate and it matters because if the

¹⁷ <https://nairametrics.com/2018/10/03/nigeria-imports-411-32b-goods-in-8-yrs/>.

exchange rate remains unstable, then more foreign investors will exit the Nigerian market. This will also cause a reduction in FDI inflows and subsequently slow down financial development in Nigeria. A continuous depreciation of the Naira would cause a loss of confidence in the Nigerian economy which will scare investors away. Therefore, it becomes important to empirically examine the relationship among FDI inflows, exchange rate and financial development considering their economic importance in Nigeria.

1.3 Contribution of this study to the literature

Empirical studies from developing countries particularly with respect to Nigeria have clearly focused on just empirical analysis without considering the fundamental theoretical mechanisms that seeks to explain the relationship among the variables of interest. There is a lack of empirical studies from Nigeria that discuss the competing theoretical mechanisms in the literature with the experience of the western world to understand how these variables affect each other. This study also examines one of the theoretical mechanisms identified in the literature and this is guided by data availability and in line with the main objective of this study.

Another important contribution of this study to the literature is that, unlike most studies from Nigeria which have examined the relationship among these variables (FDI inflows, exchange rate movement, and financial development) in pairs of two at a time (bi-variate model). This study goes further to examine and establish if there is a relationship among these variables in a tri-variate model and to establish the direction of causality among these variables. Thus, the primary objective of this study is to examine how these variables interact with each other and to establish the direction of causality among these variables in the context of a developing country (Nigeria).

Previous studies have established a relationship between the exchange rate and FDI inflows on one hand, FDI inflows and financial development on another hand, exchange rate and financial development. However, the presence of a relationship among these variables does not necessarily imply causality as the direction of causality among these variables has to be tested empirically using the appropriate methodology.

Therefore, using data from Nigeria, this study seeks to examine the dynamic relationship among exchange rate movements, FDI inflows, and financial development in Nigeria to establish if there is a relationship among these variables and go further to establish the direction of causality among these variables.

Chapter 2

Literature Review

2.1 Conceptual review

2.1.1 Foreign direct investment

Foreign direct investment is a form of investment which involves an investor known as the foreign investor or parent enterprise acquiring a lasting interest in the form of control in an enterprise resident in another country known as the host country. The lasting interest implies that there is a long-term relationship between the foreign investor and the enterprise. It is an investment which gives the foreign investor controlling ownership in a productive asset (such as factory) or business enterprise. Basically, FDI can be established through the purchase of existing assets by a foreign investor which could occur through mergers and acquisitions. Secondly, FDI can also occur through the establishment of productive assets by foreign investors mostly in the form of greenfield investments.¹⁸

FDI flows is made up of three major components which include reinvested earnings, equity capital, and intra-company loans. Reinvested earnings are made up of the directors' investors share of earnings not distributed as dividends or earnings not credited to the direct investor while equity capital describes the purchase of shares of a business enterprise (in the host country) by a foreign direct investor and intra-company loans are short-term or long-term borrowing and lending of funds between investors (direct investors) and affiliate enterprises.¹⁹

FDI has been identified as an important channel for the transfer of skills, technology and resources between countries cutting across developed, emerging and developing economies globally. The direction of FDI flows can be indicated as either inward flows or outward flows. FDI flows are usually measured under the following: FDI as a percentage of gross fixed capital formation, FDI as percentage of gross domestic product, FDI at current prices per capita (in US dollars), FDI at current prices in millions (in US dollars), and FDI as percentage of total world FDI.

¹⁸ <https://ec.europa.eu/eurostat/web/economic-globalisation/globalisation-in-business-statistics/foreign-direct-investments>

¹⁹ see https://unctad.org/system/files/official-document/wir2007p4_en.pdf

FDI flows can be classified into three major categories which include Joint ventures, greenfield investments, mergers, and acquisitions. Joint venture involves two or more companies operating as a joint entity. In the case of FDI, joint ventures can be facilitated through cross-border joint ventures which combines two or more firms to establish a venture. Mergers and acquisitions occur when either a foreign firm acquires a domestic firm or when a foreign firm merges with a domestic firm to form a new company. Essentially, for mergers and acquisitions, there is a transfer of assets from the domestic firm to the foreign firm and as a result a new company is established. A greenfield investment is created through establishing new production facilities in the FDI host country. It is usually done on a large scale; thus, it gives more opportunity for technological transfer and an increase in productivity of the hosting economy.

Types of Foreign Direct Investment

1. Horizontal foreign direct investment: Horizontal FDI happens to be the most common type of FDI globally. It occurs when an investor invests in a foreign company which operates in the same industry like that which the investor operates domestically. For instance, assuming company A produces computer chips in Ukraine, and it decides to invest funds in a similar company B which produces computer chips in China. In this case, the foreign investor (company A) is engaging in horizontal FDI since both companies belong to the same industry. This gives the investor an opportunity to expand its business activities into different countries. This type of FDI gives investors the option to either serve a foreign market through foreign direct investment or through the international trade option (cross-border exports).
2. Vertical foreign direct investment: Vertical foreign direct investment occurs when a foreign investor decides to break down the production process across different locations globally by locating each aspect of the production in locations where it is cost effective and efficient. By doing this, different stages of the value chain can be in different countries. For instance, capital intensive production can be located in a country that has abundance of capital while labour intensive production can be located in a country that has abundance of labour. This way the supply chain is increased.
3. Conglomerate foreign direct investment: A conglomerate foreign direct investment occurs when a company invests in a foreign business that is not operating in the same line of business i.e., unrelated to the investing companies existing operations. This often takes the form of a

joint venture basically because the investing company does not have the know-how (no prior experience) in the foreign company's area of expertise.

2.1.2 Financial development

Financial sector development basically refers to the set of markets, instruments, and institutions along with the regulatory and established legal frameworks that enable financial transactions to be carried out by making credit available. For instance, the establishment of credit registries tend to facilitate the dissemination of information about potential borrowers; thus, improving economic development through efficient allocation of resources to potential borrowers. From the legal and regulatory perspective, developed countries have put in place measures to develop their equity and bond markets which allows investors the opportunity to hold more diversified portfolios which is facilitated through effective regulatory and legal systems.

The financial sector of any economy is created to carry out specific functions. Some of the functions of the financial sector include facilitating the exchange of goods and services, monitoring investments, and mobilization of savings for investment purposes, etc. Financial sector development fundamentally describes the processes involved in reducing costs incurred in the financial system. Costs in this context captures costs such as the cost of acquiring information, cost of making transactions, and costs of enforcing contracts. To achieve the objective of cost reduction, several channels have emerged such as financial markets, financial intermediaries, and financial contracts aimed at cost reduction in the financial sector.

Financial sector development occurs when financial markets, financial intermediaries, and financial instruments play a significant role in reducing costs such as enforcement cost, transaction cost, and information cost. Financial sector development is made possible through the development and implementation of financial policies and the establishment of a well-regulated financial framework. This would help develop the financial sector and position it better to provide essential functions such as facilitating international trade and foreign direct investment, risk management and diversification, providing information ex ante for possible investments, allocation of capital, driving economic growth, increasing access to finance, poverty, and inequality reduction. Therefore, financial sector development occurs on the basis that financial markets and financial instruments play an effective role to reduce transaction costs, reduce the effects of information enforcement and by extension play the significant role of providing major functions of an effective and efficient financial sector in the economy.

Financial development is a multifaceted concept which goes beyond focusing on just banking sector development. It can be measured using different dimensions which cuts across the financial markets and financial institutions. This explains why financial sector development is considered a broad concept with varying effects on the economy. However, the World Bank global financial development database has developed a robust framework which attempts to measure financial development using a robust set of measures suitable for capturing the broad concept of financial development. The framework identifies four major dimensions which capture the different aspects of financial development. These include financial stability, financial access, financial efficiency, and financial depth. These four dimensions are used to measure financial institutions and financial markets.

A summary of financial development measures.

1. Financial Depth

Private sector credit to gross domestic product: this refers to the financial resources made available for the private sector in the form of loans, trade credits, purchase of non-equity securities, and other accounts receivable that establish a claim for repayment. These financial resources are usually provided by financial institutions and some of these institutions include deposit money banks, monetary authorities (central banks), Insurance companies, leasing corporations, etc.

M2 to gross domestic product: this is a measure of money stock which consists of M1 (currency and coins held by the non-bank public, travellers checks and checkable deposits) plus savings deposits (which includes money market deposit accounts), small time deposits, and balances in retail money market mutual funds as a share of gross domestic product.

Deposits to GDP: This refers to the total value of demand, saving, and time deposits at domestic deposit money banks as a share of gross domestic product. The deposit money banks consist of commercial banks and other financial institutions that take in demand deposits and other transferable deposits.

Gross value added of the financial sector to gross domestic product: the gross value added of the financial sector to GDP measures the contribution of the financial sector in terms of the output that it adds to the gross domestic product of a country. The financial sector covers the financial institutions and financial markets in the country.

Financial institutions asset to gross domestic product: this captures the total assets kept by financial institutions that do not accept transferable deposits but play the role of financial intermediaries which involves issuing securities, accepting other types of deposits, and issuing liabilities that are close substitutes for deposits as a share of gross domestic product. Examples of such institutions include development banks, offshore banking institutions, etc.

Public debt securities to gross domestic product/ Private debt securities to gross domestic product: this refers to total amount of domestic public debt securities issued in domestic markets as a share of gross domestic product. The public debt securities consist of long-term bonds, commercial papers, treasury bills, and other short-term notes while private debt securities to gross domestic product refers to total amount of domestic private debt securities issued in domestic markets as a share of gross domestic product. The private debt securities consist of long-term bonds, commercial papers, treasury bills, and other short-term notes.

International debt securities to gross domestic product: this covers the amount of public international debt securities as a share of gross domestic product. It consists of money market instruments, notes, and long-term bonds available in international markets.

Stock market capitalization to gross domestic product: this is a measure of the total value of all listed shares in a stock market as a percentage of gross domestic product. The ratio gives a comparison of all stocks at an aggregate level in a country relative to the value of total output produced by the country. It shows the percentage of gross domestic product that is representative of the value of stock market.

Stocks traded to gross domestic product: stocks traded to GDP is defined as the total value of all traded shares in a stock market exchange as a percentage of gross domestic product. The ratio gives a comparison of all stocks traded in a country relative to the value of total output produced by the country.

Outstanding domestic private debt and outstanding domestic public debt securities to GDP: the outstanding domestic private debt securities covers the total amount of domestic private debt securities (amount outstanding) issued in domestic markets as a share of gross domestic product. The outstanding domestic public debt securities to gross domestic product covers the total amount of domestic public debt securities (amount outstanding) issued in domestic markets as a share of gross domestic product. They consist of short-term notes, commercial paper, and long-term bonds.

Table 1: Summary of financial depth measures.

Financial Institutions	Financial Markets
Private sector credit to GDP	Public debt securities to GDP/Private debt securities to GDP
M2 to GDP	International debt securities to GDP
Deposits to GDP	Stock market capitalization to GDP
Gross value added of the financial sector to GDP	Stocks traded to GDP
Financial institutions asset to GDP	Outstanding domestic private debt securities to GDP

Source : <https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development>

2. Financial Access

Accounts per thousand adults (commercial banks): Accounts per thousand adults refers to the number of deposit account holders with commercial banks and other resident banks functioning as commercial banks that are resident nonfinancial corporations (public and private) per a thousand adults. The major type of deposits considered include time deposits, savings account, and checking accounts. For each country, it is calculated as 1000 multiplied by the reported number of adult population or depositors.

Percentage of people with a bank account: it covers the percentage of people who are reported to have an account (by themselves or together with someone else) at a bank or another type of financial institution.

Percentage of firms with line of credit (small firms): it covers the percentage of small firms (5-19 workers) in the formal sector with a line of credit or a loan from a (formal) financial institution, such as a bank, credit union, microfinance institution, or cooperative.

Percentage of firms with line of credit: it covers the percentage of all firms in the formal sector with a line of credit or a loan from a formal financial institution, such as a bank, credit union, microfinance institution, or cooperative.

Branches per 100,000 adults (commercial banks): commercial bank branches per hundred thousand adults refers to the retail locations of commercial banks and other resident banks that

function as commercial banks that provide financial services per hundred thousand adults in the reporting country. It is measured as the number of institutions plus the number of branches multiplied by hundred thousand and divided by the adult population in the country.

Percentage of value traded outside of top 10 traded: The value traded excluding top ten traded companies to total value traded (%) is measured as the value of all traded shares outside of the largest ten traded companies as a share of total value of all traded shares in a stock market exchange.

Percentage of market capitalization outside of top 10 largest companies: The market capitalization excluding top ten companies to total market capitalization (%) is measured as the value of listed shares outside of the largest ten largest companies to total value of all listed shares.

Table 2: Summary of financial access measures.

Financial Institutions	Financial Markets
Accounts per thousand adults (commercial banks)	Government bond yields (3 month and 10 years)
Percentage of people with a bank account	Ratio of domestic to total debt securities
Percentage of firms with line of credit (small firms).	Ratio of private to total debt securities (domestic)
Percentage of firms with line of credit (all firms).	Percentage of value traded outside of top 10 traded
Branches per 100,000 adults (commercial banks)	Percentage of market capitalization outside of top 10 largest companies

Source : <https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development>

3. Financial Efficiency

Non-interest income to total income: it measures Bank's income that has been generated by noninterest related activities as a percentage of total income (net-interest income plus noninterest income). Non-interest related income includes net gains on trading and derivatives, net gains on other securities, net fees and commissions and other operating income.

Overhead costs (% of total assets): it measures the operating expenses of a bank as a share of the value of all assets held where total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations, and other assets.

Lending-deposits spread: it is measured as the difference between lending rate and deposit rate where lending rate is the rate charged by banks on loans to the private sector and deposit interest rate is the rate offered by commercial banks on three-month deposits

Profitability (returns on assets, return on equity): returns on assets is measured as commercial banks after-tax net income to yearly averaged total assets while return on equity is measured as commercial banks after-tax net income to yearly averaged equity.

Boone indicator: it measures the degree of competition based on profit-efficiency in the banking market. It is calculated as the elasticity of profits to marginal costs. An increase in the Boone indicator implies a deterioration of the competitive conduct of financial intermediaries.

H-statistics: it is a measure of the degree of competition in the banking market. It measures the elasticity of banks revenues relative to input prices. Under perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount, and hence the H-statistic equals 1. Under a monopoly, an increase in input prices results in a rise in marginal costs, a fall in output, and a decline in revenues, leading to an H-statistic less than or equal to 0. When H is between 0 and 1, the system operates under monopolistic competition.

Net interest margin: it is measured as the accounting value of bank's net interest revenue as a share of its average interest-bearing (total earning) assets.

Bank cost to income ratio (%): this measures the operating expenses of a bank as a share of sum of net-interest revenue and other operating incomes.

Bank return on assets and equity (% before tax): the bank return on assets before tax measures the Commercial banks' pre-tax income to yearly averaged total assets while the bank return on equity before tax measures the Commercial banks' pre-tax income to yearly averaged equity.

Turnover ratio for stock market: the turnover ratio for stock market measures the total value of shares traded during the period divided by the average market capitalization for the period.

Settlement efficiency: It compares the value (volume) of transactions that are settled on a given day with the total volume (or value) of transactions eligible for settlement on that day.

Table 3: Summary of financial efficiency measures.

Financial Institutions	Financial Markets
Non-interest income to total income	Turnover of bonds (private, public) on securities exchange
Overhead costs (% of total assets)	Liquidity/transaction costs
Lending-deposits spread	Turnover ratio for stock market
Profitability (return on assets, return on equity)	Private information trading
Boone indicator (or Herfindahl or H-statistics)	Quoted bid-ask spread for government bonds
Net interest margin	Settlement efficiency

Source : <https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development>

4. Financial Stability

Asset quality ratios: the ratio measures the loan impairment charge for the year as a percentage of loans and advances to customers.

Capital adequacy ratios: the bank regulatory capital to risk weighted assets (capital adequacy ratio) measures the capital adequacy of deposit takers. It is a ratio of total regulatory capital to its assets held, weighted according to risk of those assets.

Liquidity ratios: it is used to measure a company's capacity to pay off its short-term financial obligations with its current assets i.e., a measurement of a company's liquidity. Some of these liquidity ratios include current ratio, cash ratio, and quick ratio. The most common liquidity ratio is the current ratio which is measured as current assets divided by current liabilities.

Liquid assets to deposits and short-term funding (%): it captures the ratio of the value of liquid assets (easily converted to cash) to short-term funding plus total deposits. The liquid assets include cash from banks, trading securities and at fair value through income, loans and advances to banks, and cash collaterals. Deposits and short-term funding include total customer

deposits (current, savings and term) and short-term borrowing (money market instruments and other deposits).

Bank z-score: It covers the probability of default of a country's commercial banking system. The z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the risk (volatility) of those returns to measure the solvency risk of banks. The z-score is defined as $z \equiv (k + \mu) / \sigma$, where k is equity capital as percent of assets, μ is return as percent of assets, and σ is standard deviation of return on assets as a proxy for return volatility.

Price / earnings ratio: The price to earnings ratio is the ratio used to value a company's current share price relative to the earnings per share. The price to earnings ratio is calculated by dividing the market value price per share by the company's earnings per share. A higher price to earnings ratio can mean that the price of a stock is high relative to earnings and possibly overvalued while a low price to earnings ratio may indicate that the current stock price is low relative to earnings.

Skewness of the index (stock price): the skewness index is calculated using S&P 500 options that measure tail risk returns two or more standard deviations from the mean in S&P 500 returns over the next 30 days.

Volatility (standard deviation/average) of stock price index: the volatility of stock price index (Stock price volatility) refers to the average of the 360-day volatility of the national stock market index.

Vulnerability to earnings manipulation: the vulnerability to earnings manipulation is derived from certain characteristics of information reported in the financial statements of companies that can be indicative of manipulation. It is captured as the percentage of firms listed on the stock exchange market that are susceptible to such manipulations.

Bank nonperforming loans to gross loans (%): it measures the ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans (total value of loan portfolio).

Provisions to non-performing loans: this measures the provisions made to nonperforming loans. Nonperforming loans are loans for which the contractual payments are delinquent, usually defined as and non-performing loans ratio being overdue for more than a certain number of days (e.g., usually more than 90 days).

Table 4: Summary of financial stability measures.

Financial Institutions	Financial Markets
Asset quality ratios	Price//earnings ratio
Capital adequacy ratios	Skewness of the index (stock price, sovereign bond)
Liquidity ratios	Volatility (standard deviation/average) of stock price index, sovereign bond index
Z-score	Vulnerability to earnings manipulation
Others (net foreign exchange position to capital, etc)	Ratio of short-term to total bonds (domestic, international)
	Correlation with major bond returns (Germany, US)

Source : <https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development>

2.1.3 Exchange rate

Exchange rate explains the relative price of a country's currency to another country's currency and forms the primary basis upon which international transactions are facilitated. Thus, the exchange rate is considered as the most important price in the international market. The literature is floated with different exchange rate regime classifications. However, there are primarily two exchange rate regimes commonly used. These include flexible exchange rate regime and the fixed exchange rate regime. Countries are at liberty to implement their exchange rate regime as they deem fit. However, implementing the wrong exchange rate regime can have dangerous consequences on the economy of a country. Simply put, implementing a misaligned exchange rate regime can cause financial crisis in the economy. On the contrary, implementing suitable exchange rate policies makes a country stronger relatively to other countries thus an increase in international competitiveness.

A fixed exchange rate regime implies that the exchange rate between two country's currencies is fixed which prevents exchange rate instability. On the other hand, a flexible exchange rate regime implies that the relative price for the currency of a country is determined by the invisible forces of demand and supply in the foreign exchange market which is subject to exchange rate volatility. Exchange rate can also be classified based on the level of foreign exchange rate controls in a country. Typically, the two controls include the official rate and the parallel market

rate. the official rate (nominal exchange rate) is recognised by the government of a country as the standard rate in international transactions. It basically tells you the amount of a currency needed to purchase another currency. However, due to the forces of demand and supply, the market rate emerges which is captured as the real exchange rate obtainable in the free market. In addition, the real exchange rate also factors in the cost of inflation; thus, it is preferred for the purchase of goods and services.

Exchange rate is affected by specific factors which determine the relative strength of a country's currency. Some of these factors include interest rate as higher domestic interest rates causes the demand for a currency to increase through an increase in capital inflows and vice-versa. Inflation also affects a country's exchange rate as an increase in inflation in country makes its currency depreciate and weaker relatively to other currencies.

A trade deficit or surplus also affects the exchange rate as a trade deficit indicates that the country's foreign exchange earnings are lower than its foreign exchange expenditures (Supply of foreign exchange is lower than its demand for foreign exchange) and vice-versa in the case of a trade surplus. Therefore, a trade deficit makes a country's currency depreciates as it becomes relatively weaker in the international FOREX market while on the contrary, a trade surplus makes a country's currency appreciate as it becomes relatively stronger in the international FOREX market.

2.2 Theoretical review

2.2.1 Theories linking exchange rate movement and FDI inflows

Wealth Effect theory

The trend reversal in the value of the US dollar against other major currencies that took place during the latter half of the 1980's was followed by a sharp increase in FDI flows into the US economy (see Figure 7), especially from Japanese companies which acquired a large portfolio of subsidiaries in the USA. By the end of the decade, FDI inflows were financing nearly half of the US current account deficit while Japan was using more than two thirds of its current account surplus to finance FDI outflows (see Figure 8 below).

The new reality motivated the analysis in Froot & Stein (1991). This studies the sale of a domestic asset under free but imperfect capital markets. Both foreign and domestic investors can borrow money from the international capital markets at the same terms in the domestic currency. However, to ensure that borrowers share some of the idiosyncratic risk of the asset, lenders require a loan to value ratio that is strictly less than one; thus, investors must commit some of their own wealth in the purchase of the asset. And this requirement means that changes in the exchange rate can significantly alter the relative purchasing power of foreign and domestic investors. A depreciation of the domestic currency translates to an increase in the wealth position of a foreign investor (denominated in domestic currency) while an appreciation of the domestic currency is advantageous for the domestic investor.

As an illustrative example, the paper considers an investor based in the USA and another based in Japan bidding to buy a building located in the USA with an expected future value of USD110 million. Both investors can approach a US bank to get a mortgage loan on the same terms; the loan is denominated in US dollars, with an interest rate of 10% and a loan-to-value ratio of 90%. That is, each investor is required to participate with an equity stake of 10% of the purchase price of the building. The personal wealth of the US investor is assumed to be USD7 million; she can request a loan of up to USD63 million and bid up to USD70 million for the building. The wealth of the Japanese investor is taken to be 1 billion yen; the maximum amount for the loan she can request, and her subsequent maximum bid depends on the yen/USD exchange rate.

The intuition behind the Froot and Stein mechanism emerges by comparing two hypothetical scenarios for the exchange rate. Suppose that it currently stands at 200 yen/USD. As the wealth

of the Japanese investor stands at USD5 million, he can request a loan for up to USD45 million and bid up to USD50 million dollars for the building; in this case, the US investor has the advantage in the bidding process. Suppose instead that the exchange rate stands at 100yen/USD. The Japanese investor's wealth is USD10 million, and she can request a loan for up to USD90 million and bid up to USD100 million; the advantage in the bidding process now lies with the Japanese investor. The depreciation in the US dollar induces higher FDI flows into the US economy from Japan.

The key prediction of the Froot and Stein model is that a depreciation of the domestic currency is expected to yield an increase in FDI inflows. This is because the wealth of foreign investors is now larger when denominated in the domestic currency, and this enables them to outbid domestic investors in the acquisition of domestic assets for sale.

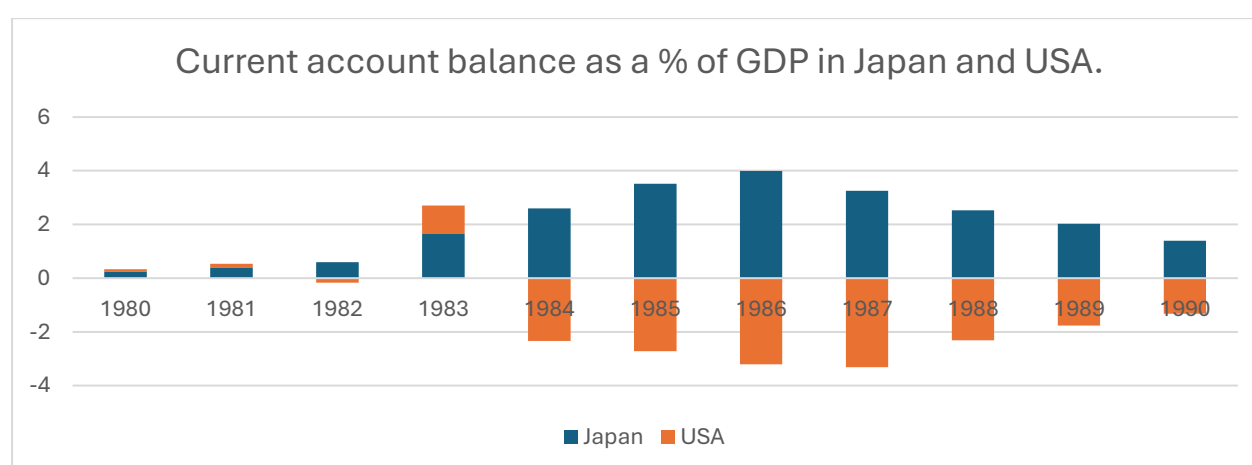


Figure 8: Data sourced from the World Bank world development indicators database.

The wealth effect mechanism is corroborated by studies such as Froot & Stein (1991) which examined the relationship between exchange rate movements and FDI in the US for the period 1973-1988 with an objective to test the validity of the wealth effect theory using an ordinary least square regression (OLS) method. The findings show that a depreciation of the US dollar increases FDI inflows in USA. The finding is justified on the basis that currency depreciation in the host country lowers the value of assets in the host country; therefore, the FDI cost in terms of the host country currency declines which in turn makes FDI in the host country attractive.

Dewenter (1995) examined if exchange rate movements drive FDI in the US with the objective of exploring the relationship between the value of the US dollar and prices of cross-border acquisitions for the period 1975-1989 using the OLS regression. Findings from the study showed that a depreciation of the US dollar causes an increase of FDI inflows in the USA

which supports the hypothesis that an increase in foreign wealth relative to domestic wealth should be associated with an increase in FDI inflows. The findings are influenced by the inclusion of a foreign corporate wealth proxy derived from the local stock market indices (foreign country index/USA index). Thus, an increase in foreign corporate wealth relative to the host country corporate wealth is associated with an increase in FDI inflows.

Mensah, Bokpin, & Ofosu-Hene (2015) examined the effect of exchange rate movements on FDI inflows in Ghana for the period 1990-2012 using a robust regression and bootstrap method. Findings from the study showed that a depreciation of the Ghanaian currency (cedis) increases FDI inflows into Ghana. The finding is linked to the hypothesis that large exchange rate shocks generate mean-reverting expectations (skewness of exchange rate movement). This mean reverting expectations provide the explanation for the link between FDI inflows and exchange rate levels arguing that investors long-term expectations about the Ghanaian currency determines their decision to invest in Ghana.

Chikwue (2019) examined the effect of exchange rate movements on FDI inflows in Nigeria for the period 1980-2017 applying the auto-regressive distributed lag and error correction mechanism within the framework of dynamic OLS. Findings from the study shows that FDI inflows is affected by exchange rate movements in the short and long run and that a depreciation of the Nigerian currency (naira) leads to an increase in FDI inflows. The finding is linked with the argument that currency depreciation reduces productions costs in Nigeria, thus making the host country attractive for foreign investors seeking production efficiency in their FDI activities.

Acquisition of firm specific assets theory

Yet another explanation with a similar focus was proposed in Blonigen (1997) at a time of a significant surge in the purchase of firm-specific assets in the US. The period from the late 1970's all through to the mid-1990's was characterized by the US depreciating against the Japanese yen and large increases in Japanese FDI flows to the US. Japanese investors were acquiring US firms to obtain access to technologies and knowhow relevant to their own productive activities in Japan. As Japan became a major foreign investor in the US while remaining itself a strikingly small recipient of FDI, the phenomenon became a huge public concern in the US under the catching label "the selling of America".

Blonigen assumed that firm-specific assets are not location specific: the acquisition cost of such an asset can be in one currency while the nominal returns from the use of the asset in another currency. The model considers a firm that plans to acquire knowledge-rich foreign assets in the foreign currency, and by leveraging this knowledge in its home market with the expectation to generate returns in its own currency from the purchase of the knowledge-rich foreign asset. Equally important, Blonigen also assumed that the law of one price does not hold in the short run: a foreign firm that acquires a domestic asset in the wake of a recent movement in the exchange rate expects to realize the asset's returns before the law of one price comes to induce price movements that offset the exchange rate change. Taken together, these two hypotheses imply that, even though foreign and domestic firms have equal opportunities to purchase firm-specific assets in the domestic market, they have different opportunities to generate returns from these assets following movements in the exchange rate.

The model provides an explanation for short-run movements in FDI flows following changes in the nominal exchange rate. The key premise is that exchange rate changes lead to valuation asymmetries between domestic and foreign firms as they bid for domestic assets generating returns that can be denominated in a different currency than that used for their purchase. Consider for instance the scenario where two computer manufacturing firms, one based in the USA and another based in Japan, both are bidding for a US-based company that designs computer chips – an essential input in either manufacturer's process.

The bid must be in US dollars. Both manufacturing firms operate in an international environment where there is perfect capital mobility but imperfections in the trading of goods and services; more precisely, both have equal access to the capital markets to fund their bids, but each is restricted to produce and sell their computers solely in their own country. Under this scenario, a change in the yen/USD exchange rate would obviously make no difference in the valuation of the target asset for the US manufacturer.

It would matter, however, for the Japanese firm as the actual nominal return would come from the realization of sales in the Japanese market and, thus, be denominated in yen. Specifically, other things (namely, the respective product prices in the US and Japanese markets) being equal, a depreciation of the USD against the yen would mean an increase in the asset's nominal return for the Japanese firm; hence, an incentive to increase its bid for the US asset. Suppose that both manufacturers can sell their computers at a 20% mark-up over the cost of the chip while they project sales revenues of USD6 million and Yen1.2 billion, respectively. The US

manufacturer is willing to bid up to USD5 million for the chip designer; this would also be the maximum bid of the Japanese firm at an exchange rate of 200Yen/USD. However, at an exchange rate of 400Yen/USD, the Japanese manufacturer will be willing to bid only up to USD2.5 million while, at an exchange rate of 100Yen/USD, its bid could be as high as USD10 million. Clearly, a depreciation of the US dollar against the Yen is more likely to result in the asset been acquired by the Japanese firm.

The key prediction of Blonigen empirical study is that real dollar depreciations can lead to a substantial increase in acquisition FDI in industries that are dominated by firm specific assets specifically manufacturing industries with high research and development.

The acquisition of firm-specific assets mechanism is corroborated by studies such as Dewenter (1995) which examined the link between exchange rate movement, the flows of cross-border acquisitions and takeover premia using transaction-specific data of foreign acquisitions of USA targets for the period 1975 to 1989. The findings show that a depreciation of the US dollar is associated with an increase in foreign acquisitions of US targets and higher foreign takeover premia for US targets. The findings show that there is a significant link between the value of dollar and takeover premia made by foreign investors for US acquisition targets. The finding can be explained by the desire of foreign investors to acquire specific U.S targets premised on depreciation of the US dollar.

Guo & Trivedi (2002) re-examined the robustness of the firm-specific asset hypothesis using data from Japanese acquisitions in USA covering the period 1975 to 1992 within a panel version of a finite mixture model. The findings show that all low research and development, most high research and development manufacturing and some non-manufacturing industries are significantly affected by real exchange rates. The findings complement Blonigen study which suggested that there is a strong link between exchange rate movement and high research and development manufacturing sector. The finding can be explained by the motive of investors seeking to use FDI to acquire US targets, particularly in research and development of the manufacturing sector.

Buch & Kleinert (2006) examine the link between exchange rate movement and FDI with a focus on examining the goods market friction hypothesis versus capital market friction hypothesis using firm-level data set for the foreign affiliates of German multinationals for the period 1989 to 1995. The findings show that an exchange rate appreciation promotes the acquisition of new firm-specific assets abroad by German multinationals. The finding is linked

to the argument that the ability of firms to bid for firm-specific assets abroad depends on exchange rate movements. Thus, since the revenue of firms depends on exchange rate movements, their ability to purchase firm-specific assets also depends on changes in exchange rate which explains the goods market friction hypothesis.

2.2.2 Theories linking exchange rate volatility and FDI inflows

Risk Aversion theory

Cushman (1985) studied how investors attitudes towards risk plays a key role in the relationship between exchange rate risk (volatility) and FDI flows. This study offers a stylized description of the dynamics of FDI flows by analysing the problem faced by a multinational firm deciding where to buy its inputs, where to produce, where to sell its output, and how to finance its capital acquisitions amid fluctuating exchange rates as choice under uncertainty. Cushman's motivation was the need to investigate the potential impact on international capital flows following the introduction of the floating exchange rate system in the mid-1970's after two major currency realignments in 1971 and 1973 involving a net depreciation of the dollar.

The key premise in the analysis is that risk-averse firms seek to maximize the certainty equivalent of future profits from foreign activities. The profits are risky as future movements in the bilateral exchange rate will affect the corresponding returns. As an illustrative example, Cushman considers a firm seeking to expand production activities by establishing a subsidiary that will produce and sell its product in a foreign country. As the potential returns on the investment will ultimately be booked in the domestic currency, the firm must consider the possibility of future changes in the exchange rate. Initially, the firm faces three choices: to invest immediately, not to invest at all, or to delay the investment (the option to wait) until a favourable future movement in the exchange rate. The option value of the latter choice is directly linked to the volatility of the exchange rate: the higher the volatility, the more valuable the option and thus the more likely that a risk-averse investor would choose to delay the investment. As a result, periods of high exchange rate volatility would be associated with decreases in FDI flows as risk-averse firms opt for postponing their investments abroad.

For a more detailed example, consider that a firm headquartered in the United Kingdom is deciding whether to expand its operating activities by establishing a subsidiary in Nigeria. The subsidiary will produce and sell locally while its operating profits will be repatriated back to

the UK. Suppose that the firm expects to make a profit of 1 million Naira from the subsidiary. Assuming a current exchange rate of 200Naira/GBP, this would mean GBP5000. Suppose now that, before the investment decision is finalised, the exchange rate moves to 400Naira/GBP. As a result, the projected profit from the subsidiary falls to GBP2500. The depreciation of the Naira translates into a fall in the expected return, denominated in pounds, from establishing the foreign subsidiary. Exchange rate volatility translates into uncertainty about the expected returns from FDI. This may induce a risk averse investor to postpone the investment in anticipation of a more favourable change in the exchange rate in the future. And such an anticipation is justified the more the observed volatility in the exchange rate.

The key prediction of the model is that the exchange rate volatility can have profound effects on FDI flows. Expectations about future movements in the exchange rate can affect the entry decision of multinationals to the point that excess volatility can discourage FDI in the host country. This intuition can explain the significant reduction in FDI inflows to the US in the early 1980's. As shown in Table 5, the US dollar appreciated against the currencies of its major trading partners during the first half of the 1980's. The concomitant decrease in FDI flows to the USA (see Figure 1) can be viewed as the result of foreign multinationals delaying their US investments in the face of a volatile exchange rate as they expect the appreciation of the US dollar to be followed by a corrective depreciation – which did occur by the end of 1980's.

Table 5: Cost of the US dollar to currency of major trading partners.

Year	German Mark	Japanese Yen	Pound Sterling
1979	100.9	96.7	109.7
1980	100.0	100.0	100.0
1981	124.1	97.5	114.7
1982	133.5	109.9	133.0
1983	140.5	105.2	153.4
1984	156.3	105.0	174.2
1985	169.8	110.9	188.3

Source: IMF Financial Statistics.

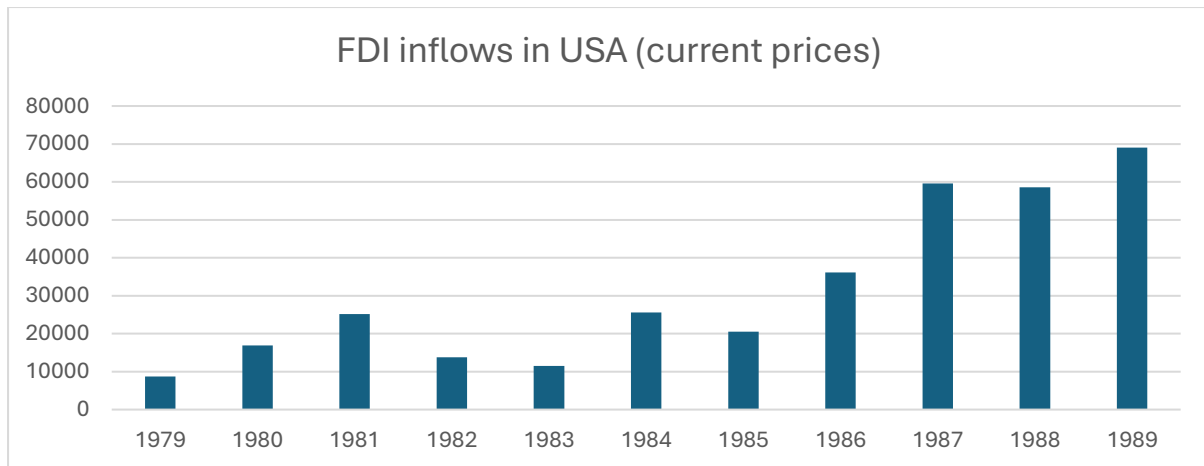


Figure 9: Data sourced from UNCTAD database.

The risk aversion mechanism is corroborated by studies such as:

Amuedo-Dorantes & Pozo (2001) which examined the effect of exchange rate volatility on FDI inflows into the United States for the period 1976-1998 using the OLS and GARCH estimation techniques. Findings from the study showed that an increase in exchange rate volatility causes a decrease in FDI inflows to the USA. The finding can be linked to the risk aversion argument which predicts that as exchange rate volatility increases, there would be a corresponding decrease in FDI inflows because an increase in exchange rate volatility lowers the certainty equivalent expected exchange rate.

Kiyota & Urata (2004) examined the impact of real exchange rate volatility on Japanese outward FDI for the period 1990-2000 using the feasible general least square technique with both aggregated and disaggregated industry data. Findings from the study showed that the real exchange rate volatility discourages Japanese outward FDI flows. This is because potential Japanese investors regard higher exchange rate volatility as a sign of increased risk rather than increased flexibility of the exchange rate. Thus, since FDI is a type of investment that involves large sunk cost, risk-averse investors are discouraged to invest in the presence of higher exchange rate volatility.

De Vita & Abbott (2007) examined the impact of real exchange rate volatility on FDI inflows into the UK for the period 1975-2001 using a general method of moments (GMM) panel estimation technique and a disaggregated sectoral data. Findings from the study showed that exchange rate volatility has a negative impact on FDI flows into the UK irrespective of the sector of destination of the investment. The proxy used for exchange rate volatility models

expectations in volatility through a series which is conditioned on past behaviour of investors and as such it differs from a scenario where exchange rate volatility is measured using the investors actual forecast which could produce different results.

However, there is evidence for the positive effect of exchange rate volatility on FDI INFLOWS. For instance, Chowdhury & Wheeler (2008) examined the impact of exchange rate volatility shocks on FDI inflows in Canada, Japan, United Kingdom, and the USA for the period 1972-2005 using the vector autoregression model estimation technique. Findings from the study showed that exchange rate volatility has a positive impact on FDI inflows in Canada, Japan, and USA.

Similarly, Dhakal, Nag, Pradhan, & Upadhyaya (2010) examined the effect of exchange rate volatility on FDI inflows in China, Indonesia, Malaysia, Philippines, South Korea, and Thailand for the period 1974-2005 using the error correction and GARCH model. Findings from the study showed that exchange rate volatility has a positive effect on FDI inflows in all the countries examined. The study attributes its findings to the theoretical predictions of risk neutral investors suggesting that a higher price volatility raises the expected profitability of capital which in turn increases the level of investment.

By contrast, the relationship has been found to be negative for low-income countries in sub-Saharan Africa. For instance, Suliman, Elmawazini, & Shariff (2015) examined the relationship between exchange rate volatility and FDI inflows for low-income countries in Sub-Saharan Africa (SSA) for the period 1980-2003 using a two stage least square method. Findings from the study showed that an increase in exchange rate volatility decreases FDI inflows. The findings can be justified by the decision made by Sub-Saharan African countries to peg their currency to the US dollar which may reduce flexibility by controlling the nominal price of exchange rate adjustments, but the exchange rate volatility leads to an overvaluation of the Sub-Saharan countries currencies thus making it less attractive to risk averse foreign investors.

Export Substitution theory

As in Cushman (1985), also Goldberg & Kolstad (1995) link FDI flows to the value of an option for risk-averse firms as they respond to the volatility of the exchange rate. However, the option now is for multinational firms to substitute international trade flows, in particular exports to foreign countries, for activities (production and sales) in the foreign country.

The key premise of the Goldberg and Kolstad mechanism is that, if short term exchange rate volatility is to influence FDI flows, it would result in an increase in the share of production activities located in the FDI host country. The intuition is that foreign exchange volatility impedes international trade by rendering the proceeds from it riskier. Specifically, a depreciation of the domestic currency may reduce the profits from domestic exports as aggregate demand in the foreign country shrinks. As a result, a multinational firm may find it more profitable to produce and sell locally in the foreign country, by means of establishing a foreign subsidiary.

Consider, for instance, that a German car manufacturer has a production facility in Poland where it makes cars, at cost of Euro 15K per car, for export to US market. We will assume that the US car market is perfectly competitive; the typical car sells for USD 20K, and the typical firm operates at a 10% profit margin. The current exchange rate is 1.2USD/Euro so that the Polish facility operates at a profit of Euro 1.7K per car (a profit margin of 11.3%). However, if the exchange rate were to fall to 1.1USD/Euro, the firm would be able to increase its profits to Euro 3.2K per car (a profit margin of 21.3%) while, if the exchange rate were to increase to 1.3USD/Euro, the firm would see its profit shrink to Euro 385 per car (a profit margin of 2.6%). In the latter case, the firm would have an incentive to move its production facility from Poland to the US.

The key prediction of the Goldberg and Kolstad model is that FDI flows ought to be higher towards countries experiencing higher exchange rate volatility. Importantly, however, this takes place without necessarily depressing overall economic activity or domestic investment activity. The prediction agrees with the observed evolution of the bilateral FDI flows between the US, on the one hand, and Japan, Canada, and the United Kingdom, on the other, during the 1980's and 1990's. This period of significant exchange rate volatility was associated with a marked increase in the share of world investment activity occurring in the US.

The export substitution model is corroborated by studies such as Goldeberg & Kolstad (1995) which examined if exchange rate variability influences the pattern of two-way bilateral FDI flows using quarterly USA bilateral FDI flows with the United Kingdom, Japan, and Canada for the period 1978 to 1991 using OLS regressions. The findings shown that exchange rate volatility causes an increase in the share of investment activity and productive capacity located abroad in host countries. This is linked to the assumptions that utility is negatively related to variations in profit and that the adjustment of factors of production cannot be done after the

realization of shocks to exchange rate. Thus, firms are prompted to diversify by transferring some of their productive capacity abroad to guard against exposures to currency risk.

Foad (2005) examined the interactions between exchange rate volatility, foreign affiliate exports, and FDI inflows using data on the operations of foreign affiliates of US multinationals from 1983 to 2002 for seventeen European countries. The findings show that after accounting for foreign exports affiliate, exchange rate volatility between the host country and USA has a negative effect on the level of FDI. This finding is linked to the decision of multinationals to serve the receiving country through a local production plant rather than exporting to the receiving country to protect against currency risk.

Itagaki (1981) investigates the impact of exchange rate volatility and international taxation on the activities of a monopolistic multinational firm engaging in international trade and production. The findings show that when the multinational is faced with a positive exposure to exchange rate volatility, the multinational decides to invest abroad in the form of foreign processing facilities to reduce its exposure to exchange rate risk.

2.2.3 Theory linking exchange rate regimes and FDI inflows

Production Flexibility theory

During the 1980s, the international economy was characterized by a proliferation of exchange rate systems coupled with a growing integration of capital markets and an increasing importance of FDI flows. As multinationals began to diversify their productive capacity by setting up foreign subsidiaries, the issue of how different exchange rate regimes may influence domestic and foreign direct investment became increasingly relevant. This is the backdrop of the analysis in Aizenman (1992), which investigates how firms may allocate their productive capacity between domestic and foreign facilities in the face of real and monetary macroeconomic shocks under fixed versus flexible exchange rate regimes.

The model considers a two-country world with differentiated commodities, and output being subject to country-specific productivity and monetary shocks. The labour supply is fixed in each country. Investment capital can move freely between the two countries; yet the decision to invest in production plants is location- and product-specific as well as irreversible: it takes place before the realization of shocks. As a result, the domestic firms in each country must decide *ex ante* whether to operate as a multinational. The latter set-up is more costly than

operating in only the home country but offers the option to reallocate employment and production between the two countries in response to the country-specific shocks – to take advantage of the more efficient or cheaper plants.

The key insight is that establishing subsidiaries abroad can be viewed as a diversification strategy: it allows risk-neutral firms to stabilize total output, thereby maximizing expected profits, in the face of fundamental uncertainty with respect to the costs of production. The key result is that, under either fixed or flexible exchange rate regimes, the attractiveness of diversification increases with the fluctuations of the underlying shocks – both for real and monetary shocks. The exchange-rate regime itself can influence the extent to which domestic and foreign direct investment increase with uncertainty. In the case of monetary shocks, fixed exchange rates are better in insulating real wages thereby leading to lower fluctuations in production costs and thus higher expected profits. In the case of productivity shocks, it is flexible exchange rates that foster lower fluctuations in employment and production, yet this is now associated with lower expected profits. Overall, a fixed exchange rate regime is more conducive to both domestic and foreign direct investment. This is since fixed exchange rates insulate real wages and production from monetary shocks and leads to higher expected profitability.

The production flexibility mechanism is corroborated by studies such as Abbott, Cushman & De Vita (2012) which examined the effect of exchange rate regimes on FDI inflows to a panel of 70 developing countries for the period 1985-2004 using the system generalized methods of moments estimation technique. The finding shows that fixed and intermediate de facto exchange rate regimes are significantly better at attracting FDI inflows than the de facto floating exchange rate regimes in developing countries. The finding is linked to the argument that fixed exchange rate regimes are better at insulating production from monetary shocks and excess volatility which in turn leads to higher profitability for investors.

Ricci (2006) investigated the effects of exchange rate regimes (fixed versus flexible) on the choice made by firms as regard where to locate their production facility and on a country's specialization pattern. The study shows that exchange rate regimes are associated with different location incentives when monetary and exchange rate shocks arise in the presence of short-run price rigidities. The findings show that countries are more specialized under a flexible exchange rate regime than a fixed exchange rate regime. The findings imply that the pattern of

specialization for countries depends on the exchange rate regime adopted by the country and not uniquely defined by the trade model.

2.2.4 Theories linking financial development and foreign direct investment inflows.

In recent years, the world has been experiencing a process of global financial integration which brings together developing, emerging, and developed market economies, especially in terms of cross-border investment activities and capital flows. At the same time, most countries have decided to adopt freely floating exchange rate regimes and liberalizing their capital accounts to compete favourably in the international capital markets. However, the adverse effect of exchange rate fluctuations (movements and volatility) on the movement of international capital flows continues to be an issue for the developing and emerging countries.

In the case of developed countries, a critical factor rendering exchange rate fluctuations (movement and volatility) increasingly a non-priority issue is the rapid development of the financial markets for international capital flows: the introduction of new financial instruments and institutional structures which has enabled multinationals to significantly mitigate the impact of exchange rate volatility on their activities. As a result, many analysts have come to the conclusion that exchange rate fluctuations has little significant effect on economic activities in developed countries – even though it continued to effect adversely economic activity and growth in developing countries, especially those with low levels of financial development (Aghion, Bacchetta, Romain & Rogoff, 2006).

The significant increase in FDI flows, especially towards developing and emerging economies, and the crucial role of financial development in facilitating these investment activities brings to bear questions on the effect of financial development on FDI flows. The economics literature has been actively involved in investigating the effect of financial development on FDI flows, especially on how the underlying relationship may depend upon the level of financial development given that the latter varies markedly across developing as well as emerging economies. In what follows is an attempt to summarize the competing mechanisms the literature has put forward to explain the relationship between financial development and foreign direct investment.

Access to Finance theory

Desai, Foley, & Hines Jr (2004) examined the role local tax rates and local capital market conditions play on the choice of capital structure (i.e., the level and composition of borrowing), by foreign subsidiaries of multinational corporations. The key premise that, by offering better access terms to finance at least a fraction of the investment outlay locally, a more developed financial market in the host country – in conjunction with favourable taxation - can better facilitate risk diversification for foreign investors. The theory assumes that multinational corporations use internal and external capital markets while incorporating opportunity cost to reduce the cost of capital in the presence of financial frictions.

The model seeks to understand if and why multinationals use internal capital markets as a substitute for external finance particularly when external finance becomes too costly. It seeks to establish how financing choices are affected by strong or weak internal capital markets and how these capital markets are instrumental in minimizing tax, while providing alternative sources of finance particularly when external finance is considered too costly. The model seeks to measure the extent to which multinational affiliates alternate between external loan sources and loans requested from the parent companies.

The key prediction of the model is that financing of foreign subsidiaries is likely to be influenced significantly by local capital market conditions and local tax rates. Specifically, by reducing their borrowing costs, a more developed local financial market encourages multinationals to enter and establish subsidiaries, which in turn has the potential to raise the aggregate volume of multinational activity in the host country promoting thus FDI activity directly and overall economic activity indirectly. This also has the potential to increase the access of foreign investors to global capital markets.

The access to finance mechanism is corroborated by studies such as Desai, Foley, & Hines Jr (2004) which analysed the determinants of capital structures of US multinational foreign affiliates exploring how their internal capital market works using 3,700 multinational firms which operate through 30,000 affiliates in the years 1982, 1989, and 1994 respectively. The findings show that the affiliates increase internal borrowing as against the option of external borrowing due to adverse capital market conditions. This is linked to the capital market conditions reflected through shallow capital markets and weak creditor rights which makes the US multinational affiliates to rely more on borrowings from parent companies as against external borrowing.

Dellis (2018) examined the relationship between foreign direct investment and financial development with an objective to examine if a developed and deep financial system attracts foreign direct investment inflows in 39 advanced and emerging economies for the period 2005-2016 using a two-step generalized method of moments (GMM) estimator (system GMM approach). Findings from the study showed that the depth of domestic financial markets and ease of access to credit are significant determinants for FDI inflows as this causes an increase in FDI inflows. The findings can be explained by the paradox of finance hypothesis which argues that since multinational affiliates engage largely with domestic financial markets; the presence of an efficient and deep domestic financial system would attract FDI inflows.

Kaur, Yadav, & Gautam (2013) analysed the impact of financial development on FDI inflows with a focus on BRIC countries (Brazil, Russia, India, and China) for the period 1991-2010 using the panel data random and fixed effect models. Findings from the study showed that FDI inflows is positively affected by the size of stock market capitalization and size of the banking sector. The findings are justified on the basis that when FDI inflows are created through mergers and acquisitions, the development of the capital market becomes more important and given higher consideration by a foreign investor. In addition, a robust stock market aids the interaction between domestic and foreign markets and facilitates the removal of entry and exit barriers for potential and existing foreign investors which explains why the size of the stock market plays a significant role in attracting FDI inflows. The size of the banking sector also contributes significantly to attracting FDI inflows because Banks facilitate investment funds and aid in repatriation of foreign investors funds.

Agglomeration effect theory

Desbordes & Wei (2017) investigated the effect the level of financial development, both in the host as well as in the source country, can have on the FDI flows – especially with respect to FDI in the manufacturing sector. It is assumed that a higher level of financial development can induce the growth needed by the local manufacturing sector. This is expected to have a positive agglomeration effect on FDI inflows as foreign investors seek to explore the investment opportunities attached to a growing manufacturing sector in the host country.

The key premise of their mechanism is that the source country and host country financial development must be taken into consideration for FDI activities because this affects the relative volume of FDI flows in financially vulnerable sectors. Specifically, the higher the level of

financial development in the host country, the more positive a general agglomeration effect on inward FDI – a tendency for the manufacturing activity by foreign multinationals to be concentrated in a specific location rather than disperse across activities in different locations.

The key prediction of the mechanism is that the effect of financial development on FDI should be stronger in sectors that are more financially vulnerable. The growth of a local manufacturing sector in the host country will be aided by high levels of financial development.

The agglomeration effect is corroborated by studies such as Desbordes & Wei (2017) which investigated the effect of source and destination countries financial development on real manufacturing FDI projects in 83 source countries and 125 destination developed and developing countries for the period 2003-2006 using a Poisson fixed effects estimator (conditional maximum likelihood version) and the Fixed effects logit estimator. Findings from the study showed that both source and destination country financial development have a significant and positive effect on greenfield, expansion, and mergers and acquisition FDI inflows. The findings are linked to the growth of a local manufacturing sector which is aided by higher levels of financial development; thus, yielding a positive agglomeration effect.

Bobonis & Shatz (2007) investigated the effects of agglomeration economies on FDI levels using state-level data in the US for the period 1985-1999 using an Arellano-Bond dynamic panel data general method of moments estimator. Findings from the study shows that agglomeration externalities influence FDI levels agglomerated in a location. The findings are linked to the agglomeration effect on state levels of real investments facilitated by foreign affiliates.

Competition effect theory

A high level of financial development can increase the intensity of local competition among multinationals and local firms. This motivated Bilir, Chor, & Manova (2013) to examine how multinationals respond to the level of financial development in the host country, as well as how firms respond to differences across industries as regards their dependence on finance. The competition effect primarily assumes that foreign affiliates of multinationals existing in a host country don't necessarily depend on financing in the host country. Particularly, multinationals that have a developed financial sector in their country of origin.

The mechanism demonstrates how frictions in financial markets of the host country affect the entry of multinationals seeking to establish subsidiaries. The key insight of the model is that local financial development, by promoting the growth of the local manufacturing sector and thus increasing the number of local firms, increases local competition to the point where firm profitability can fall significantly. This can make the country less attractive than before as destination for FDI by non-financially constrained multinationals. Another dimension to this is that if there are frictions in the credit market in the presence of improved financing conditions in the host country, this improved financing conditions in the host country would significantly encourage massive entry of domestic firms which have credit constraints. Thus, due to the massive influx of domestic firms, the local product market sees a surge in competition among firms (domestic and foreign). This sends a signal to the foreign investors to draw back on their investments in the host country. The foreign affiliates are then forced to strategize by reducing their sales in the host country while exploring the option of exporting their products to either the country-of-origin market or other available markets apart from the host country market.

The key prediction of this theory is that the development of the host country financial sector creates competition among domestic firms, and this affect the activity of multinationals present in the host country and by extension prevent potential multinationals seeking to invest in the host country. Domestic firms may crowd out affiliates of multinationals through a high level of competition for the local market if the domestic financial market undergoes development. However, in the absence of financial development in the local market, the multinationals may crowd out the local firms by using the advantage of their home country financial development.

The competition effect mechanism is corroborated by studies such as Bilir, Chor, & Manova (2013) which evaluated the effect of host country financial development on the global activities of multinationals using US firm-level data for the period 1989-2009. Findings from the study showed that both at the aggregate and affiliate level, the share of local sales out of the total affiliate sales reduces as financial development increases in the host country while there is an increase in the share of sales in the US and other affiliated countries. This finding is linked to the host country financial development which causes an increase in the entry of multinationals whilst generating a competition effect which decreases sales in the host country market. The competition effect reduces the revenue of affiliates in the host country due to increased entry by domestic firms premised on an increase in financial development which makes it easier for the local firms to access funds and compete with the multinationals. This explains why the competition effect can make a country less attractive for multinationals.

2.2.5 Theory linking exchange rate and financial development

The link between exchange rate and financial development can be explained using the wealth effect hypothesis put forward by Froot and Stein (1991) which studies the sale of a domestic asset under free but imperfect capital markets. Both foreign and domestic investors can borrow money from the international capital markets at the same terms in the domestic currency. However, to ensure that borrowers share some of the idiosyncratic risk of the asset, lenders require a loan to value ratio that is strictly less than one; thus, investors must commit some of their own wealth in the purchase of the asset. And this requirement means that changes in the exchange rate can significantly alter the relative purchasing power of foreign and domestic investors - a depreciation of the domestic currency translates to an increase in the wealth position of a foreign investor (denominated in domestic currency) while an appreciation of the domestic currency is advantageous for the domestic investor.

Financial development plays a significant role in reducing the risk attached to the instability of exchange rates and offers better hedging facilities to foreign investors. Therefore, it is assumed that a developed financial system provides better hedging facilities to solve the problem of asymmetric information and therefore encourages FDI inflows. Developed financial markets provide lower borrowing cost unlike underdeveloped financial markets. Therefore, it is assumed that if a multinational operates in a country that has higher financial development, then the need to hedge against higher exchange rate instability is reduced and the need to request for loans from the parent company by the subsidiaries is also reduced as there is higher liquidity in the host country.

The mechanism predicts that the relationship between exchange rate movements and FDI inflows depends on the tightness of credit constraints in the financial market and institutions of a country. Thus, if there are credit constraints because of imperfect information (asymmetric information) in the global markets and a potential FDI host country experiences an exchange rate depreciation, it follows therefore that the potential foreign investor sees an increase in his relative wealth position; therefore, loosening their credit constraints. On the contrary, an exchange rate depreciation in the host country may not cause an increase in FDI inflows if there is an increase in troubled banks in the FDI source country. This was the experience with FDI outflows from Japan in the 90's to other countries as FDI outflows reduced due to the troubled banks experience in Japan in the 90's.

The relationship between exchange rate and financial development is corroborated by studies such as:

Ubesie (2016) which examined the effect of exchange rate movements on the financial depth of the Nigerian economy which is one of the broader areas of financial development for the period 1985-2015 using the ordinary least square multiple regression. Findings from the study showed that exchange rate movements have a negative effect on the depth of the Nigerian financial sector.

Hajilee & Al Nasser (2014) examined the effect of exchange rate volatility on stock market capitalization as one of the most important indicators of financial development for 12 emerging economies for the period 1980-2010 using the error correction model. Findings from the study showed that exchange rate volatility has a negative effect on stock market development in China, Mexico, Pakistan, and Venezuela while in Philippines and South Africa, exchange rate volatility has a positive effect on stock market development. The findings can be explained by whether the firms in each of the countries either focus mainly on importation or exportation. The positive effect of exchange rate volatility on stock market capitalization would exist if a currency depreciation made domestic firms more competitive, thus increasing their export activities which in turn causes an increase in stock prices. On the contrary, the negative effect of exchange rate volatility on stock market capitalization would occur if the domestic firms depend heavily on the importation of equipment's needed to produce goods and services as this would cause an increase in production cost and reduced profits. This would make the stock market experience a reduction in stock prices and reduced participation in the stock market.

Abanikanda (2022) examined the effect of exchange rate volatility on depth and efficiency of the financial sector in Nigeria for the period 1986-2018 using the autoregressive distributed lag technique. Findings from the study showed that exchange rate volatility has a negative effect on the efficiency and depth of financial institutions. The finding can be explained by the uncertainty of exchange rate which serves as a disincentive to invest in the stock market, and this worsens as the expectations about a continuous volatility of exchange rate would continue to discourage investors from investing in the stock market.

Raifu & Farayibi (2022) examined the effect of exchange rate volatility on financial development in Nigeria and South Africa for the period 1970-2017 using the autoregressive distributed lag technique. Findings from the study showed that exchange rate volatility has a negative effect on financial development in Nigeria while it has a positive effect on financial

development in South Africa. The difference in results is justified by the difference in financial development between both countries in terms of the level of financial development in both countries which in turn determines the financial sector resilience to exchange rate volatility. The level of financial development in South Africa is higher than Nigeria; Thus, the financial sector in South Africa has a stronger resilience to the effects of exchange rate volatility. On the contrary, because Nigeria has a lower level of financial development, the financial sector in Nigeria has a weak resilience to the effects of exchange rate volatility.

Nafiseh, Mosayeb & Seyed (2020) examined the impact of exchange rate volatility on Banks performance using selected financial development indicators which include capital ratio of Banks, loan to deposit ratio, ratio of lending to total bank deposits in 14 Iranian Banks for the period 2007-2017 using the panel random effect model regressions. Findings from the study showed that exchange rate volatility has a negative effect on Banks capital return ratio. On the contrary, exchange rate volatility has a positive effect on the loan to deposit ratio, and a positive effect on the ratio of lending to total bank deposits.

2.2.6 Identified Gap in literature

A review of literature shows that different empirical studies fit into two or more competing theoretical models and each of the theoretical models have different policy implications in line with the intuition of each model. For instance, Kiyota and Urata (2004) extend the framework of the wealth effect model by incorporating the impacts of the failures of law of one price between different markets on real exchange rate volatility. Yet, their analytical framework isn't different from that of the wealth effect model with specific modifications to examine the effect of exchange rate on FDI flows. The explanatory variables included in the regression equation include real exchange rate (depreciation or appreciation) to capture the wealth effect model and real exchange rate volatility to capture the risk aversion model. A situational problem arises as both models have different policy implications on FDI inflows. For the risk aversion model, a more stable exchange rate is needed to attract and increase FDI inflows whereas on the contrary, the wealth effect model favours a continuous depreciation of the exchange rate to encourage FDI inflows.

The same objections evident above can be raised also for the approach in Amuedo-Dorantes & Pozo (2001). Tagaki and Shi (2011) investigate the impact of exchange rate movements on FDI flows borrowing heavily from the wealth effect model; while also accounting for the effect of

expected changes in the exchange rate on the expected returns of FDI which is a premise that stems from the risk-aversion model. The key explanatory variables are the nominal and real exchange rate which captures the wealth effect model while the effect of expected changes in real exchange rate is captured as exchange rate volatility and exchange rate skewness.

Buch and Kleinert (2006) test two different hypotheses for the relation between exchange rate changes and FDI flows, capital versus goods' market frictions. The theoretical justification for frictions in the capital markets rests on the wealth effect model whereas that for frictions in the goods market stems from the firm-specific assets model. Included in the regressions are leverage and monitoring costs which are used for proxies to capture the frictions in the capital markets while the share of home sourced inputs and share of output sold at home are used as proxies to capture the frictions in the goods market.

The observations made above are particularly related to empirical studies from developed countries. However, empirical studies originating from developing countries particularly with respect to Nigeria have clearly focused on just empirical analysis without reviewing the fundamental theoretical mechanisms that seeks to explain the relationship among the variables of interest. The empirical literature from Nigeria lacks a comprehensive review of the various theoretical mechanisms as discussed extensively in this current study.

Secondly, the empirical literature is mixed with various findings as regards the relationship between foreign direct investment and exchange rate on one hand, foreign direct investment and financial development on another hand, financial development, and exchange rate. The empirical literature has mixed findings without a consensus as regards the relationship among the variables of interest and this cuts across a cross-section of different countries. For instance, in examining the relationship between exchange rate levels and FDI, studies such as Dewenter (1995) examined if exchange rate movements drive FDI in the US with the objective of exploring the relationship between the value of the US dollar and prices of cross-border acquisitions for the period 1975-1989 using the OLS regression. Findings from the study showed that a depreciation of the US dollar causes an increase of FDI inflows in the USA. Mensah, Bokpin, & Ofori-Hene (2015) examined the effect of exchange rate movements on FDI inflows in Ghana for the period 1990-2012 using a robust regression and bootstrap method. Findings from the study showed that a depreciation of the Ghanaian currency (cedis) increases FDI inflows into Ghana. Applying the auto-regressive distributed lag and error correction mechanism within the framework of dynamic OLS, Chikwue (2019) examined the effect of

exchange rate movements on FDI inflows in Nigeria for the period 1980-2017. Findings from the study shows that a depreciation of the Nigerian currency (naira) leads to an increase in FDI inflows.

On the contrary, Takagi & Shi (2011) examined the impact of exchange rate movements on the volume of Japanese FDI flows towards nine Asian countries for the period 1987-2008 using the general least square (GLS) estimation technique. Findings from the study showed that a depreciation of the Japanese yen against the currency of the selected host countries caused a reduction in Japanese FDI flows to the host countries. Similarly, Tan, Xu, & Gashaw (2021) examined the impact of exchange rate movements on FDI inflows in China for the period 1985-2019 using the vector error-correction model. Findings from the study showed that a continuous appreciation of the Chinese currency to the US dollar discourages FDI inflows into China. Lily, Kogid, Mulok, Lim, & Asid (2014) examined the relationship between exchange rate movements and FDI inflows in Malaysia, Philippines, Thailand, and Singapore for the period 1971-2011 using the ARDL bounds model. Findings from the study showed that in the case of Philippines, Malaysia, and Singapore, a currency appreciation in each of these countries has a positive effect on FDI inflows.

Yet, still on the same subject matter, another branch of the empirical literature establishes that exchange rate movements do not have a significant effect on FDI inflows. For instance, De Vita & Abbott (2007) examined the impact of real exchange rate movements on FDI inflows into the UK for the period 1975-2001 using a general method of moments (GMM) panel estimation technique and a disaggregated sectoral data. Findings from the study showed that real exchange rate movements do not have a significant effect on FDI inflows into the UK. Similarly, Polat & Payaslioglu (2015) examined the impact of real exchange rate levels on FDI inflows to Turkey for the period 2004-2014 using a Markov switching model. Findings from the study showed that real exchange rate levels have no effect on FDI inflows to Turkey.

In examining the relationship between exchange rate volatility and FDI, studies such as Amuedo-Dorantes & Pozo (2001) examined the effect of exchange rate volatility on FDI inflows into the United States for the period 1976-1998 using the OLS and GARCH estimation techniques. Findings from the study showed that an increase in exchange rate volatility causes a decrease in FDI inflows to the USA. Similarly, Kiyota & Urata (2004) examined the impact of real exchange rate volatility on FDI inflows to Japan for the period 1990-2000 using the feasible general least square technique with both aggregated and disaggregated industry data.

Findings from the study showed that exchange rate volatility discourages FDI inflows into Japan. De Vita & Abbott (2007) examined the impact of real exchange rate volatility on FDI inflows into the UK for the period 1975-2001 using a general method of moments (GMM) panel estimation technique and a disaggregated sectoral data. Findings from the study showed that exchange rate volatility has a negative impact on FDI flows into the UK irrespective of the sector of destination of the investment. Durairaj (2010) examined the nexus between real exchange rate volatility and FDI inflows to India for the period 1990-2008 using the vector error correction model, and GARCH. Findings from the study showed that a decrease in real exchange rate volatility causes an increase in FDI inflows.

On the contrary, Chowdhury & Wheeler (2008) examined the impact of exchange rate volatility shocks on FDI inflows in Canada, Japan, United Kingdom, and the USA for the period 1972-2005 using the vector autoregression model estimation technique. Findings from the study showed that to the extent that shocks to exchange rate volatility have an impact on FDI, the impact is positive in Canada, Japan, and USA. Dhakal, Nag, Pradhan, & Upadhyaya (2010) examined the effect of exchange rate volatility on FDI inflows in China, Indonesia, Malaysia, Philippines, South Korea, and Thailand for the period 1974-2005 using the error correction and GARCH model. Findings from the study showed that exchange rate volatility has a positive effect on FDI inflows in all the countries examined. Havi (2021) examined the impact of exchange rate volatility on FDI inflows in Ghana for the period 1970-2018 using a dynamic ordinary least square method. Findings from the study showed that an increase in real exchange rate volatility is associated with increased FDI inflows in Ghana.

Yet still on the same subject matter, another branch of the empirical literature argues that there is no relationship between exchange rate volatility and FDI flows. Studies such as Polat & Payaslioglu (2015) examined the impact of real exchange rate volatility on FDI inflows to Turkey for the period 2004-2014 using the Markov switching model and GARCH. Findings from the study showed that real exchange rate volatility has no effect on FDI inflows to Turkey. Uzoma-Nwosu & Orekoya (2019) examined the short and long run relationship between exchange rate volatility and FDI inflows in Nigeria for the period 1980-2017 using the vector error correction model and GARCH model. Findings from the study showed that exchange rate volatility has no relationship with FDI inflows in Nigeria.

In examining the relationship between FDI and financial development, some studies examined the effect of financial development on foreign direct investment. Studies such as Dellis (2018) investigated the relationship between foreign direct investment and financial development in 39 advanced and emerging economies for the period 2005-2016 using a two-step generalized method of moments estimator (system GMM approach). Findings from the study showed that the depth of domestic financial markets and ease of access to credit are significant determinants for FDI inflows as this causes an increase in FDI inflows.

Similarly, Kaur, Yadav, & Gautam (2013) analysed the impact of financial development on FDI inflows with a focus on BRIC countries (Brazil, Russia, India, and China) for the period 1991-2010 using the panel data random and fixed effect models. Findings from the study showed that FDI inflows is positively affected by the size of stock market capitalization and size of the banking sector whilst on the contrary, an increase in Bank domestic credit to the private sector has a negative effect on FDI inflows to BRIC countries.

Using a different approach but with a similar objective, Desbordes & Wei (2017) investigated the effect of source and destination countries financial development on real manufacturing FDI projects in 83 source countries and 125 destination developed and developing countries for the period 2003-2006 using a Poisson fixed effects estimator (conditional maximum likelihood version) and the Fixed effects logit estimator. Findings from the study showed that both source and destination country financial development have a significant and positive effect on greenfield, expansion, and mergers and acquisition FDI inflows.

On the contrary, the following studies examined the effect of foreign direct investment on financial development. Gupta & Muruko-Jaezuruka (2020) investigated the impact of foreign direct investment inflows on financial development in Namibia for the period 1990-2017 using the error correction model. Findings from the study showed that there is a positive and significant relationship between foreign direct investment inflows and financial development as an increase in FDI inflows yields an increase in financial development. Adaramola & Obisesan (2015) examined the impact of foreign direct investment inflows on financial development (capital market development) in Nigeria for the period 1970-2010 using the ordinary least square estimator. Findings from the study showed that foreign direct investment has a significant and positive impact on market capitalization in Nigeria. Pham, Gan, & Hu (2022) investigated the effect of FDI inflows on financial development in 30 Asian developing countries for the period 1986-2019 using the system generalized method of moments estimator.

Findings from the study showed that an increase in FDI inflows has a positive effect on the performance of Banks and stock markets positively.

Thirdly, a review of the empirical studies on the relationship among exchange rate, FDI flows, and financial development shows that the focus has been on examining either the relationship between exchange rate and FDI flows, FDI flows and financial development, exchange rate and financial development. A key gap identified from the literature is the absence of studies that seek to examine the relationship among exchange rate movements, foreign direct investment and financial development making it difficult to ascertain how the variables interact with each other and the direction of causality among the variables.

The empirical literature review shows that previous studies have either examined the direction of causality between foreign direct investment and exchange rate such as Tan & Xu (2021), Vergil & Cestepe (2007), Aribatise & Adeyemi (2019), Akinlo & Onatunji (2021), Osigwe & Uzonwanne (2015) while other studies have examined the direction of causality between foreign direct investment and financial development such as Pham, Gan, & Hu (2022), Soumare & Tchana Tchana (2014), Zakaria (2007), Pokou (2020), Keita, Yu, & Moshoeshoe (2022). However, to the best of my knowledge, no study is yet to examine the direction of causality among foreign direct investment, exchange rate and financial development in Nigeria.

It becomes imperative to examine this relationship because these variables are interconnected and as pointed out by Aghion et al (2009); a developed financial sector provides better hedging facilities to solve the problem of asymmetric information and therefore encourages capital inflows. The availability of hedging facilities in any economy is dependent on the level of financial development even as foreign investors are interested in hedging facilities which can help mitigate the uncertainty attached to exchange rate. The empirical literature is silent as regards how the three variables interact with each other particularly with respect to emerging and developing countries. Although few studies have attempted to examine the relationship among these variables, however, the approach adopted in these studies is different from what this current study intends to achieve. For instance, Lamouchi & Zouari (2013) examined the relationship between financial development and capital flows and the effect of both on real exchange rate movements for 38 developed and developing countries.

Khraiche & Gaudette (2013) examined the effect of exchange rate volatility on FDI inflows while considering the role played by financial development for 39 emerging economies. Jehan & Hamid (2017) examined the relationship between exchange rate volatility and capital inflows

and the role played by financial development for 115 developing countries. Coletta (2018) examined the relationship between real exchange rate movements and sectoral FDI inflows while incorporating the role of financial development for 66 developing and developed economies. From the above, it clearly shows that there remains a gap in our understanding of the relationship among FDI inflows, exchange rate movement, and financial development, especially with respect to the causal relationship among the three variables.

Previous studies have established a relationship either between exchange rate (movements and volatility) and FDI inflows, FDI inflows and financial development, exchange rate and financial development. However, the presence of a relationship among these variables does not necessarily imply causality as the direction of causality among these variables has to be tested empirically using the appropriate methodology.

The relationship among these variables varies from one country to another and it becomes more important to examine this relationship as emerging and developing markets are beginning to play more important roles in the international trade system. This gap is to be filled by this study which seeks to examine how these variables interact with one another using Nigeria as a case study. The findings from this study will help to shed light on the dynamic relationship which exists among FDI inflows, exchange rate movement and financial development in Nigeria.

Research Question

What is the relationship and direction of causality among exchange rate movement, FDI inflows, and financial development in Nigeria?

Research Objective

To examine the relationship and direction of causality among exchange rate movement, FDI inflows, and financial development in Nigeria.

2.2.7 Link between the literature review and the empirical analysis carried out

Several theoretical mechanisms have been reviewed in the literature giving a broad perspective of the interaction among FDI inflows, exchange rate, and financial development. In the case of Nigeria, the effect of exchange rate movement and exchange rate volatility on FDI inflows really matters for Nigeria considering how exchange rate movement and volatility have influenced economic activities in Nigeria. More importantly, in recent times, the issue of exchange rate movement and exchange rate volatility has taken a centre stage in the economic landscape of Nigeria following the floating of the Nigerian currency against the US dollar in

2023 premised on deliberate economic reforms needed to reposition the Nigerian economy. The aftermath of this policy implementation has led to the exit of several multinationals from the Nigerian economy citing the instability of the exchange rate and other negative macroeconomic conditions as the reasons for their exit.

Previous studies in Nigeria have focused on the effect of exchange rate movement on FDI inflows, or the effect of exchange rate volatility on FDI inflows. However, the empirical focus of this study is different, which is to examine the relationship among exchange rate movement, FDI inflows and financial development in Nigeria.

The testable theories that are applicable and fit into the Nigerian context are the wealth effect theory and the risk aversion theory. However, this study would focus on the wealth effect theory which captures the relationship between exchange rate movements and FDI inflows while incorporating financial development. This is because of data limitations which makes it difficult to empirically examine the risk aversion theory. The available data for this study fits into the primary objective of this study which would focus on examining the relationship among exchange rate movement, FDI inflows, and financial development using Nigeria as a case study.

Previous studies in Nigeria have only focused on the variables in pairs i.e. exchange rate and FDI, FDI and financial development, exchange rate and financial development using bi-variate models. The approach of this study is different as it seeks to examine the three variables simultaneously which requires a tri-variate model. Therefore, this necessitates the use of a multivariate modelling technique (VAR) to capture the objective of this study.

2.3 Methodological review

The methodological review shows that several empirical methodologies have been adopted in literature with different findings. Therefore, in what follows is an attempt to highlight the different methodologies adopted in the empirical literature along with a summary explaining each methodology vis-à-vis their pros and cons and a justification of why the methodology does not fit in for the purpose of this study.

The ordinary least square method (OLS): The OLS is a linear regression technique used to estimate the unknown parameters in an econometric model. The OLS method relies on minimizing the sum of squared residuals between the observed values of the dependent variable

(actual) and the predicted values from the model. The OLS methodology minimizes the sum of the squared residuals by finding the values of the coefficients that result in the smallest possible sum of the squared differences. The resulting line obtained from minimizing the sum of squared residuals is known as the regression line. The regression line represents the best fit for the data because the OLS method draws a line through the data points which minimizes the sum of the squared differences between the observed values and the corresponding fitted values. The difference between the actual value and the predicted value is known as residuals.

The OLS method is based on the following assumptions; linearity which implies that there must be a linear relationship between the independent and dependent variables, Homoscedasticity which implies that the variance of the residuals should be constant across all levels of the independent variables, Normality which implies that the errors should be normally distributed, and lastly there should be no multicollinearity which implies that the independent variables should not be highly correlated with each other. These assumptions must be met for the OLS method to be considered valid and unbiased. However, if these assumptions are violated, then OLS would produce biased and inconsistent estimates.

OLS has the following advantages: it is widely used for regression analysis because it is simple, easy to understand, and flexible to use. Secondly, OLS can be applied to various types of linear models and extended to non-linear models by using a maximum likelihood approach. Thirdly, OLS is the best linear unbiased estimator under the Gauss-Markov theorem which implies that OLS has the smallest variance among all the linear estimators that are unbiased. Despite the advantages of the OLS, the OLS has the following disadvantages: it is restricted by its assumptions such as the linearity and normality assumptions which may not hold in real world data. In such instances, the OLS produces biased and inconsistent estimates. Secondly, the OLS is sensitive to outliers and influential observations which can distort the OLS estimates and reduce their accuracy. The OLS method has been used by the following studies: Dewenter (1995), Froot & Stein (1991), Amuedo-Dorantes & Pozo (2001), Ubesie (2016).

Autoregressive distributed lag model (ARDL): ARDL model is a linear time series model in which both the dependent and independent variables are related contemporaneously and across lagged values. The ARDL model requires that the error terms should have no autocorrelation with one another. The variance and the mean must be constant throughout the model (no heteroscedasticity). The ARDL model is an OLS based model which is applicable

for both stationary and non-stationary time series which makes it suitable for time series that have a mixed order of integration.

The ARDL cointegration technique is preferable when the variables are of mixed orders i.e. $I(0)$, $I(1)$ or a combination of the both which is a major advantage of the ARDL model. Another advantage of the ARDL model is that it can be used for forecasting and estimating multiplier effects of regressors. The major disadvantage is that it is based on a single equation approach which restricts only one level-relationship among a given set of variables. The following studies have adopted the ARDL methodology: Lily et al (2014), Mandigma (2021), Wang (2013), Akinlo & Onatunji (2021).

Generalized least squares (GLS): the generalized least square technique is a generalization of the ordinary least square estimation technique which is suitable for fitting linear models that have the problem of heteroskedasticity or the problem of autocorrelation. When the problem of heteroskedasticity or autocorrelation is encountered in a data set, OLS becomes unsuitable for the estimation. Thus, an alternative to deal with these problems is to use the GLS estimation technique. This is because the GLS estimation technique allows for heteroskedasticity and autocorrelation to be in the error structure while making necessary adjustment in the estimated coefficient. The GLS estimation has the following advantages: it can be used to estimate a dataset that has unequal variance and a dataset that exhibits correlation among the error terms, the GLS is also preferred to the OLS because it can gain asymptotic efficiency over the OLS as the GLS estimator is unbiased and asymptotically normal. It has the following disadvantages: The disadvantage of the GLS estimator is that it is not suitable for dealing with multicollinearity or errors in variables. The following studies have adopted the GLS estimator: Takagi & Shi (2011)

Feasible general least square (FGLS): the FGLS method is used to estimate the coefficients of a multiple linear regression model and the covariance matrix in the presence of innovations that are non-spherical with an unknown covariance matrix. The FGLS estimator gives more efficient estimates than the ordinary least square regression method because it estimates the large error covariance matrix consistently in the presence of serial and cross-sectional correlations, and heteroskedasticity. The advantage of using the FGLS is that in the presence of heteroskedastic errors, the FGLS gives potential efficiency gains over the OLS. A major disadvantage is that if there is a misspecification of the heteroskedasticity errors, then the FGLS

gives inefficient estimates. The following studies have adopted the FGLS: Kiyota & Urata (2004)

Generalized method of moments (GMM): the generalized method of moments (GMM) is a statistical method that combines observed economic data with the information in population moment conditions to produce estimates of the unknown parameters of the economic model. It is a general method for estimating population parameters from a data sample. GMM does not require assumptions such as normality unlike the ordinary least square but rather GMM requires an assumed population condition which can be expressed in terms of moments. Thus, GMM requires a set moment conditions which are implied by assumption of the underlying econometric model. The GMM is particularly useful when the number of moment conditions exceeds the number of parameters. More importantly using more moments than parameters to be estimated maximises the information available to the estimation process.

The GMM has the following advantages: it can overcome the computational complexities associated with the maximum likelihood estimator, it is very useful to solve complex economic models, the GMM panel data model can provide consistent results in the presence of different sources of endogeneity, the GMM gives more efficient estimation with the ability to include time invariant regressors. The following studies have adopted the GMM: De Vita & Abbott (2007), Pham, Gau & Hu (2022).

Panel data fixed effects model: the fixed effect model or estimator uses panel data to control for omitted variables which vary across individuals but remain constant over time. The rationale behind the fixed effects model is that the characteristics of an individual can affect the predictor variables. Thus, there is a need to control for this effect in the regression model. The assumptions of the fixed effect model include that the model parameters of a fixed effect model are fixed and not random. The fixed effects model assumes that the individual-specific effects are correlated with the independent variables. It assumes that the unobserved characteristics of individuals that are correlated with the regressors do not vary over time. It also assumes that the omitted variable is correlated with included regressors. The advantage of using a fixed effects model include that it allows us to control for all time invariant omitted variables which can help to correct the omitted variable bias and give more consistent estimates. A disadvantage of the fixed effects model is that it cannot work when lagged outcomes are included in the regression model. Thus, in a fixed effects model, a lagged dependent variable cannot be used as a regressor. Secondly, a fixed effect model does not allow

for time invariant variables to be included in the regression model as such variables would be absorbed by the intercept. Studies that have uses this methodology include Desbordes & Wei (2017), Bilir, Chor, & Manova (2019), Schmitz (2009).

Panel data random effects model: the random effect model is used when individual effects are strictly uncorrelated with the regressors; thus, necessitates the need to model the individual specific constant terms as randomly distributed across cross-sectional units drawn from a large population. The random effect model is particularly applied when differences across entities have a significant influence on the dependent variables. The random effects model assumes that individual-specific effects are uncorrelated with the independent variables. The advantage of using the random effect model is that it allows you to include time invariant variables in the regression model. The disadvantage of the random effects model is that some variables may be missing from the regression model thus causing the problem of omitted variable bias particularly because there is a need to specify the individual characteristics that may or may not influence the predictor variables. Studies that used this methodology include Gurler & Kara (2020), Kaur, Yadav, & Gautam (2013), Schmitz (2009).

Dynamic ordinary least square (DOLS): DOLS is an estimation technique which is applied when variables are cointegrated because it gives an efficient approach in estimating the coefficients of a cointegrating relationship. It provides more accurate and robust estimates when compared to the ordinary least square regression method especially when estimating the long-run relationship between variables. The advantage of using the DOLS include that it removes bias in the coefficients which could be caused by serial correlation. It allows for a better specification of the dynamics in each model. It also corrects for regressor endogeneity by the inclusion of leads and lags of first differences of the regressors which makes the estimates more efficient. The following studies have adopted the dynamic OLS: Havi (2021)

Two stage least square regression (2SLS): the 2-stage least square regression is applied to estimate simultaneous equation models or systems of equations using a single equation approach which implies that each equation in the model can be estimated differently or one after the other. 2SLS makes use of instrumental variables that are uncorrelated with the error terms to compute estimated values of the problematic predictors for the first stage. For the second stage, it uses computed values to estimate a linear regression model of the dependent variable. Thus, the estimates of the two-stage model are optimal because the computed values are based on variables that are uncorrelated with the error terms. 2SLS assumes that there is a

linear relationship between the dependent variable and each independent variable. It also assumes that the variance of the distribution of the dependent variable should be constant for all values of the independent variable. An advantage of the 2SLS is that it solves the problem of endogeneity since the 2SLS assumes that the instrumental variable is correlated to the predictor but not with the error term. The 2SLS also makes it possible to combine multiple instrumental variables unlike the other instrumental variable estimators. A major disadvantage of the 2SLS occurs when exogenous instruments are weak (having a weak correlation with the endogenous variable). The following studies have adopted the two stage least square regression: Ogunleye (2005), Suliman, Elmawazini & Shariff (2015).

Error correction model (ECM): the ECM model is used to estimate variables that exhibit a long run relationship (a long-run common stochastic trend known as cointegration). The ECM allows for the estimation of the short-run and long-run effect of one time series variable on another time series variable and makes it possible to deal with non-stationary variables. The ECM model estimates the speed at which a dependent variable achieves the state of equilibrium subject to a change in the independent variables. The advantages of the ECM model include first; ECMs can eliminate trends among variables because ECMs are structured in terms of first differences, and this takes care of the spurious regression problem. Secondly, the disequilibrium error term in an ECM is a stationary variable defined by the presence of cointegration among the variables. This unique advantage of cointegration among the variables makes it possible for the adjustment process to take place which prevents the errors in the long-run relationship from increasing. The ECM also measures the correction from disequilibrium of the previous period. The major disadvantage of ECM is that it is not suitable if there is no long run relationship among the variables.

Chapter 3

Methodology

3.1 Estimation Technique

Vector autoregressive model (VAR)

The vector autoregressive model was developed by Sims (1980) as an estimation technique that can be used by macroeconomists to characterize the joint dynamic behaviour of a collection of variables which does not require strong restrictions like the type needed to identify underlying structural parameters. The VAR model has become a universal method of multivariate time series modelling used to examine the dynamic relationships that exist between variables that interact with each other. It is a natural extension of the univariate autoregressive model to dynamic multivariate time series. The structure of VAR models enables one to explain the values of endogenous variables from their past observed values. It often provides superior forecasts to those from univariate time series models and elaborate theory-based simultaneous equations models.

The VAR model has proven to be especially useful for describing the dynamic behaviour of economic and financial time series and for forecasting for which the VAR model proves to be accurate as it considers the history of the other variables included in the VAR. In addition to data description and forecasting, the VAR model is also used for structural inference and policy analysis. In structural analysis, certain assumptions about the causal structure of the data under investigation are imposed, and the resulting causal impacts of unexpected shocks or innovations to specified variables on the variables in the model are summarized. These causal impacts are usually summarized with impulse response functions and forecast error variance decompositions.

A VAR model can examine the dynamic relationships that exist between the variables as they interact with each other. In this regard, A major advantage of the VAR model over structural simultaneous models is that a VAR model doesn't require you to distinguish between endogenous and exogenous variables a priori, Sims (1980). A VAR model is established on a framework that allows for the modelling of endogenous variables in a multivariate setting. Thus, it differs from univariate models because VAR models allow feedback to occur between the variables in the model. The VAR model has advantage over the univariate time series models as it gives a systematic but flexible approach for capturing complex real-world

behaviours and better forecasting performance. A VAR model can be estimated for the following reasons: to establish causal relationships among variables of interest, to simulate shocks to the system and trace out the effects of shocks on the endogenous variables, to forecast macroeconomic and financial variables (decomposing shocks to the VAR system).

The VAR model is described in the equation below:

$$Y_t = A + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \dots + \beta_p Y_{t-p} + u_t$$

The VAR process models a $T \times K$ multivariate timeseries Y_t . In this case, K represents the number of variables (the number of single time series) and T represents the number of observations. K is the number of single time series while Y_t is a collection of the series. The number of lags ranges from 1 to p , where the lags are used as the predictors in the above equation, and the value of p represents the order of the system of equations. The beta values represent the coefficients of the lags of Y_t . The coefficients range from β_1 to β_p . The error term u_t represents the white noise or residuals. An illustration of the VAR model for two time series is shown in the equation below:

$$Y_{1,t} = A_1 + \beta_{11,1} Y_{1,t-1} + \beta_{12,1} Y_{2,t-1} + u_{1,t}$$

$$Y_{2,t} = A_2 + \beta_{21,1} Y_{1,t-1} + \beta_{22,1} Y_{2,t-1} + u_{2,t}$$

From the equation above, there are two time series namely, Y_1 and Y_2 . The equation captures the case of a single lag, however there can be more than one lag depending on the lag selection criteria. The objective of the VAR model above is to forecast and examine the dynamic relationship between the series Y_1 and Y_2 at time t . Therefore $Y_{1,t}$ is a function of the past values of $Y_1(Y_{1,t-1})$ and $Y_2(Y_{2,t-1})$. The same applies to $Y_{2,t}$; where $Y_{2,t}$ is a function of the past values of $Y_1(Y_{1,t-1})$ and $Y_2(Y_{2,t-1})$. This gives a VAR model advantage over the univariate autoregressive model for which the predictors or lags have influence on the dependent variable only and not vice versa. In the case of a VAR, it is different because a VAR is expressed as a multivariate model which allows for the variables to interact with each other and determine if they influence each other in the system.

Estimation procedure for a VAR

The first step is to test for stationarity of the variables. If the series are stationary, the model is forecasted by fitting a VAR to the data directly which implies estimating a VAR in levels. However, if the series are non-stationary, it is necessary to take the difference of the data in order to make it stationary before fitting a VAR model which implies estimating the VAR in differences. The second step is to select the number of lags (p) using the information criterion which include AIC, HQIC, SBIC, and FPE. AIC represents the Akaike information criterion, HQIC represents Hannan-Quinn information criterion, SBIC represents the Schwarz information criterion, FPE represents the final prediction error. Liew (2004) suggests that AIC and FPE are superior to the other criteria in the case of sample sizes below 60 because they minimize the chance of underestimation while maximizing the chance of recovering the true lag length. It should be noted that the FPE is not an information criterion, however it is included in the information criterion discussion because we select the lag length corresponding to the lowest value and in doing this it is important to minimize the prediction error. The AIC measures the discrepancy between the given model and the true model, which we expect to minimize. The SBIC and the HQIC can be interpreted similarly to the AIC.

The third step is to perform the cointegration test. In this case, the Johansen cointegration test is preferred for testing cointegration among the variables. The Johansen cointegration test permits more than one cointegrating relationship as well as it helps to avoid the issues created when errors are carried from one step to the next which makes it more applicable than the Engle granger cointegration test for multivariate analysis. In addition, the Johansen test treats every variable as endogenous variable, Wassell & Saunders (2008). In the absence of cointegration among the variables a VAR can be estimated. However, if the variables are cointegrated, then a vector error correction model is to be estimated.

The fourth step is to estimate the VAR model specified which is aimed at examining if the variables in the model influence each other subject to the condition that each time series in the VAR is modelled as a linear combination of the past values of itself and the past values of other time series variables included in the model.

The fifth step is to carry out a granger causality test to determine the direction of causality among the variables. In this case, the direction of causality can be unidirectional or bidirectional. A granger causality test measures the prediction of future values of a time series

using the past values of another time series. Thus, a granger causality is aimed at testing whether one variable can forecast another variable.

The sixth step is to carry out an impulse response function test. An impulse response is simply defined as how a system reacts while responding to external changes. An impulse response function describes the evolution of the reaction of a VAR model to a shock in one or more variables, Lutkepohl (2010). The impulse response is important because in a VAR model, all the variables depend on each other and as such, the individual coefficient estimates provide limited information as regards how the system reacts to a shock (Zivot & Wang, 2003). Therefore, there is a need to carry out an impulse response test because it provides a more detailed information about the dynamic behaviour of a VAR model. An impulse response is useful for evaluating economic policies because it helps to trace the transmission of a single shock within a system of equations.

Vector error correction model (VECM)

The vector error correction model is a restricted VAR (special form of VAR) which allows cointegration restrictions built into the specified model. It is designed for use with non-stationary series that are known to be cointegrated. The VECM specification restricts the long run behaviour of the endogenous variables to converge to their cointegrating relationships while it also allows for a wide range of short run dynamic relationships. The vector error correction model can be used to examine the dynamic behaviour of the relationship among endogenous variables and useful for forecasting multivariate time series data.

Therefore, if a time series is cointegrated, then the VAR framework needs to be modified so that there can be a consistent estimation of the relationships among the series. This modification gives rise to the vector error correction model. Adding error correction features to a multi-factor model known as the vector autoregressive model results in the vector error correction model which considers any cointegrating relationships among the variables. If there is cointegrating relationship among variables (the variables exhibit a long run relationship), which implies that the variables are related and can be combined linearly. Therefore, even if there are shocks in the short run which may affect movement in the individual series, they would converge in the long run. In addition, the cointegration term is known as the error correction term since the long run equilibrium deviation is corrected through a series of partial adjustments in the short run.

A vector error correction model is specified below:

$$\Delta Y_t = A + \sum_{i=1}^{k-1} \beta_1 \Delta Y_{t-i} + \sum_{j=1}^{k-1} \beta_2 \Delta Y_{t-j} + \dots + \sum_{p=1}^{k-1} \beta_p \Delta Y_{t-p} + \lambda i ECT_{t-1} + u_t$$

The VECM process models a T*K multivariate timeseries Y_t which is obtained by differencing a VAR. In this case, K represents the number of variables (the number of single time series) and T represents the number of observations. K is the number of single time series while ΔY_t is a collection of the series which is differenced to obtain a VECM. The number of lags ranges from 1 to p, where the lags are used as the predictors in the above equation, and the value of p represents the order of the system of equations. The beta values represent the coefficients of the differenced lags of Y_t . The coefficients range from β_1, β_2 to β_p . The λi represents the speed of adjustment parameter while the ECT_{t-1} (error correction term) contains the long run information to be derived from the long run cointegrating relationship. The error term u_t represents the white noise or residuals (stochastic error terms).

Estimation procedure for a Vector error correction model (VECM)

The first step is to select the number of lags (p) using the information criterion which include AIC, HQIC, SBIC, and FPE. AIC represents the Akaike information criterion, HQIC represents Hannan-Quinn information criterion, SBIC represents the Schwarz information criterion, FPE represents the final prediction error. Liew (2004) suggests that AIC and FPE are superior to the other criteria in the case of sample sizes below 60 because they minimize the chance of underestimation while maximizing the chance of recovering the true lag length.

It should be noted that the FPE is not an information criterion, however it is included in the information criterion discussion because we select the lag length corresponding to the lowest value and in doing this it is important to minimize the prediction error. The AIC measures the discrepancy between the given model and the true model, which we expect to minimize. The SBIC and the HQIC can be interpreted similarly to the AIC.

The second step is to perform the cointegration test. In this case, the Johansen cointegration test is preferred for testing cointegration among the variables because the Johansen cointegration test permits more than one cointegrating relationship as well as it helps to avoid the issues created when errors are carried from one step to the next which makes it more applicable than the Engle granger cointegration test for multivariate analysis. In addition, the Johansen test treats every variable as endogenous variable (Wassell & Saunders, 2008). In the

absence of cointegration among the variables a VAR can be estimated. However, if the variables are cointegrated, then a vector error correction model is to be estimated.

The third step is to estimate the vector error correction model which is aimed at examining if the variables in the model influence each other in the short and long run subject to the condition that each time series in the modified VAR is modelled as a linear combination of the past values of itself and the past values of other time series variables included in the model.

The fourth step is to carry out a granger causality test to determine the direction of causality among the variables. In this case, the direction of causality can be unidirectional or bidirectional. A granger causality test measures the prediction of future values of a time series using the past values of another time series. Thus, a granger causality is aimed at testing whether one variable can forecast another variable.

3.2 Model Specification

Model 1: To examine the dynamic relationship among foreign direct investment inflows, nominal exchange rate, and financial development.

$$\ln FDI_t = \sigma + \sum_{i=1}^k \beta_i \ln FDI_{t-i} + \sum_{j=1}^k \phi_j \ln EXR_{t-j} + \sum_{m=1}^k \gamma_m \ln FDV_{t-m} + u_{1t}$$

$$\ln EXR_t = \alpha + \sum_{i=1}^k \beta_i \ln FDI_{t-i} + \sum_{j=1}^k \phi_j \ln EXR_{t-j} + \sum_{m=1}^k \gamma_m \ln FDV_{t-m} + u_{1t}$$

$$\ln FDV_t = \delta + \sum_{i=1}^k \beta_i \ln FDI_{t-i} + \sum_{j=1}^k \phi_j \ln EXR_{t-j} + \sum_{m=1}^k \gamma_m \ln FDV_{t-m} + u_{1t}$$

Where:

$\ln FDI$ = logged form of FDI inflows

$\ln EXR$ = logged form of nominal effective exchange rate

$\ln FDV$ = logged form of financial development

$\beta_i \phi_j \gamma_m$ = short run dynamic coefficients of the model's adjustment long run equilibrium.

u_{1t} = residuals (stochastic error terms often called impulses, or innovations or shocks)

Model 2: To examine the dynamic relationship among FDI inflows, real effective exchange rate, and financial development.

$$\Delta \ln FDI_t = \sigma + \sum_{i=1}^{k-1} \beta_i \Delta \ln FDI_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EXR_{t-j} + \sum_{m=1}^{k-1} \gamma_m \Delta \ln FDV_{t-m} + \lambda_1 ECT_{t-1} + u_{1t}$$

$$\Delta \ln EXR_t = \alpha + \sum_{i=1}^{k-1} \beta_i \Delta \ln FDI_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EXR_{t-j} + \sum_{m=1}^{k-1} \gamma_m \Delta \ln FDV_{t-m} + \lambda_2 ECT_{t-1} + u_{1t}$$

$$\Delta \ln FDV_t = \delta + \sum_{i=1}^{k-1} \beta_i \Delta \ln FDI_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EXR_{t-j} + \sum_{m=1}^{k-1} \gamma_m \Delta \ln FDV_{t-m} + \lambda_3 ECT_{t-1} + u_{1t}$$

Where:

$\ln FDI$ = logged form of FDI inflows

$\ln EXR$ = logged form of real effective exchange rate

$\ln FDV$ = logged form of financial development

$K-1$ = lag length is reduced by 1

$\beta_i \phi_j \gamma_m \psi_p \eta_l$ = short run dynamic coefficients of the model's adjustment long run equilibrium.

λ_i = speed of adjustment parameter with a negative sign.

ECT_{t-1} = The error correction term contains the long run information derived from the long run cointegrating relationship.

u_{1t} = residuals (stochastic error terms often called impulses, or innovations or shocks)

Model 3: To examine the dynamic relationship among foreign direct investment inflows, nominal effective exchange rate, and financial development index.

$$\ln FDI_t = \sigma + \sum_{i=1}^k \beta_i \ln FDI_{t-i} + \sum_{j=1}^k \phi_j \ln EXR_{t-j} + \sum_{m=1}^k \gamma_m \ln FDVI_{t-m} + u_{1t}$$

$$\ln EXR_t = \alpha + \sum_{i=1}^k \beta_i \ln FDI_{t-i} + \sum_{j=1}^k \phi_j \ln EXR_{t-j} + \sum_{m=1}^k \gamma_m \ln FDVI_{t-m} + u_{1t}$$

$$\ln FDV_t = \delta + \sum_{i=1}^k \beta_i \ln FDI_{t-i} + \sum_{j=1}^k \phi_j \ln EXR_{t-j} + \sum_{m=1}^k \gamma_m \ln FDVI_{t-m} + u_{1t}$$

Where:

lnFDI = logged form of FDI inflows

lnEXR = logged form of nominal effective exchange rate

lnFDV = logged form of financial development index

$\beta_i \phi_j \gamma_m$ = short run dynamic coefficients of the model's adjustment long run equilibrium.

u_{1t} = residuals (stochastic error terms often called impulses, or innovations or shocks)

Model 4: To examine the dynamic relationship among foreign direct investment inflows, real effective exchange rate, and financial development index.

$$\Delta \ln FDI_t = \sigma + \sum_{i=1}^{k-1} \beta_i \Delta \ln FDI_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EXR_{t-j} + \sum_{m=1}^{k-1} \gamma_m \Delta \ln FDV_{t-m} + \lambda_1 ECT_{t-1} + u_{1t}$$

$$\Delta \ln EXR_t = \alpha + \sum_{i=1}^{k-1} \beta_i \Delta \ln FDI_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EXR_{t-j} + \sum_{m=1}^{k-1} \gamma_m \Delta \ln FDV_{t-m} + \lambda_2 ECT_{t-1} + u_{1t}$$

$$\Delta \ln FDV_t = \delta + \sum_{i=1}^{k-1} \beta_i \Delta \ln FDI_{t-i} + \sum_{j=1}^{k-1} \phi_j \Delta \ln EXR_{t-j} + \sum_{m=1}^{k-1} \gamma_m \Delta \ln FDV_{t-m} + \lambda_3 ECT_{t-1} + u_{1t}$$

Where:

lnFDI = logged form of FDI inflows

lnEXR = logged form of real effective exchange rate

lnFDV = logged form of financial development index

K-1= lag length is reduced by 1

$\beta_i \phi_j \gamma_m \psi_p \eta_l$ = short run dynamic coefficients of the model's adjustment long run equilibrium.

λ_i = speed of adjustment parameter with a negative sign.

ECT_{t-1} = The error correction term contains the long run information derived from the long run cointegrating relationship.

u_{1t} = residuals (stochastic error terms often called impulses, or innovations or shocks)

3.3 Source of data

This study made use of annual time series data spanning a period of 40 years from 1980 to 2020. The data was obtained from the World Bank database, United Nations Conference on Trade and Development database (UNCTAD), and the International Monetary fund (international financial statistics) database.

The variables used in this study are described in the table below

Table 6: description of variables

Variables	Description of variables
FDI	Foreign direct investment inflows (US dollars at current prices)
NEXR	Nominal effective exchange rate
REXR	Real effective exchange rate based on the consumer price index
FDV	financial development measured as the domestic credit to the private sector by banks
FDVI	Financial development index

There are several factors that have been examined in literature which determine FDI inflows. Some of which include exchange rate, economic growth, trade openness, financial development, human capital, political stability, trade openness, infrastructure, institutional quality, etc. However, the primary objective of this study is to examine the dynamic relationship among FDI inflows, exchange rate and financial development. Thus, the variables to be examined are limited to just the three variables in line with the objective of this study.

3.4 Justification for the variables included in the model

Exchange rate: foreign investors consider exchange rate as a strong indicator for macroeconomic stability particularly because the absence of a volatile exchange rate in a host country makes the host country attractive to foreign investors. This is because in the absence of volatility of exchange rate, uncertainty relating to the expected value of assets and profits to be generated in the host country becomes more predictable. Thus, foreign investors are more inclined to consider investing in countries with a more stable exchange rate.

Financial development: financial development captured by an effective and efficient financial system in the host country also plays a major role in determining foreign direct investment. One major reason why investors consider the level of financial development in a host country is because a developed financial sector provides better hedging facilities against fluctuations caused by unstable exchange rates unlike a less developed financial sector, and this encourages FDI to flow to host countries with better developed financial sectors.

Secondly, a host country with developed financial markets provides lower borrowing cost; therefore, a foreign investor is guaranteed of higher liquidity and lower borrowing cost in host countries that have developed financial markets. This explains why foreign investors have a better access to finance in countries with developed financial markets and the justification for an increased flow of foreign direct investment to such countries.

In addition to the above, the variables selected in this study are available for the period covered by the study (1980-2020). Thus, their selection is also based on data availability.

Chapter 4

4.1 Results for model 1 (the dynamic relationship among foreign direct investment inflows, nominal effective exchange rate, and financial development)

Table 7: Summary of Descriptive statistics

	FDI	NEEXR	FDV
Mean	2716.142	95.621	9.195414
Standard deviation	2477.295	97.273	3.515476
Skewness	1.184576	0.7752	1.168392
Kurtosis	3.297844	2.7134	4.041352
Observations	40	40	40

Table 7 above shows the descriptive statistics for foreign direct investment inflows (FDI inflows), nominal effective exchange rate, and financial development. The results from the table show that FDI inflows has the highest mean value while financial development has the lowest mean value. The high standard deviation values of foreign direct investment and nominal effective exchange rate shows that both variables have high variability while the low standard deviation value of financial development show that it has low variability. The skewness statistics which show the degree of asymmetry or departure from symmetry revealed that all the variables are positively skewed. The kurtosis statistics which indicate the degree of peakedness of a distribution reveal that foreign direct investment and financial development have relatively high peaked distribution since their values are greater than 3 when compared to the nominal effective exchange rate which has a low peaked distribution since its value is less than 3.

4.1.1 Unit root test

This section examines the time series properties of the variables to understand the individual nature of the variables and to ascertain their suitability for the estimation techniques adopted for this study. It is very important to determine the order of integration before proceeding with the adopted methodology because most economic and financial time series are non-stationary and including non-stationary variables in the model can lead to spurious regression coefficient estimate. It is equally important that all the series are integrated of the same order before proceeding to the vector autoregressive (VAR) analysis to avoid the problem of spurious regressions.

Table 8: Philip-Perron test

Variable	Levels	1 st difference
FDI	-2.167	-10.482***
NEEXR	-1.570	-5.600***
FDV	-3.084	-5.618***

Note: all variables are in logged form, The model includes constant and trend term

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 9: Augmented Dickey-Fuller test

Variable	Levels	1 st difference
FDI	-1.128	-4.388***
NEEXR	-1.865	-4.518***
FDV	-3.609	-4.179***

Note: all variables are in logged form, The model includes constant and trend term

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 8 and 9 above depicts the Phillips-Perron and Augmented Dickey-Fuller unit root test results under the assumptions that both trend and constant are present in the testing procedure. It is often appropriate to include both constant and trend to capture the complexity in the data-generating process of the variable because at times traces of randomness remains in some detrended macroeconomic variables. It can be deduced from the test results that the variables are $I(1)$, which implies that the variables are stationary at first difference. The economic implication of this is that any disturbance to these stationary variables will not be sustained for a long period of time i.e., a shock to these variables will reduce over time.

Before proceeding to estimate the model, it is necessary to determine the optimal lag length of the model. This is necessary because if the lag length is too small, the model becomes misspecified. Also, a short lag length could result in autocorrelation of the error terms, thereby resulting in insignificant and inefficient estimators. A larger lag length on the other hand, increases the number of parameters which would decrease the degrees of freedom. This implies large standard errors and therefore wide confidence intervals for the model coefficients (Fuss, 2007). It is equally important to note that to avoid a situation whereby the VAR model is heavily parameterised (having many parameters relative to the data observations) and causing the degrees of freedom problem, it is necessary to avoid the inclusion of too many variables in the model.

The optimal lag length (selection order criteria) for the model is to be determined by the Akaike information criterion (AIC), Hannan-Quinn information criterion (HQIC), and the Schwarz Bayesian information criterion (SBIC). This is important because when the true model is not known, there is a possibility that the model can be under specified or over specified if the lags included are either too few or too many. Therefore, to regularize our model, we need the SBIC and AIC. These criteria help to balance the information gathered by adding additional lags against the increase in the complexity of the model caused by these lags. from the table below, AIC, HQIC, and the SBIC criteria suggests one as the optimal lag length for the model.

Table 10: lag-order selection criteria

Lag	LL	LR	Df	p	FPE	AIC	HQIC	SBIC
0	-93.3423				0.042373	5.35235	5.39841	5.48431
1	-13.884	158.91*	9	0.000	0.000848*	1.43824*	1.62247*	1.96608*
2	-7.85086	12.075	9	0.209	0.001012	1.60283	1.92523	2.526553
3	-3.14192	9.4179	9	0.400	0.001324	1.84122	2.30179	3.16082
4	4.18177	14.647	9	0.101	0.001538	1.93455	2.53309	3.64983

*optimal lag

From the table above, the lag order selection criteria suggests that the appropriate lag order is lag order 1. Thus, we proceed to carry out a cointegration test to determine if the variables are cointegrated. This is necessary because if the variables are cointegrated, then the appropriate methodology to use would be the vector error correction model which estimates a short run and long run model. On the contrary, if the variables are not cointegrated, then the model can be estimated using the vector auto regression model (VAR model).

4.1.2 Johansen co-integration test

Table 11: Summary of the Johansen co-integration test

Maximum rank	Eigenvalue	Trace statistic	Critical value 5%
0	.	25.4900*	29.68
1	0.33996	9.2870	15.41
2	0.15949	2.5108	3.76
3	0.06235		

* selected rank

The Johansen co-integration test shows that the variables are not cointegrated at maximum ranks 0 to 3. This suggests that there is no long-run relationship among the variables. Thus, the appropriate methodology to use is the vector autoregressive model (VAR model) for the empirical analysis. The VAR model fits into the objective of this study as it examines how the variables interact with each other in the short run while determining the direction of causality among the variables.

4.1.3 Vector autoregressive model

Table 12: VAR Regression results

Dependent variable	Regressors	Coefficient	Standard error	t-statistic
DFDI	DFDI(L1)	0.5130442	0.1357402	0.000***
	DNEEXR(L1)	-0.2156109	0.0826947	0.009***
	DFDV(L1)	0.0882547	0.340315	0.795

Note: all variables are in logged form

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 13: VAR Regression results

Dependent variable	Regressors	Coefficient	Standard error	t-statistic
DNEEXR	DFDI(L1)	0.1422827	0.0813025	0.080**
	DNEEXR(L1)	0.9824147	0.0495305	0.000***
	DFDV(L1)	-0.2533946	0.203834	0.214

Note: all variables are in logged form

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 14: VAR Regression results

Dependent variable	Regressors	Coefficient	Standard error	t-statistic
DFDV	DFDI(L1)	0.06957	0.04458	0.119
	DNEEXR(L1)	-0.01329	0.02716	0.625
	DFDV(L1)	0.67313	0.11178	0.000***

Note: all variables are in logged form

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

For the FDI model, the nominal effective exchange rate has a significant and negative impact on FDI inflows. A one percent change in the nominal exchange rate causes FDI inflows to decrease by 0.22%. However, in the FDI model, financial development does not have a significant effect on FDI inflows.

For the nominal effective exchange rate model, FDI inflows have a significant effect on the nominal effective exchange rate. A one percent change in FDI inflows causes the nominal effective exchange rate to increase by 0.14%. However, in the nominal effective exchange rate model, financial development does not have a significant effect on the nominal effective exchange rate.

For the financial development model, both FDI inflows and the nominal effective exchange rate do not have a significant effect on financial development.

Table 15: Granger Causality Wald result

Equation	Excluded	chi2	Df	Prob>chi2
DFDI	DNEEXR	6.7981	1	0.009***
DFDI	DFDV	0.06725	1	0.795
DFDI	ALL	8.7137	2	0.013***

Note: all variables are in logged form

*** p < 0.01; ** p < 0.05; * p < 0.1

Table 16: Granger Causality Wald result

Equation	Excluded	chi2	Df	Prob>chi2
DNEXR	DFDI	3.0626	1	0.080*
DNEXR	DFDV	1.5454	1	0.214
DNEXR	ALL	3.6818	2	0.159

Note: all variables are in logged form

*** p < 0.01; ** p < 0.05; * p < 0.1

Table 17: Granger Causality Wald result

Equation	Excluded	chi2	Df	Prob>chi2
DFDV	DFDI	2.4351	1	0.119
DFDV	DNEXR	0.2394	1	0.625
DFDV	ALL	5.8061	2	0.055

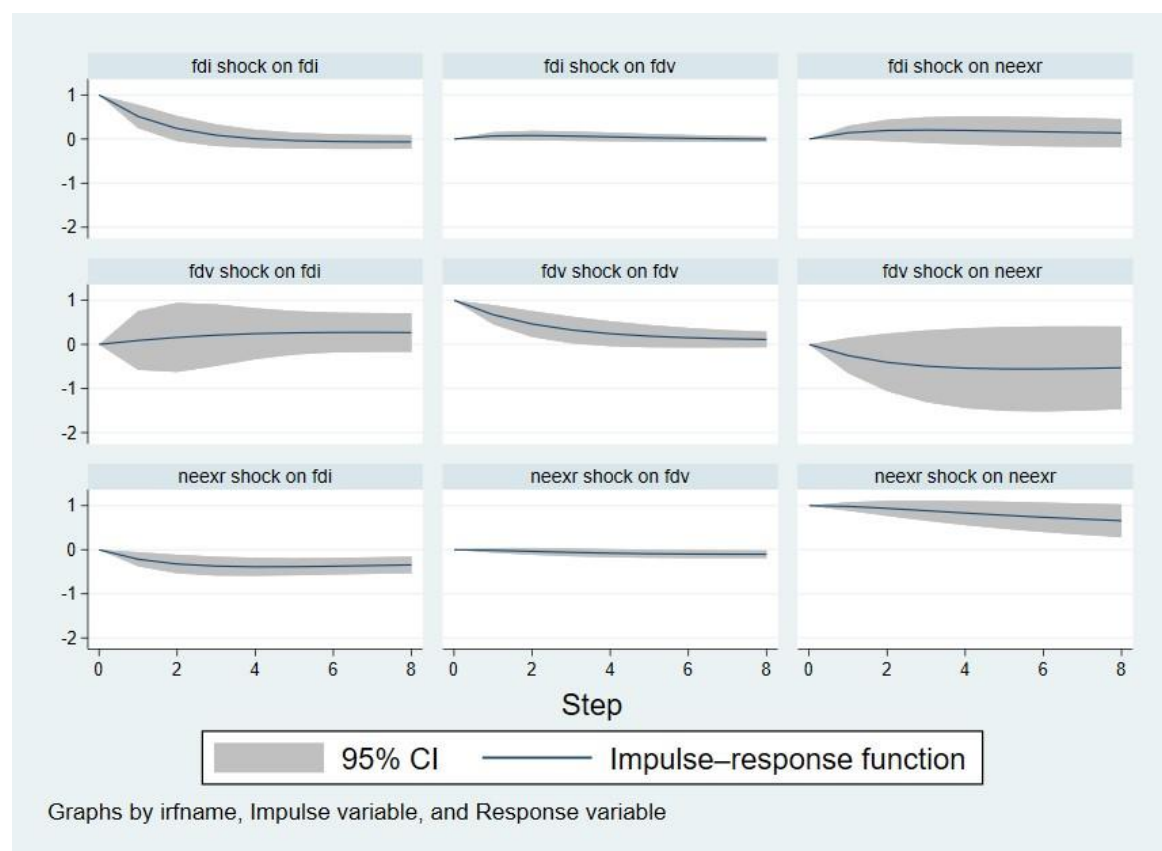
Note: all variables are in logged form

*** p < 0.01; ** p < 0.05; * p < 0.1

The table above shows the results of the granger causality test. The first equation shows that the nominal effective exchange rate granger causes FDI inflows. However, financial

development does not granger cause FDI inflows. The second equation shows that FDI inflows granger causes the nominal effective exchange rate. However, financial development does not granger cause the nominal effective exchange rate. The third equation shows that both FDI inflows and the nominal effective exchange rate do not granger cause financial development. In summary, there is a bidirectional causality from the nominal effective exchange rate to FDI inflows and from FDI inflows to the nominal effective exchange rate. This implies that both variables drive each other in Nigeria.

4.1.4 Impulse response function



The first set of impulse response functions show that a one standard deviation shock from FDI inflows to FDI inflows has a positive impact on FDI inflows above the steady state. The positive effect begins to decline after the first period but remains in the positive region. A one standard deviation shock from FDI inflows to financial development shows that the shock has no significant impact on financial development because the shock remains in the steady state region. A one standard deviation shock from FDI inflows to the nominal effective exchange rate shows that the shock begins to rise before the first period but after the first period, it remains steady all through the remaining periods and in the positive region.

The second set of impulse response functions show that a one standard deviation shock from financial development to FDI inflows has a positive effect. The positive effect begins in the first period and remains steady all through. The second graph shows that a one standard deviation shock from financial development to financial development has a positive impact on financial development. The positive impact begins to decline from the first period, but it remains in the positive region. The third graph shows that a one standard deviation shock from financial development to the nominal effective exchange rate has a negative impact on the nominal effective exchange rate. The negative impact begins from the first period and remains in the negative region all through the remaining periods.

The third set of impulse response functions show that a one standard deviation shock from the nominal effective exchange rate to FDI inflows shows that there is a negative shock which implies that the nominal effective exchange rate causes FDI inflows to decrease. The negative shock is sustained all through the remaining periods. However, a one standard deviation shock from the nominal effective exchange rate to financial development shows that the shock has no significant impact on financial development because the shock remains in the steady state region all through the periods.

Note: the adopted approach for the VAR impulse response function (IRF) is the generalised impulse response function. The generalised impulse response function is different from the orthogonalized impulse response function because it is not conditioned on the ordering of the variables, and this is suitable for the objective of this study.

Results for Model 2 (the dynamic relationship among foreign direct investment inflows, real effective exchange rate, and financial development).

4.2.1 Unit root test (model 2)

Table 18: Aug. Dickey-fuller test

Variable	Levels	1 st difference
FDI	-1.128	-4.388***
REEXR	-2.821	-4.055***
FDV	-3.609	-4.179***

Note: all variables are in logged form, The model includes constant and trend term

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 18 above shows the Augmented Dickey-Fuller unit root test results under the assumption that both trend and constant are present in the testing procedure. It is often appropriate to include both constant and trend to capture the complexity in the data-generating process of the variable because at times traces of randomness remains in some detrended macroeconomic variables. It can be deduced from the test result that the variables are $I(1)$, which implies that the variables are stationary at first difference.

Before proceeding to estimate the model, it is necessary to determine the optimal lag length of the model. This is necessary because if the lag length is too small, the model becomes misspecified. Also, a short lag length could result in autocorrelation of the error terms, thereby resulting in insignificant and inefficient estimators. A larger lag length on the other hand, increases the number of parameters which would decrease the degrees of freedom. This implies large standard errors and therefore wide confidence intervals for the model coefficients (Fuss, 2007). The optimal lag length (selection order criteria) for the model is to be determined by the AIC, HQIC, and the SBIC criteria.

Table 19: Lag-order selection criteria

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-72.0431				0.01298	4.16906	4.21512	4.30102
1	-16.1149	111.86	9	0.000	0.00096	1.56194	1.74617*	2.08978*
2	-5.82174	20.586*	9	0.015	0.00090*	1.4901*	1.8125	2.41382
3	-0.80562	10.032	9	0.348	0.001162	1.71142	2.172	3.03102
4	4.41844	10.448	9	0.315	0.001518	1.9212	2.51995	3.63668

*optimal lag

Table 19 above shows that the appropriate lag length to be used in the estimation model is the lag 2. Therefore, the next step is to test for cointegration among the variables. This is necessary because the variables must be cointegrated to allow for a short run and long run estimation model. However, if the variables are not cointegrated, the model can only be estimated in the short run.

4.2.2 Johansen cointegration test

Table 20: Summary of the Johansen co-integration test

Maximum rank	Eigenvalue	Trace statistic	Critical value 5%
0	.	31.1323	29.68
1	0.38994	12.3531*	15.41
2	0.20582	3.5964	3.76
3	0.09030		

* selected rank

The cointegration test in the above table shows that the variables are cointegrated at maximum rank zero which indicates one cointegrating rank in the model. Therefore, this establishes a long run relationship among the variables in the model. This suggests that the appropriate methodology to be used is the vector error correction model (VECM) which can estimate both the short run model and long run model.

4.2.3 Vector error correction model

Table 21: Vector error correction model regression results

	Coefficient (standard error)	z	p-value
D_FDI			
_ce1L1	-0.3139 (0.109)	-2.88	0.004**
FDI (LD)	-0.4103 (0.140)	-2.94	0.003***
REEXR (LD)	0.2569 (0.252)	1.02	0.308
FDV (LD)	-0.0762 (0.428)	-0.18	0.859
Constant	0.0223 (0.077)	0.29	0.772

Note: all variables are in logged form, *** p < 0.01; ** p < 0.05; * p < 0.1

Table 22: Vector error correction model regression results

	Coefficient (standard error)	z	p-value
D_REEXR			
_ce1L1	-0.1415 (0.079)	-1.80	0.072*
FDI (LD)	0.1567 (0.101)	1.55	0.120
REEXR (LD)	0.4134 (0.182)	2.27	0.023**
FDV (LD)	-0.3413 (0.309)	-1.10	0.270
Constant	-0.0371 (0.056)	-0.67	0.506

Note: all variables are in logged form, *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 23: Vector error correction model regression results

	Coefficient (standard error)	z	p-value
D_FDV			
_ce1L1	0.0734 (0.422)	1.74	0.082*
FDI (LD)	0.0208 (0.054)	0.39	0.700
REEXR (LD)	-0.050 (0.098)	-0.51	0.612
FDV (LD)	0.095 (0.166)	0.57	0.568
Constant	0.0240 (0.030)	0.80	0.421

Note: all variables are in logged form, *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Interpretation of the error correction term coefficients (ECT): for the FDI equation, the adjustment term (-0.3139) is statistically significant at the 5% level which suggests that the deviation from the long-run equilibrium (previous year errors) is corrected within the current

year at a convergence speed of 31.4%. In the real effective exchange rate equation, the adjustment term (-0.1415) is statistically significant at the 10% level which suggests that the deviation from the long-run equilibrium (previous year errors) is corrected within the current year at a convergence speed of 14.2%.

Short-run analysis

For the FDI equation, the real effective exchange rate and financial development do not have a significant effect on FDI inflows in the short run.

Similarly, for the real effective exchange rate equation, foreign direct investment inflows and financial development do not have any significant effect on the real exchange rate in the short run.

In the financial development equation, foreign direct investment inflows and the real effective exchange rate do not have a significant effect on financial development in the short run.

Table 24: Long run vector error correction model results (Johansen normalization restriction imposed)

	coefficient (standard error)	z	p-value
_ce1			
FDI	1	.	.
REEXR	1.4211 (0.2774)	5.12	0.000
FDV	-1.7424 (0.4644)	-3.75	0.000
Constant	-10.6272	.	.

Note: all variables are in logged form, *** p < 0.01; ** p < 0.05; * p < 0.1

Long run analysis

The table above shows the long-run relationship among the variables. The real effective exchange rate has a significant and negative effect on FDI inflows. A percentage change in the real effective exchange rate causes FDI inflows to decrease by 1.42% in the long run. On the contrary, financial development has a significant and positive effect on FDI inflows. A percentage change in financial development causes FDI inflows to increase by 1.74% in the long run.

Sensitivity analysis: A sensitivity analysis is incorporated into this study using a different measure of financial development (financial development index). This makes the empirical section of this study more consistent with the empirical literature review where various measures of financial development are identified. Thus, for models 3 and 4, financial development (domestic credit to the private sector by banks) is replaced with the financial development index which is a more robust measure of financial development.

Results for Model 3 (the dynamic relationship among foreign direct investment inflows, nominal effective exchange rate, and financial development index)

4.3.1 Unit root test

Table 25: ADF test

Variable	Levels	1 st difference
FDI	-1.128	-4.388***
NEEXR	-1.865	-4.518***
FDVI	-2.869	-4.485***

Note: all variables are in logged form, The model includes constant and trend term

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 25 above depicts the augmented dicky-fuller unit root test results under the assumptions that both trend and constant are present in the testing procedure. It is often appropriate to include both constant and trend to capture the complexity in the data-generating process of the variable because at times traces of randomness remains in some detrended macroeconomic variables. It can be deduced from the test results that the variables are $I(1)$, which implies that the variables are stationary at first difference. The economic implication of this is that any disturbance to these stationary variables will not be sustained for a long period of time i.e., a shock to these variables will reduce over time.

Before proceeding to estimate the model, it is necessary to determine the optimal lag length of the model. This is necessary because if the lag length is too small, the model becomes misspecified. Also, a short lag length could result in autocorrelation of the error terms, thereby resulting in insignificant and inefficient estimators. A larger lag length on the other hand, increases the number of parameters which would decrease the degrees of freedom. This implies large standard errors and therefore wide confidence intervals for the model coefficients (Fuss,

2007). It is equally important to note that to avoid a situation whereby the VAR model is heavily parameterised (having many parameters relative to the data observations) and causing the degrees of freedom problem, it is necessary to avoid the inclusion of too many variables in the model.

The optimal lag length (selection order criteria) for the model is to be determined by the AIC, HQIC, and the SBIC criteria. From the table below, the AIC and FPE suggests one as the lag order, while the HQIC and the SBIC criteria suggests two as the lag order. For this study, we choose the lag order selected by the AIC. Stock and Watson (2007) recommend that the AIC gives a better model selection criterion; stating that although the AIC includes more parameters, but it guides against omitting significant parameters.

Table 26: lag-order selection criteria

lag	LL	LR	Df	p	FPE	AIC	HQIC	SBIC
0	-78.9872				0.01909	4.55484	4.6009	4.6868
1	5.41588	168.81	9	0.000	0.00029*	0.365784*	0.550015*	0.89362*
2	11.8834	12.935	9	0.166	0.00034	0.506475	0.828878	1.43019
3	15.6635	7.5601	9	0.579	0.00047	0.796473	1.25705	2.11607
4	24.4205	17.514*	9	0.041	0.0005	0.809972	1.40872	2.52545

*optimal lag

The next step is to test for cointegration among the variables. This is necessary because if the variables are cointegrated, then the appropriate methodology to use would be the vector error correction model which estimates a short run and long run model. On the contrary, if the variables are not cointegrated, then the model can be estimated using the vector auto regression model (VAR model). The co-integration test in the table below shows that the variables are not co-integrated at any of the ranks. Therefore, this establishes the absence of a long run relationship among the variables in the model. This suggests that the appropriate methodology to be used is the VAR technique.

Table 27: Summary of the Johansen co-integration test

Maximum rank	Eigenvalue	Trace statistic	Critical value 5%
0	.	21.1461*	29.68
1	0.28275	8.1854	15.41
2	0.15864	1.4486	3.76
3	0.03646		

* selected rank

Table 28: VAR Regression results

Dependent variable	Regressors	Coefficient	Standard error	P> z
DFDI	DFDI(L1)	0.52954	0.130010	0.000***
	DNEEXR(L1)	-0.241023	0.796103	0.002***
	DFDVI(L1)	-0.354881	0.508794	0.485

Note: all variables are in logged form

*** p < 0.01; ** p < 0.05; * p < 0.1

Table 29: VAR Regression results

Dependent variable	Regressors	Coefficient	Standard error	P> z
DNEEXR	DFDI(L1)	0.11924	0.07906	0.131
	DNEEXR(L1)	0.99337	0.04841	0.000***
	DFDVI(L1)	-0.27102	0.30936	0.381

Note: all variables are in logged form

*** p < 0.01; ** p < 0.05; * p < 0.1

Table 30: VAR Regression results

Dependent variable	Regressors	Coefficient	Standard error	P> z
DFDVI	DFDI(L1)	-0.00465	0.02552	0.855
	DNEEXR(L1)	-0.01525	0.01562	0.329
	DFDVI(L1)	0.79369	0.09986	0.000

Note: all variables are in logged form

*** p < 0.01; ** p < 0.05; * p < 0.1

For the FDI model, the nominal effective exchange rate has a significant and negative effect on FDI inflows. A one percent change in the nominal effective exchange rate causes FDI inflows to decrease by 0.24%. However, in the FDI model, the financial development index does not have a significant effect on FDI inflows.

For the nominal effective exchange rate model, FDI inflows and the financial development index do not have a significant effect on the nominal effective exchange rate.

In the financial development index model, FDI inflows and the nominal effective exchange rate do not have a significant effect on the financial development index.

Table 31: Granger Causality Wald result

Equation	Excluded	chi2	Df	Prob>chi2
DFDI	DNEEXR	9.166	1	0.002***
DFDI	DFDVI	0.487	1	0.485
DFDI	ALL	9.2257	2	0.010***

Note: all variables are in logged form

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 32: Granger Causality Wald result

Equation	Excluded	chi2	Df	Prob>chi2
DNEXR	DFDI	2.2747	1	0.131
DNEXR	DFDVI	0.7675	1	0.381
DNEXR	ALL	2.8629	2	0.239

Note: all variables are in logged form

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 33: Granger Causality Wald result

Equation	Excluded	chi2	Df	Prob>chi2
DFDVI	DFDI	0.0332	1	0.855
DFDVI	DNEXR	0.9527	1	0.329
DFDVI	ALL	1.6586	2	0.436

Note: all variables are in logged form

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

The table above shows the result of the granger causality test. The first equation shows that the nominal effective exchange rate granger causes FDI inflows. However, the financial development index does not granger cause FDI inflows. The second equation shows that both FDI inflows and financial development index do not granger cause the nominal effective exchange rate. The third equation shows that FDI inflows and the nominal effective exchange

rate do not granger cause the financial development index.

In summary, there is a unidirectional causality from the nominal effective exchange rate to FDI inflows.

Results for Model 4 (the dynamic relationship among foreign direct investment inflows, real effective exchange rate, and financial development index)

Table 34: Aug. Dickey-fuller test

Variable	Levels	1 st difference
FDI	-1.128	-4.388***
REEXR	-2.821	-4.055***
FDVI	-2.869	-4.485***

Note: all variables are in logged form, The model includes constant and trend term

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 34 above shows the Augmented Dickey-Fuller unit root test results under the assumption that both trend and constant are present in the testing procedure. It is often appropriate to include both constant and trend to capture the complexity in the data-generating process of the variable because at times traces of randomness remains in some detrended macroeconomic variables. It can be deduced from the two test results that the variables are $I(1)$, which implies that the variables are stationary at first difference.

Before proceeding to estimate the model, it is necessary to determine the optimal lag length of the model. This is necessary because if the lag length is too small, the model becomes mis-specified. Also, a short lag length could result in autocorrelation of the error terms, thereby resulting in insignificant and inefficient estimators. A larger lag length on the other hand, increases the number of parameters which would decrease the degrees of freedom. This implies large standard errors and therefore wide confidence intervals for the model coefficients (Fuss, 2007). The optimal lag length (selection order criteria) for the model is to be determined by the AIC, HQIC, and the SBIC criteria.

Table 35: Lag-order selection criteria

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-55.7291				0.005243	3.26273	3.30878	3.39469
1	6.36576	124.19	9	0.000	0.000275	0.313013	0.497243*	0.840853*
2	17.4992	22.267*	9	0.008	0.000248*	0.194488*	0.516891	1.11821
3	18.7525	2.5065	9	0.981	0.000392	0.624862	1.08544	1.94446
4	26.2668	15.029	9	0.090	0.000451	0.7074	1.30615	2.42288

*optimallag

Table 35 above shows that the appropriate lag length to be used in the estimation model is the lag 2. Therefore, the next step is to test for cointegration among the variables. This is necessary because the variables must be cointegrated to allow for a short run and long run estimation model. However, if the variables are not cointegrated, the model can only be estimated in the short run.

4.4.2 Johansen cointegration test

Table 36: Summary of the Johansen co-integration test

Maximum rank	Eigenvalue	Trace statistic	Critical value 5%
0	.	32.6862	29.68
1	0.44615	10.2338*	15.41
2	0.18827	2.3073	3.76
3	0.05891		

* selected rank

The cointegration test in the above table shows that the variables are cointegrated at maximum rank zero which indicates one cointegrating rank in the model. Therefore, this establishes a long run relationship among the variables in the model.

4.4.3 Vector error correction model

Table 37: Vector error correction model regression results

	Coefficient (standard error)	z	p-value
D_FDI			
_ce1L1	-0.29323 (0.0971)	-3.02	0.003***
FDI (LD)	-0.44139	-3.23	0.001***

	(0.1366)		
REEXR (LD)	0.34319 (0.2645)	1.30	0.194
FDVI (LD)	-0.36169 (0.7673)	-0.47	0.637
Constant	0.01512 (0.0763)	0.20	0.843

Note: all variables are in logged form, *** p < 0.01; ** p < 0.05; * p < 0.1

Table 38: Vector error correction model regression results

	Coefficient (standard error)	z	p-value
D_REEXR			
_ce1L1	-0.09325 (0.0737)	-1.26	0.042*
FDI (LD)	0.13752 (0.1037)	1.33	0.185
REEXR (LD)	0.40348 (0.2008)	2.01	0.045**
FDVI (LD)	-0.12715 (0.5826)	-0.22	0.827
Constant	-0.0393 (0.058)	-0.68	0.498

Note: all variables are in logged form, *** p < 0.01; ** p < 0.05; * p < 0.1

Table 39: Vector error correction model regression results

	Coefficient (standard error)	z	p-value
D_FDVI			
_ce1L1	0.04629 (0.0205)	2.26	0.024**
FDI (LD)	-0.05233 (0.0289)	-1.81	0.070*
REEXR (LD)	-0.04474 (0.0559)	-0.80	0.423
FDVI (LD)	0.02331	0.14	0.886

	(0.1621)		
Constant	0.01666 (0.0161)	1.03	0.302

Note: all variables are in logged form, *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Interpretation of the error correction term coefficients (ECT): for the FDI equation, the adjustment term (-0.29323) is statistically significant at the 5% level which suggests that the deviation from the long-run equilibrium (previous year errors) is corrected within the current year at a convergence speed of 29.32%. In the real effective exchange rate equation, the adjustment term (-0.09325) is statistically significant at the 5% level which suggests that the deviation from the long-run equilibrium (previous year errors) is corrected within the current year at a convergence speed of 9.32%.

Short-run analysis

For the FDI equation, the real effective exchange rate and financial development index do not have a significant effect on FDI inflows in the short run. Similarly, for the real effective exchange rate equation, FDI inflows and the financial development index do not have any significant effect on the real effective exchange rate in the short run.

In the financial development index equation, FDI inflows have a significant effect on financial development index in the short run. A percentage change in FDI inflows causes the financial development index to reduce by 0.05%. However, the real effective exchange rate does not have a significant effect on the financial development index in the short run.

Table 40: Long run vector error correction model results (Johansen normalization restriction imposed)

	coefficient (standard error)	z	p-value
_ce1			
FDI	1	.	.
REEXR	1.67087 (0.26766)	6.24	0.000
FDVI	-3.20201 (0.85869)	-3.73	0.000
Constant	-21.09733	.	.

Note: all variables are in logged form, *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Long run analysis

The table above shows the long-run relationship among the variables. The real effective exchange rate has a significant and negative effect on FDI inflows. A percentage change in the real effective exchange rate causes FDI inflows to decrease by 1.67% in the long run.

On the contrary, a percentage change in the financial development index causes FDI inflows to increase by 3.20% in the long run.

4.5 Discussion of findings

This study examines the dynamic relationship among FDI inflows, exchange rate movements, and financial development in Nigeria. The first part of the empirical analysis examined the dynamic relationship among FDI inflows, nominal effective exchange rate movements, and financial development. A cointegration test was carried out to examine if the variables are cointegrated. The result show that the variables are not cointegrated. Thus, this necessitated the use of a VAR model to examine the dynamic relationship among the three variables.

The results show that the nominal effective exchange rate movement has a significant and negative effect on FDI inflows in the short run in Nigeria. The theoretical background (wealth effect) suggest that a depreciation of the host country currency should cause an increase in FDI inflows in the short run, however, the empirical findings of this study does not align with this. A weaker currency reduces FDI inflows, and a stronger currency attracts FDI inflows as pointed out by Alba et al (2009). Thus, in the case of Nigeria, since the movement of the nominal effective exchange rate has a negative effect on FDI inflows; it can be said that the Nigerian currency is a weaker currency, and a weaker currency can discourage FDI inflows especially with foreign investors that are particular about the strength of the host country currency.

The result also shows that FDI inflows has a positive effect on the nominal effective exchange rate movements. This implies that FDI inflows causes the nominal effective exchange rate to appreciate. Theoretically, an increase in FDI inflows will increase a demand for the host country currency and cause the exchange rate to appreciate. This is what the empirical findings confirm in the case of Nigeria.

The granger causality result show that there is a bidirectional causality form FDI inflows to the nominal effective exchange rate movement and vice-versa. This suggests that both variables

have a causal effect on each other in Nigeria which implies that both variables influence one another in Nigeria. However, there is no evidence of causality between FDI inflows and financial development, similarly no evidence of causality between the nominal exchange rate movement and financial development in Nigeria.

The second part of the empirical analysis (model 2) incorporates the use of real effective exchange rate instead of the nominal effective exchange rate in examining the relationship among FDI inflows, exchange rate movement, and financial development. This provides a comparison between both exchange rate proxies to see if the results would remain the same. It is important to do so because the empirical literature shows that some previous studies used the nominal effective exchange rate while other studies used the real effective exchange rate.

The results show that the variables are cointegrated; therefore, this necessitates the use of the VECM model which can be used to examine both the short-run and long-run dynamic relationship among the variables. Thus, the results from the use of the nominal effective exchange rate model are quite different from that of the real effective exchange rate model. This would provide a comparison between both models and serve as a guide for the appropriate policies to be recommended.

The result shows that there is no significant relationship among the variables in the short run unlike what was obtainable when the nominal effective exchange rate was used in model 1; however, in the long run, there is a relationship among the variables. In the long run, the real effective exchange rate has a negative effect on FDI inflows. This is in line with the findings of studies such as Oza (1994), Yaprakly (2016). The negative effect of the real effective exchange rate on FDI inflows could be because Nigeria depends heavily on the importation of production inputs in the production process. Thus, a real effective exchange rate movement (depreciation) can make production more expensive due to a weaker currency; thus, having a negative effect on FDI inflows.

Secondly, in the long run, financial development has a positive effect on FDI inflows. It increases FDI inflows by 1.74%. This is in line with the findings of Dellis (2008), Desai, Foley, & Hines (2004) and supported by the access to finance theory. This finding implies that foreign investors are attracted to invest in Nigeria due to the availability of credit made available to investors by the Nigerian financial sector. Thus, in the case of Nigeria, an increase in credit

made available to foreign investors would continue to facilitate an increase in FDI inflows especially for foreign investors that do not rely on their parent company for investment funds.

The third part of the empirical analysis involves a sensitivity analysis to determine how a change in the independent variables would affect the results of the model. In this case, a different measure of financial development is used as observed in the empirical literature. In addition, this makes the empirical analysis more consistent with the literature where various measures of financial development are presented. Thus, the financial development index which is more robust as it covers the financial depth, efficiency, and access of financial markets and institutions in Nigeria is used in the sensitivity analysis (models 3 and 4).

In model 3, the cointegration test showed that the variables were not cointegrated. The VAR results showed that the nominal effective exchange rate has a negative effect on FDI inflows. This result is similar to the results obtained in model 1. Thus, since the movement of the nominal effective exchange rate has a negative effect on FDI inflows; it can be said that the Nigerian currency is a weaker currency, and a weaker currency can reduce FDI inflows as shown in the empirical findings of this study.

Secondly, the VAR results also showed that the financial development index does not have a significant effect on FDI inflows and similarly; FDI inflows does not have a significant effect on the financial development index. This finding corroborates the findings of model 1 which implies that in the short run, financial development does not have a significant effect on FDI inflows in Nigeria. This could imply that most of the FDI inflows in Nigeria rely on internal finance (funds from parent companies) to finance their FDI activities in the short run.

In model 4, the cointegration test showed that the variables were cointegrated. In the short run, the variables do not have a significant effect on each other except for FDI inflows which has a negative effect on the financial development index. However, in the long run, both the real effective exchange rate and the financial development index have significant effect on FDI inflows. The real effective exchange rate has a negative effect on FDI inflows in the long run. This corroborates the findings in model 2. Since the real effective exchange rate measures the relative strength of a nation's currency to other currencies. The negative effect it has on FDI inflows in Nigeria could be traced to the effects of a weakening currency which has the tendency to reduce FDI inflows.

However, the financial development index has a positive effect on FDI inflows in the long run. This finding corroborates the finding in model 2 about the positive effect of the financial development index on FDI inflows in Nigeria. Thus, it can be concluded that financial development has a positive and significant effect on FDI inflows in Nigeria while in the short run, it does not have a significant effect on FDI inflows in Nigeria.

4.6 Difference between this study's approach and other studies in Nigeria

The approach adopted in this study makes it different from previous studies in Nigeria. firstly, this study provides a comprehensive review of the theoretical mechanisms that explain the relationship among the variables of interest which is missing in previous studies. Although, the theoretical mechanisms identified in this study were specific to the economic experience of the developed countries which is available in the literature. However, this study attempts to examine one of the theoretical mechanisms using Nigeria as a case study and this is guided by data availability to understand if this theoretical mechanism explains the economic relationship among the variables of interests in the context of a developing country as against the experience of the developed countries.

Secondly, the approach adopted in this study differs from previous studies because previous studies such as Chikwue (2019), Muhamad, Azu, & Oko (2018), Uzoma-Nwosu & Orekoya (2019), Nwosa & Emma-Ebere (2017), Adaramola & Obisesan (2015), Raifu & Farayibi (2022), etc examined the relationship between exchange rate movement and FDI inflows, FDI inflows and financial development, exchange rate and financial development. However, this study differs from previous studies because it goes further to establish if there is a relationship among exchange rate movement, FDI inflows and financial development using a tri-variate model unlike previous studies that used bi-variate models, and this study also goes further to establish the direction of causality among the variables of interest.

Chapter 5

Summary and Policy Recommendations

5.1 Summary

This study brings a new insight into the empirical literature by examining the dynamic relationship among FDI inflows, exchange rate, and financial development in developing countries using Nigeria as a case study. Using annual data on FDI inflows, exchange rate and financial development in Nigeria.

Over the years, developing countries have received lower FDI inflows when compared to the developed countries. Some of the reasons for this include poorly developed financial institutions and markets, unfavourable business environment, bad government policies, unstable exchange rate, etc. However, some of the factors that have attracted foreign investors to developing countries include the large market size in many of the developing countries especially in Africa which can be traced to a large population size, availability of natural resources which are in high demand globally, and cheaper cost of production, particularly relatively cheaper labour. One of the developing countries in this category is Nigeria which has the largest economy in Africa with an estimated GDP size of 477.38 billion USD.²⁰

Nigeria has benefitted immensely from FDI inflows over the years and remains the top destination of FDI inflows in West Africa and among the top five in Sub-Saharan Africa in recent times.²¹ The major pulling factor for foreign investors over the years was and remains the availability of natural resource commodities especially in the oil and gas sector. This caused foreign investors to explore the Nigerian market leading to an increase in capital inflows and because of this, the exchange rate appreciated at the early stage between the 70's up until mid-80's but began to depreciate after the introduction of the structural adjustment programme which was introduced to restructure and diversify the productive base of the Nigerian economy in order to reduce dependence on the oil sector and heavy reliance on importation, Ahmed (1987).

The structural adjustment programme was supported by external financing to provide new funds which involved commercial banks, the Paris club, and other creditors. It also involved a debt rescheduling plan for the Nigerian government. Furthermore, the Federal Government of Nigeria introduced the second-tier foreign exchange market with effect from 29th September

²⁰ <https://www.statista.com/statistics/1120999/gdp-of-african-countries-by-country/>

²¹ <https://www.statista.com/statistics/1240649/african-countries-attracting-the-highest-fdi-value/>

1986. The objective was to allow market forces of demand and supply to determine the naira exchange rate as opposed to the discretionary fixing of exchange rate which was the norm at that time.

Further structural changes were implemented and particularly with a focus on the financial sector. For instance, an export decree took effect in July 1986 which involved the central bank of Nigeria providing rediscounting and refinancing facilities aimed at assisting commercial banks to provide the required export financing. Thus, commercial banks began to provide funds to finance the exporting activities of the private sector. This facilitated financial development in Nigeria as financial institutions repositioned themselves to perform better in their financing activities for the private and public sector.

The increasing role of the Nigerian financial sector has seen the sector experience positive trends over the years making it one of the most financially developed countries in Africa. For instance, in recent times the Nigerian stock exchange market has maintained its position as the best performing stock market globally. The stock market gains were spearheaded by the manufacturing sector (top cement manufacturers) and the banking sector pushing the main index past a 100,000 index points for the very first time. The stock market has achieved a 36.37% return so far in 2024 which is higher than the inflation rate of 28.9% in Nigeria.²²

However, despite the positive trends observed in the financial sector and the increase in FDI inflows over the years, the Nigerian economy continues to suffer economic problems which can be traced to factors such as the overreliance of the Nigerian economy on oil revenues to finance government expenditure. The discovery of oil in Nigeria shifted the focus of the Nigerian economy from an economy sustained by agricultural activities to an economy sustained by revenue from resource commodities. It has resulted rather in an economic misfortune which can be explained by the phenomenon called the Dutch disease; a situation where resource-rich countries suffer economic problems due to the exploitation of their natural resources.

This has exposed the currency to external exchange rate shocks over the years. Thus, the exchange rate appreciation or depreciation has been conditioned largely on the swings in the international market for oil and gas. The exchange rate of the Nigerian currency to the US

²² <https://african.business/2024/01/finance-services/nigerian-stock-market-takes-bull-by-its-horns-in-2024>

dollar was at a record low of 0.530/1 USD in November 1980 compared to an all-time high of 1400/1 USD as of January 2024.²³ This is an indication of the currency crisis battling the Nigerian economy combined with the fast-rising inflationary pressure which has informed the decision of some multinationals to exit the Nigerian market.

Therefore, it becomes necessary to examine the relationship among exchange rate movements, FDI inflows and financial development given that the Nigerian economy is highly dependent on revenue from oil and gas sales and the dilemma of been both a high exporter of crude oil and a high importer of refined petroleum products which explains why Nigeria is constantly exposed to external shocks which continue to weaken the economy. Given the structure of the Nigerian economy and the important role played by exchange rate, FDI inflows and financial development in a developing country like Nigeria plagued by the Dutch disease, it becomes imperative to empirically examine the relationship among these variables in Nigeria.

The findings of this study show that there is a bidirectional causality between the nominal effective exchange rate and financial development in Nigeria in the short run. This implies that the nominal effective exchange rate of the Nigerian Naira to the US dollar (Naira/USD) drives FDI inflows in Nigeria and FDI inflows drive the nominal effective exchange rate in Nigeria. Thus, this study concludes that the nominal effective exchange rate is a major determinant of FDI inflows in Nigeria and that FDI inflows in Nigeria is a major determinant of the nominal effective exchange rate in Nigeria in the short run.

On the contrary, the results are different when the nominal effective exchange rate is replaced with the real effective exchange rate in model 2. The result shows that there is no significant relationship among the variables in the short run; however, in the long run, there is a significant relationship among the variables. In the long run, the real effective exchange rate has a negative effect on FDI inflows. It implies that a continuous depreciation of the real exchange rate causes FDI inflows to reduce in the long run in Nigeria. This is because foreign investors are more concerned about the real exchange rate of a currency as it gives a better reflection of the purchasing power of that currency, and it also reflects the rate at which the goods and services of a country are traded with that of another country.

Secondly, in the long run, financial development has a positive effect on FDI inflows in Nigeria. An increasing access to finance in Nigeria encourages FDI inflows and encourages

²³ <https://www.cbn.gov.ng/rates/exchratebycurrency.asp>.

the growth of the financial system (institutions and markets).

A sensitivity analysis which helps to determine how a change in the independent variables would affect the results of the model is incorporated in models 3 and 4. In model 3, the results showed that the nominal effective exchange rate has a negative effect on FDI inflows. The results also showed that the financial development index does not have a significant effect on FDI inflows and similarly; FDI inflows does not have a significant effect on the financial development index.

In model 4, In the short-run, FDI inflows has a negative effect on the financial development index. However, in the long run both the real effective exchange rate and the financial development index have significant effect on FDI inflows. The real effective exchange rate has a negative effect on FDI inflows. However, the financial development index has a positive effect on FDI inflows in the long run.

The above findings are important in the case of Nigeria and timely because the country's currency is currently in a distress as it continues to depreciate further against the US dollar and other global currencies. This occurrence has led to a lot of negative economic effects on the Nigerian economy. Some of the negative effects include the withdrawal of some multinationals from the Nigerian market due to exchange rate crisis and higher inflationary pressures. In addition, some foreign airlines have threatened to withdraw their services from Nigeria due to their inability to repatriate their profits from Nigeria due to forex shortages. Nigeria continues to battle with exchange rate instability and the negative consequences. It is therefore important to implement policies that can stabilize the exchange rate and attract higher FDI inflows which in turn increases financial development.

5.2 Policy Recommendations

1. Based on the findings of this study; the nominal effective exchange rate and the real effective exchange rate of the Nigerian naira to the USA dollar has a negative effect on FDI inflows in Nigeria. However, FDI inflows has a positive effect on both the nominal and the real effective exchange rate. This suggests that there is a need to implement policies that can strengthen the Nigerian currency to attract more FDI inflows as this would also have a positive effect on both the nominal effective exchange rate and the real effective exchange rate. One of such policies that can be implemented is the import substitution industrialization aimed at stimulating local production and reducing over dependence on imports which causes foreign exchange pressures. This would make the Nigerian currency stronger and attract more FDI inflows.

2. The sustained increase in inflationary pressure affects the stability of the naira. Thus, the government needs to tackle inflationary pressures in the economy to stabilize the Nigerian currency relative to foreign currencies. This is crucial and timely as more foreign companies are beginning to exit the Nigerian market due to the exchange rate crisis and high inflationary pressures battling the Nigerian economy. The findings of this study show that the Nigerian currency is weakened and as such it has become unattractive to foreign investors.

3. The findings of this study show that financial development (domestic credit to private sector by banks) and the financial development index has a positive effect on FDI inflows. This suggests that the financial sector (markets and institutions) is playing a significant and positive role in attracting FDI inflows to Nigeria. Thus, there is a need for the Nigerian government to implement policies that can further develop the Nigerian financial sector so that the financial sector can be better positioned to facilitate more FDI inflows.

5.3 Suggestions for further research

This study has examined the relationship among exchange rate, FDI inflows, and financial development in the context of a developing country using Nigeria as a case study. The primary objective of this study can equally be examined at the subregional level of the Economic Community of West African States and the regional level of Sub-Sahara Africa since some of these countries share similar characteristics with Nigeria such as the presence of natural resources which attract FDI inflows. A panel study at the subregional and regional level would give an insight into how these variables interact and what policies can be recommended at the subregional and regional level.

Secondly, further studies focusing on other countries at the regional and subregional level can empirically examine some of the theoretical mechanisms identified in this study subject to data availability. This would give a perspective into which of the theoretical mechanisms is applicable in other developing countries.

References

- Abanikanda, E. O. (2022). Measuring the impact of exchange rate volatility on the depth and efficiency of the financial sector: evidence from Nigeria. *International Journal of Monetary Economics and Finance, Inderscience Enterprises Ltd*, 15(4), 331-352.
- Abzari, M., Zarei, F., & Esfahani, S. S. (2011). Analyzing The Link between Financial Development and Foreign Direct Investment among D-8 Group of Countries. *International Journal of Economics and Finance*, 3(6), 148.
- Adaramola, A. O., & Obisesan, O. G. (2015). Impact of Foreign Direct Investment on Nigerian Capital Market Development. *International Journal of Academic Research in Accounting Finance and Management Sciences*, 5(1), 136-144.
- Aghion, P., Bacchetta, P., Romain, R., & Rogoff, K. (2006). Exchange Rate Volatility and Productivity Growth: The Role of Financial Development. *National Bureau of Economic Research working paper*, 12117.
- Aghion, P., Bacchetta, P., Romain, R., & Rogoff, K. (2009). Exchnage rate volatility and productivity growth: the role of financial development. *Journal of Monetary Economics*, 56(4), 494-513.
- Agyapong, D., Asiamah, M., & Crabbe, J. L. (2019). Effect of Capital Inflows on Financial Development in Ghana. *Jurnal Perspektif Pembiayaan dan Pembangunan Daerah*, 7(1), 85-102.
- Aizenman, J. (1992). Exchange rate flexibility, volatility, and domesic and foreign direct investment. *International Monetary Fund, Staff papers*, 39(4), 890-922.
- Akanji, O. O. (2006). The achievement of convergence in the Nigerian foreign exchange market. *Central Bank of Nigeria Bullion*, 30(3), 2.
- Akinlo, A., & Onatunji, O. (2021). Exchange rate volatility and foreign direct investment in selected West African Countries. *The International Journal of Business and Finance Research*, 15(1), 77-88.
- Alba, J. D., Donghyun, P., & Wang, P. (2009). The impact of exchnage rate on foregin direct investment and the interdependence of foreign direct investment over time. . *Asian Development Bank Economics Working Paper Series No 164* .
- Alnaa, S., & Ahiakpor, F. (2020). Exchnage rate volatility and foreign direct investment in Ghana. *Research in Applied Economics*, 12(3), 38-50.
- Alsmadi, A. A., & Oudat, M. S. (2019). The Effect Of Foreign Direct Investment On Financial Development: Empirical Evidence From Bahrain. *Ekonomski pregled, Hrvatsko društvo ekonomista (Croatian Society of Economists)*, 70(1), 22-40.
- Ammer, J., & Freeman, R. T. (1994). Inflation targeting in the 1990's: The experience of New Zealand, Canada and United Kingdom. *International finance Discussion Papers*, 1-36.
- Amuedo-Dorantes, C., & Pozo, S. (2001). Foreign exchange rates and foreign direct investment in the United States. *The International Trade Journal*, 15(3), 323-343.

- Ani, W., Ugwunta, D., & Okanya, O. (2013). The Effect of Foreign Exchange Reforms on Financial Deepening: Evidence from Nigeria. *American Journal of Business and Management*, 2(3), 204-209.
- Bayar, Y., & Gavriltea, M. D. (2018). Foreign Direct Investment Inflows and Financial Development in Central and Eastern European Union Countries: A Panel Cointegration and Causality. *International Journal of financial Studies*, 6(2).
- Bayoumi, T., & Lipworth, G. (1997). Japanese Foreign Direct Investment and Regional Trade. *IMF Working Paper No. 97/103*. Retrieved from <http://dx.doi.org/10.2139/ssrn.882625>
- Bilir, K. L., Chor, D., & Manova, K. (2013). Host-country financial development and multinational activity. *European Economic Review, Elsevier*, 115, 192-220.
- Bilir, K. L., Chor, D., & Manova, K. (2019). Host-country financial development and multinational activity. *European Economic Review*, 115, 192-220.
- Blonigen, B. (1997). Firm-Specific Assets and the Link between Exchange Rates and Foreign Direct Investment. *American Economic Review*, 87(3), 447-465.
- Bristy, H. J. (2014). Impact of financial Development on Exchange rate volatility and long-run Growth Relationship of Bangladesh . *International Journal of Economics and Financial Issues*, 4(2), 258-263.
- Campa, J. M. (1993). Entry by foreign firms in the United States under exchange rate uncertainty. *Review of Economics and Statistics*, 75(4), 614-622.
- Caves, R. E. (1988). "Exchange-Rate Movements and Foreign Direct Investment in the United States," . *Harvard Institute of Economic Research, Discussion Papers Series No. 1383*.
- Chami, R., Fullenkamp, C., & Sharma, S. (2010). A framework for financial market development. *Journal of Economic Policy Reform*, 13(2), 107-135.
- Chikwue, C. (2019). Effects of exchange rate on foreign direct investment inflow in Nigeria. *South Asian Journal of Social Studies and Economics*, 4(2), 1-12. Retrieved from <https://doi.org/10.9734/sajsse/2019/v4i230123>
- Chowdhury, A. R., & Wheeler, M. (2008). Does Real Exchange Rate Volatility Affect Foreign Direct Investment? Evidence from Four Developed Economies. *The International Trade Journal*, 22(2), 218-245.
- Coletta, F. B. (2018). Sectoral FDI and the real exchange rate: The role of financial development. *MAGKS Joint Discussion Paper Series in Economics*, 28-2018.
- Concer, R. D., Turolla, F. A., & Magarido, M. A. (2010). Outward Brazilian foreign Direct Investment: Impulses and Responses. *Revista Eletrônica de Negócios Internacionais (Internext)*, 132-148.
- Cushman, D. O. (1985). Real exchange rate risk, expectations, and the level of direct investment. *The Review of Economics and Statistics*, 67(2), 297-308.
- De Vita, G., & Abbott, A. J. (2007). Do Exchange Rates Have any Impact upon UK Inward Foreign Direct Investment? *Applied Economics*, 39(20), 2553-2564. doi:10.1080/00036840600749748

- Dellis, K. (2018). Financial development and FDI flows: evidence from advanced economies. *Working Papers 254, Bank of Greece*. Retrieved from <http://dx.doi.org/10.2139/ssrn.4196673>
- Desai, M. A., Foley, F. C., & Hines Jr, J. R. (2004). A multinational perspective on capital structure choice and internal capital markets . *NBER working paper No 9715*, 1-41.
- Desbordes, R., & Wei, S. (2017). The effects of financial development on foreign direct investment. *National Bureau of Economic Research working paper series*, 1-45. Retrieved from <http://www.nber.org/papers/w23309>
- Devlin, R., Ffrench-Davis, R., & Griffith-Jones, S. (1994). Surges in capital flows and development: An overview of policy issues. *coping with capital surges: Latin American macroeconomics and investment*, 1-56.
- Dewenter, K. L. (1995). Do Exchange Rate Changes Drive Foreign Direct Investment? *The Journal of Business*, 68(3), 405-433.
- Dhakal, D., Nag, R., Pradhan, G., & Upadhyaya, K. P. (2010). Exchange rate volatility and foreign direct investment: Evidence from East Asian countries. *International Business and Economics Research Journal*, 121-128.
- Durairaj, K. (2010). Foreign direct investment and exchnage rate in India. *PhD Thesis, Pondicehrry University, India* .
- Emenike, K. O. (2018). Exchange rate volatility in West African countries: is there a shred of spillover. *International Journal of Emerging Markets*, 13(6), 1457-1474.
- Eregha, P. (2019). Exchange rate regimes and foreign direct investment flow in West African monetary zone. *International Economic Journal*, 34(1), 85-99.
- Fapetu, O., Adeyeye, P. O., Seyingbo, O. A., & Owoeye, S. D. (2017). Exchnage rate volatility and stock market performance in Nigeria. *Nigerian Journal of Management Sciences*, 6(1), 308-317.
- Froot, K., & Stein, J. (1991). Exchange rates and foreign direct investment: An imperfect capital markets approach. *The Quarterly Journal of Economics*, 106(4), 1191-1217.
- Furceri, D., & Borelli, S. (2008). Foreign direct investments and exchange rate volatility in EMU neighbourhood countries. *Journal of International and Global Economic Studies*, 1(1), 42-59.
- Fuss, R. (2007). Vector Autoregressive Models. *Albert-Ludwigs-University of Freiburg*.
- Ganiyu, Y. O., Abidemi, O. I., & Enitan, O. O. (2018). Foreign Direct Investment and Financial Development in Economic Community of West African States. *Euro Economica*, 37(3), 29-40.
- Garber, P. M. (1993). The Collapse of the Bretton Woods Fixed Exchange Rate System. *National Bureau of Economic Research* , 461-494. Retrieved from <http://www.nber.org/chapters/c6876>
- Goldberg, L., & Kolstad, C. (1995). Foreign direct investment, exchange rate variability and demand uncertainty. *International Economic Review*, 36(4), 873-885.

- Gorg, H., & Wakelin, k. (2002). The Impact of Exchange Rate Volatility on US Direct Investment,. *Manchester School, University of Manchester*, 70(3), 380-397.
- Graham, E. M., & Krugman, P. R. (1994). The Surge in Foreign Direct Investment in the late 1980s. In K. A. Froot, & K. Froot (Ed.), *Foreign Direct Investment* (pp. 13-36). Chicago: University of Chicago Press.
- Gurler, M., & Kara, F. (2020). The Relationship Between Foreign Direct Investment and Financial Development in OECD Countries. *Handbook of Research on Decision-Making Techniques in Financial Marketing*, IGI Global,, 206-226.
- Hajilee, M., & Al Nasser, O. (2014). The relationship between financial market development and foreign direct investment in LAtin American Countries. *The Journal of Developing Areas*, 49(2), 227-245.
- Hajilee, M., & Al Nasser, O. M. (2015). The relationship between financial market development and foreign direct investment in latin American countries . *Journal of Developing Areas*, 49(2), 227-245.
- Hanusch, M., Nguyen, H., & Algu, Y. (2018). Exchange rate volatility and foreign direct investment inflows: Evidence from cross-country panel data. *MTI global practice discussion paper*, No 2. Retrieved from World Bank. <https://openknowledge.worldbank.org/handle/10986/29911>
- Haque, M. A., Biqiong, Z., & Arshad, M. U. (2022). Sources of Financial Development and Their Impact on FDI Inflow: A Panel Data Analysis of Middle-Income Economies. *Economies, MPDI*, 10(8), 182.
- Havi, E. (2021). The impact of exchange rate volatility on foreign direct investment inflows in Ghana. *African Journal of Economic Review*, 9(4), 183-199.
- Henri, N., Luc, N. N., & Larissa, N. (2019). The Long-run and Short-run Effects of Foreign Direct Investment on Financial Development in African Countries. *African Development Bank African Development Review*,, 31(2), 216-229.
- Itagaki, T. (1981). The Theory of the Multinational Firm under Exchange Rate Uncertainty. *Canadian Journal of Economics*, 276-297.
- Jehan, Z., & Hamid, A. (2017). "Exchange rate volatility and capital inflows: role of financial development,". *Portuguese Economic Journal, Springer; Instituto Superior de Economia e Gestao*, 16(3), 189-203.
- Kaur, M., Yadav, S. S., & Vinayshil, G. (2013). Financial System Development and Foreign Direct Investment: A Panel Data Study for BRIC Countries. *Global Business Review*, 14(4), 729-742.
- keho, Y. (2020). Linkage betwwen foreign direct investment and financial development: Evidence from West African Countries. *Journal of Applied finance and Banking*, 10(6), 57-75.
- Kharabsheh, B., & Aldaher, A. (2020). The Effect Of Foreign Direct Investment On Financial Development: Empirical Evidence From Bahrain. *International Journal of Financial Research*, 11(4), 64-73.

- Khraiche, M., & Gaudette, J. (2013). "FDI, Exchange Rate Volatility and Financial Development: Regional Differences In Emerging Economies,". *Economics Bulletin, AccessEcon*, 33(4), 3143-3156.
- Kiyota, K., & Urata, S. (2004). Exchange rate, exchange rate volatility and foreign direct investment in Japan. *The World Economy*, 27(10), 1501-1536.
- Kizilkaya, O., Ucler, G., & Ay, A. (2015). The interaction between exchnage rate and foreign direct investments: Evidence from Turkey. *Journal of Business and Economics*, 6(2), 337-347.
- Klein, M. W., Peek, J., & Rosengren, E. S. (2002). Troubled Banks, Impaired Foreign Direct Investment: The Role of Relative Access to Credit. *The American Economic Review*, 92(3), 664-682.
- Korgaonkar, C. (2012). Analysis of the impact of financial development on Foreign Direct Investment: A Data Mining Approach. *Journal of Economics and Sustainable Development*, 3(6), 70-78.
- Lamouchi, A., & Zouari, E. (2013). Financial development and capital flows: The effect on the real exchnage rate. *Global Journal of Management and Business Research*, 13(C(3)), 31-42.
- Latief, R., & Lefen, L. (2018). The effect of exchange rate volatility on international trade and foreign direct investment in developing countries along "one belt and one road",. *International Journal of Financial Studies*, 6(86). doi:10.3390/ijfs6040086
- Lily, J., Kogid, M., Mulok, D., Lim, T., & Asid, R. (2014). Exchange rate movements and foreign direct investment in Asean economies. *Economics Research International*. Retrieved from <http://dx.doi.org/10.1155/2014/320949>
- Mandigma, M. B. (2021). Impact of real exchnage rate on foreeign direct investment in four emerging markets of Southeast Asia. *Review of Integrative Business and Economics Research*, 10(11).
- Martins, J. F. (2015). Impact of real exchnage rate volatility on foreign direct investment inflows in Brazil. *Instituto Universitario de Lisboa, ISCTE Business School*.
- Melku, S. (2012). Exchange rate volatility and foreign direct invetsment: A panel data analysis. *M.Sc Thesis Dissertation*. Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:sh:diva-16995>
- Mensah, L., Bokpin, G., & Ofosu-Hene, E. (2015). Foreign exchange rate moments and foreign direct investment in Ghana. *Journal of Economics and Finance*, 41(1). doi:10.1007/s12197-015-9342-6
- Mishra, D., Mody, A., & Murshid, A. P. (2001). Private Capital Flows and Growth. *IMF Journal of Finance and Development*, 38(2).
- Mlachila, M., Cui, L., Jidoud, A., Newiak, M., Radzewicz-Bak, B., Takebe, M., . . . Zhang, J. (2016). *Financial development in Sub-SAharan Africa, Promoting Inclusive ans Sustainable Growth*. International Monetray Fund .
- Muhammad, S., Azu, N., & Oko, N. (2018). Influence of real exchange rate and volatility on foreign direct investment inflow in Nigeria. *International Business Research*, 11(6), 73-82. doi:10.5539/ibr.v11n6p73

- Nafiseh, K., Mosayeb, P., & Seyed, H. M. (2020). The Impact of Exchange Rate volatility on Banking Performance (case of Iran). *EconStor Open Access Articles and Book*, 39-56.
- Nwosa, P. I., & Emma-Ebere, O. (2017). The Impact of Financial Development on Foreign Direct Investment in Nigeria. *Journal of Management and Social Sciences*, 6(1), 181-197.
- Nzotta, S. M., & Okereke, E. J. (2009). Financial Deepening and Economic Development of Nigeria: An Empirical Investigation. *African Journal of Accounting, Economics, Finance and Banking Research*, 5(5).
- Obadan, M. I. (1994). Real Exchange rates in Nigeria: A preliminary study. *NCEMA Monograph series*, 6, 1-76.
- Odell, J. (1979). The U.S. and the Emergence of Flexible Exchange Rates: An Analysis of Foreign Policy Change. *International Organization*, 33(1), 57-81.
- Ogun, O., Egwaikhide, F., & Ogunleye, E. (2012). Real exchange rate and foreign direct investment in Sub-Sharan Africa: some empirical results . *Economia Mexicana NUEVA EPOCA, CIDE Division de Economia*, 175-202.
- Ogunleye, E. K. (2005). Exchange Rate Volatility and Foreign Direct Investment in Sub-Saharan Africa: Evidence From Nigeria and South Africa. . *Report, African Center for Economic Transformation Ghana* .
- Otchere, I., Soumare, I., & Yourougou, P. (2016). FDI and financial market development in Africa. 39(5), 651-678.
- Papadavid, P., Rewilak, J., & Brighty, N. (2017). Financial barriers to economic growth in low-income countries.
- Pham, H. T., Gan, C., & Hu, B. (2022). Causality between Financial Development and Foreign Direct Investment in Asian Developing Countries. *JRFM, MDPI*, 15(5), 1-26.
- Pokou, K. (2020). FDI Inflows and Financial Development in Ecowas: Causality Analysis in the Frequency Domain. *Asian Economic and Financial Review, Asian Economic and Social Society*, 10(8), 946-955.
- Polat, B., & Payaslioglu, C. (2015). Exchange rate uncertainty and FDI inflows: the case of Turkey. *Asia-Pacific Journal of Accounting and Economics*, 23(1), 112-129.
- Raifu, I. A., & Farayibi, A. O. (2022). Effect of Exchange Rate Volatility on Financial Sector Development: Evidence from Nigeria and South Africa. Retrieved from <http://dx.doi.org/10.21>
- Schmitz, M. (2009). Financial Reforms and Capital Flows to Emerging Europe. *The Institute for International Integration Studies Discussion Paper Series iisd278, IIIS*.
- Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica*, 48(1), 1-48.
- Sinha, A. K., Sahoo, S. K., & Pattanaik, D. (2015). A Study of Relationship Between Exchange Rate Volatility and Banking Indices (BANEX) – An Indian Perspective. *Srusti Management Review*, 8(2), 12-19.

- Soumare, I., & Tchana Tchana, F. (2015). Causality between FDI and Financial Market Development: Evidence from Emerging Markets. *The World Bank Economic Review*, 29(1), S205-S216.
- Suliman, A., Elmawazini, K., & Shariff, M. (2015). Exchange rates and foreign direct investment: Evidence for Sub-Saharan Africa. *The Journal of Developing Areas*, 49(2), 203-226.
- Takagi, S., & Shi, Z. (2011). Exchange rate movements and foreign direct investment (FDI): Japanese investment in Asia. *Japan and the World Economy*, 23(4), 265-272.
- Tan, L., Xu, Y., & Gashaw, A. (2021). Influence of exchnage rate on foreign direct investment inflows: An empirical analysis based on co-integration and granger causality test. *Mathematical Problems in Engineering*, 1-12. doi:<https://doi.org/10.1155/2021/7280879>
- Tsaurai, K. (2022). Role of financial sector development in foreign direct investment inflows in BRICS . *Investment Management and Financial Innovations*, 19(3), 215-228.
- Tsaurai, K., & Makina, D. (2017). Financial Development Threshold Levels for FDI: Evidence from Selected Upper-Middle Income Countries. *30th Australasian Finance and Banking Conferene*. Australia: Institute of Global Finance, Australian School of Business, University of New South Wales.
- Ubesie, M. C. (2016). The effect of variations in foreign exchange on financial depth: evidence from Nigeria. *European Journal of Accounting, Auditing and Finance Research*, 4(4), 56-64.
- Ullah, S., Haider, S. Z., & Azim, P. (2012). Impact of exchnage rate volatility on foreign direct investment: A case study of Pakistan. *Pakistan Economic and Social Review*, 50(2), 121-138.
- Uzoma-Nwosu, D., & Orekoya, S. (2019). Exchange rate volatility and foreign direct investment in Nigeria. *Euro Economica*, 38(2), 227-242.
- Vergil, H., & Cestepe, H. (2007). Foreign Direct Investment and Real Exchange Rate: A Causality Analysis. *Istanbul Stock Exchange Review, Research and Business Development Department, Borsa Istanbul*, 9(34), 35-44.
- Veundjua, M.-J., & Prashant, G. (2020). Assessing Foreign Direct Investment Long-Run Contribution to Financial Development: Evidence from Namibia. *Economics Bulletin, AccessEcon*, 40(4), 3111-3123.
- Wang, D. (2013). The Impact of Exchange Rate Volatility on Foreign Direct Investment in BRIC countries . *Research project submitted in partial fulfillment of the requirements for the degree of Master of Finance, Saint Mary's University* .
- Wilkins, M. (1998). Multinational Corporations: An Historical Account. In: Kozul-Wright, R., Rowthorn, R. (eds). *Transnational Corporations and the Global Economy*, 95-133.
- Xing, Y. (2006). Why is China so Attractive for FDI? The Role of Exchange Rates. *China Economic Review*, 17(2), 198-209.

Appendix:

A summary of the empirical literature on exchange rate movement and FDI in developed economies

Paper	Objective of the study	Methodology	Findings
Dewenter (1995)	To examine if exchange rate changes drive FDI in the US while exploring the relationship between the value of the US dollar and the flow and prices of cross-border acquisitions for the period 1975-1989.	OLS regression. The dependent variable (FDI) takes two separate forms: absolute and relative FDI. • Absolute FDI is measured as the consumer price index adjusted for inflation in nominal USD values. • Relative FDI is measured as the nominal USD value of FDI divided by a parallel measure of domestic M&A activity. Key explanatory variables include RER, and relative corporate wealth (measured using the USD value of foreign stock indices).	A depreciation of the US dollar is associated with higher levels of FDI flows into the US. The level of foreign relative to domestic investment shows no consistent or significant relation to the exchange rate.
Froot & Stein (1991)	To examine the relationship between the exchange rate and FDI in the US for the period 1973-1988.	OLS regression. The dependent variable is FDI inflows (measured as a percentage of US gross national product). The control variables include the real value of the US dollar (proxied using the IMF index for the real value of the US dollar).	A depreciation of the US dollar increases FDI inflows in the US.
Caves (1988)	To examine the impact of exchange rate movements on FDI inflows into the US with a focus on two specific channels: changes in the RER and expected short-run ER movements.	Panel regression. The depended variable is FDI inflows. The control variables include RER and ER.	There is a negative and significant correlation between RER and ER levels and FDI inflows into the US.
Bayoumi & Lipworth (1997)	To examine the relationship between exchange rate movements and Japanese FDI outflows, but also Japanese domestic and foreign fixed investment, for the period 1982-1995.	Panel regression using real bilateral data on FDI outflows from Japan to twenty of its major trading partners. The control variables include real investment in Japan, real investment in the recipient country, and the real bilateral exchange rate.	Aggregate FDI outflows have been driven largely by investment in Japan and the exchange rate. The geographic distribution of FDI outflows has been influenced by foreign economic conditions.

Takagi & Shi (2011)	To examine the impact of exchange rate movements on the volume of Japanese FDI flows towards nine Asian countries for the period 1987-2008.	GLS estimation. The dependent variable is real FDI flows. The control variables include RER, real GDP growth, degree of openness, and the ratio of labour cost in the host economy to Japanese labour cost.	A reduction in Japanese FDI due to a depreciation of the yen against the currency of host countries. Japanese FDI shows a negative response to the third moment of monthly RER changes.
Alba, Donghyun & Wang (2009)	To examine the impact of exchange rate movements on FDI inflows into the US for the period 1982-1994.	Markov zero-inflated Poisson regression. The model allows for FDI interdependence taken as a two-state Markov process where the two states are interpreted as favourable or unfavourable FDI environment. The dependent variable is exchange rate levels. The control variables include unit labour costs, sunk costs, and advertising expenses.	Exchange rate movements have a positive and significant effect on the average rate of FDI inflows under a favourable FDI environment.

A summary of the empirical literature on exchange rate volatility and FDI in developed economies

Paper	Objective of the study	Methodology	Findings
De Vita & Abbott (2007)	To examine the impact of the level and volatility of RER on FDI inflows into the UK for the period 1975-2001.	GMM panel estimation using disaggregated data in the manufacturing sector. The dependent variable is RER volatility. They control variables include economic growth, geographic distance, stock market growth, trade openness, and a language dummy variable.	Exchange rate volatility has a negative impact on FDI flows into the UK irrespective of the sector of destination of the investment. However, RER levels have an insignificant effect.
Chowdhury & Wheeler (2008)	To examine the impact of shocks to exchange rate volatility on FDI in Canada, Japan, United Kingdom, and the USA for the period 1972-2005.	Vector autoregressions model. The dependent variable is the RER and the volatility of the RER. The control variables include the price level, real output, and interest rate.	In Canada, Japan, and the United States, innovations to exchange rate uncertainty explain significant portions of the forecast error variance in FDI at longer time horizons. The impulse response functions indicate that, to the extent that shocks to exchange rate volatility have an impact on FDI, the impact is positive and takes place with a lag.
Amuedo-Dorantes & Pozo (2001)	To examine the effect of exchange rate levels and volatility on FDI inflows	OLS and GARCH. The dependent variable is the ratio of FDI inflows into the U.S. to the US GNP.	No statistically significant relationship between exchange rate and inward FDI in the short run. FDI decreases in response to an increase in exchange rate volatility in the long run.

	into the United States for the period 1976-1998.	The control variables include real trade weighted exchange rate and its volatility.	
Kiyota & Urata (2004)	To examine the impact of the RER changes and its volatility on FDI inflows to Japan for the period 1990-2000.	Feasible GLS using both aggregated and disaggregated industry data. The explanatory variables are RER and RER volatility. The control variables include relative labour costs, and an agglomeration effect.	A depreciation of the Japanese yen attracts FDI inflows while high volatility of the exchange rate discourages FDI inflows.

A summary of the empirical literature on exchange rate movement and FDI in developing economies.

Paper	Objective of the study	Methodology	Findings
Lily, Kogid, Mulok, Lim, & Asid (2014)	To examine the relationship between RER movements and FDI in Malaysia, Philippines, Thailand, and Singapore for the period 1971-2011.	Auto regressive distributed bounds. The explanatory variables are NER and RER	Exchange rate movement is a determinant for FDI inflows in the case of Singapore, Malaysia, and Philippines, but not in the case of Thailand. In the case of Philippines, Malaysia, and Singapore, a currency appreciation in each of these countries has a positive effect on FDI inflows.
Mandigma (2021)	To investigate the impact of RER movements on FDI in Indonesia, Malaysia, Philippines, and Thailand for the period 1970-2017.	Auto-regressive distributed lag. The dependent variable FDI is proxied using inward adjusted FDI (measured by inward FDI divided by GDP at constant prices). The key control variable is RER.	RER movements influence FDI in both the short and long run in the four countries examined. There is a short-run unidirectional causality of RER on adjusted FDI in Indonesia, Philippines, and Thailand. The long-run effect of RER on adjusted FDI is only evident in Thailand.
Tan, Xu, & Gashaw (2021)	To examine the influence of exchange rate movements and mechanisms on FDI flows in China for the period 1985-2019.	Vector error-correction model. The independent variables are NER along with cost-effect, wealth-effect, and demand-effect indices. The control variables include government spending and trade openness.	Continuous appreciation of the Chinese currency against the US dollar discourages FDI inflows into China. The wealth-effect mechanism describes the long-term relationship between exchange rate movements and FDI inflows into China.
Kizilkaya, Ucler, & Ay (2015)	To examine the interaction between RER movements and	Bound testing and auto regressive distributed lags. The control variables include trade openness and the rate of inflation.	RER movements, trade openness and the inflation rate have a positive effect on FDI inflows into Turkey.

	FDI into Turkey for the period 1989-2011.		
Ogun, Egwaikhide, & Ogunleye (2012)	To examine the relation between RER movements and FDI inflows in Sub-Saharan African countries for the period 1970-2005.	Simultaneous estimation technique. The dependent variable is FDI. The control variables include real effective exchange rate, inflation rate, interest rate, and real GDP.	A significant negative relationship between RER movements and FDI flows.
Mensah, Bokpin, & Ofosu-Hene (2015)	To examine the effect of exchange rate movements on FDI in Ghana for the period 1990-2012.	A robust regression and bootstrap method. The dependent variable is FDI. The control variables include exchange rate, inflation, and an index for the political atmosphere.	A depreciation of the Ghanaian cedis increases FDI inflows while political atmosphere has a positive relationship with FDI inflows indicating that it increases FDI inflows.
Chikwue (2019)	To examine the effect of exchange rate movements on FDI inflows in Nigeria for the period 1980-2017.	Auto regressive distributed lag and error correction mechanism within the framework of dynamic OLS. The control variables include exchange rate, interest rate, inflation rate, and trade openness.	FDI is affected by exchange rate movements in the short and long run. A depreciation of the Naira leads to an increase in FDI inflows into Nigeria.

A summary of the empirical literature on exchange rate volatility and FDI in developing economies.

Paper	Objective of the study	Methodology	Findings
Ullah, Haider, & Azim (2012)	To investigate the impact of exchange rate movements and exchange rate volatility on FDI in Pakistan for the period 1980-2010.	Cointegration technique and causality analysis. The dependent variable is FDI. The independent variables include exchange rate level, exchange rate volatility, trade openness, and inflation.	FDI is positively associated with depreciation of the Rupee while exchange rate volatility deters FDI. A Granger causality test suggests that exchange rate volatility causes FDI, not vice versa.
Martins (2015)	To examine the impact of RER volatility on FDI inflows in Brazil for the period 1976-2013.	Auto-regressive distributed lags. The independent variable is RER volatility. The control variables include GDP growth, population growth, trade openness, inflation, information infrastructure, and financial development.	In both the short and long run, RER volatility has a negative impact on FDI inflows in Brazil.
Durairaj (2010)	To examine the causal nexus between RER volatility and FDI	Johansen cointegration, vector error correction, and GARCH. The dependent variable is FDI. The	A long-run relationship among FDI and RER volatility. A depreciation of the RER leads to an increase in FDI

	inflows to India for the period 1990-2008.	independent variables include RER levels and RER volatility.	inflows. A decrease in RER uncertainty in the short run yields an increase in FDI.
Dhakal, Nag, Pradhan, & Upadhyaya (2010)	To examine the effect of exchange rate uncertainty on FDI inflows in China, Indonesia, Malaysia, Philippines, South Korea, and Thailand for the period 1974-2005.	Error correction and GARCH. The independent variable is RER volatility. The control variables include current account balance, real GDP, and trade openness.	Exchange rate volatility has a positive effect on FDI inflows in all the countries examined.
Wang (2013)	To explore the relationship between exchange rate volatility and FDI inflows in Brazil, Russia, India, and China for the period 1994-2012.	Autoregressive distributed lag, Error correction model. The dependent variable is FDI flows while the independent variable is exchange rate volatility.	Exchange rate volatility negatively affects FDI in Russia and India in the long run. In the short run exchange rate volatility affects FDI in China. No evidence of a relationship between exchange rate volatility and FDI in Brazil.
Polat & Payaslioglu (2015)	To examine the impact of RER level and its volatility on FDI inflows to Turkey for the period 2004-2014.	Markov switching model, GARCH. The independent variable is RER level and RER volatility. The control variables include indices for inflation, transportation costs, real-sector business confidence and communication costs.	No effect of RER levels and its volatility on FDI inflows to Turkey.
Muhammad, Azu, & Oko (2018)	To examine the effect of RER volatility on FDI inflows to Nigeria for the period 1970-2014.	Auto regressive distributed lag, GARCH methodology. The dependent variable (FDI) is proxied using FDI inflows as a percentage of GDP. The control variables include real GDP growth rate, RER and RER volatility. A dummy variable captures the political regime (democratic or otherwise).	A depreciation in the RER has appositive effect on FDI inflows in the short run. However, increases in RER volatility have negative effect on FDI inflows.
Uzoma-Nwosu & Orekoya (2019)	To examine the short and long run relationship between exchange rate volatility and FDI inflows in	Vector error correction model and GARCH. The dependent variable is inward FDI at current prices as a percentage of GDP.	Exchange rate volatility has no relationship with the net inflows of FDI into Nigeria neither in the short run nor in the long run.

	Nigeria for the period 1980-2017.	The explanatory variables include interest rate, growth rate of real GDP, growth rate of population, and RER volatility.	
Alnaa & Ahiakpor (2020)	To examine the relationship between FDI inflows and exchange rate volatility in Ghana for the period 1986-2017.	Generalized autoregressive conditional heteroskedasticity estimation technique. The control variables include RER, real GDP, the inflation rate, and the treasury bill rate.	Exchange rate volatility causes FDI volatility in the short run. The volatility in FDI is also influenced by volatility in real GDP and by the treasury bill rate.
Havi (2021)	To examine the impact of exchange rate volatility on FDI inflows in Ghana for the period 1970-2018.	Dynamic OLS. The control variables include the degree of openness, RER volatility, size of the economy, GDP level, and real GDP growth.	FDI inflows are negatively related to RER depreciation and the degree of openness. On the contrary, RER volatility and the size of the economy are associated with increased FDI inflows.
Ogunleye (2005)	To examine exchange rate volatility and FDI inflows in Sub-Saharan Africa for the period 1970-2005. Specific attention is focused on Nigeria and South Africa due to observed similarities in the relationship between exchange rate volatility and FDI.	Two-stage least squares, which allows the relationship between FDI and exchange rate volatility to be investigated within the context of a simultaneous equation through which both variables are jointly determined. The control variables include real effective exchange rate, RER volatility, demand volatility, real interest rate, infrastructure, and a dummy variable to capture capital controls.	Exchange rate volatility is associated with reduced FDI inflows while FDI inflows are associated with increased exchange rate volatility in both countries. Exchange rate volatility is driven by nominal shocks, foreign reserve shocks, and inflation in both countries.
Melku (2012)	To examine the short and long run impact of exchange rate volatility on FDI in Kenya, Uganda, and Tanzania for the period 1993-2010.	Unbalanced panel data approach. The control variables include real GDP, GDP growth, openness, RER, and RER volatility.	Exchange rate volatility has a negative effect on FDI in the three countries. The impact of exchange rate volatility is more pronounced in the long than in the short run when a country is more open to trade and investment.
Akinlo & Onatunji (2021)	To examine the relationship between	Autoregressive Distributed Lag model.	RER volatility has a higher significant effect on FDI flows than NER volatility. NER volatility turned out to

	exchange rate volatility and FDI inflows in selected West African countries for the period 1986-2017.	The control variables include real per capita income, infrastructural availability, trade openness, and exchange rate volatility (divided into RER volatility and NER volatility).	have a negative effect in all the countries examined; the effect was significant only in Ghana, Sierra-Leone, and Nigeria. On the contrary, RER volatility turned out to have a high negative effect in Sierra Leone, Cote d’Ivoire, Togo, and Nigeria.
Suliman, Elmawazini, & Shariff (2015)	To examine the relation between RER volatility and FDI for low-income countries in Sub-Saharan Africa for the period 1980-2003.	Panel data approach and two stage least squares. The dependent variable is FDI. The independent variable is the RER and RER volatility. The control variables include income level, income growth, and a dummy variable for whether the host country has a fixed exchange rate to the US dollar.	A depreciation of the RER yields an increase in FDI inflows. However, higher RER volatility is associated with greater volatility in FDI flows.
Eregha (2019)	To examine the effect of exchange rate, it’s uncertainty and volatility on FDI flows to the West African monetary zone for the period 1980-2014.	Panel data regression technique. The dependent variable is FDI inflows. The independent variables include the NER, NER volatility (measured in two ways – using the standard deviation and the GARCH approach). The control variables include real GDP, degree of openness, real GDP growth, inflation rate, and a dummy variable for the year when the West African monetary zone was formed.	Exchange rate movements are unanticipated rather than anticipated innovations which affect FDI inflows. The NER volatility measure, which accounts for predictable innovations, does not have a significant effect on FDI inflows. The uncertainty measure, which accounts for unpredictable exchange rate innovations, has a negative effect on FDI inflows.
Furceri & Borelli (2008)	To analyse the role of exchange rate volatility in the evolution of FDI inflows in 35 economic and monetary union neighbourhood countries for the period 1995-2004.	Panel data regression and generalized method of moments estimation. The dependent variable is FDI. They control variables include real GDP, level of GDP per capita, openness, trade barrier, inflation, investment prices, a dummy for the Asian crisis and a dummy for the Russian crisis.	The effect of exchange rate volatility on FDI inflows depends on a country’s degree of openness. Countries that operate a relatively closed economy are positively affected by exchange rate volatility. By contrast, countries that operate with a relatively high degree of economic openness are affected negatively by exchange rate volatility.
Hanusch, Nguyen, & Algu (2018)	To investigate the relationship between real effective exchange rate volatility and FDI inflows using a sample of 80 developing	Pooled OLS. The dependent variable is FDI. The control variables include GDP per capita, terms of trade, real effective exchange rate, time dummies to capture the time at which global effects impact all	There is a negative relationship between RER volatility and FDI inflows.

	countries for the period 1990-2015.	countries, and country dummies to capture the time-invariant fixed effects within a country.	
Latief & Lefen (2018)	To examine the effect of real effective exchange rate volatility on international trade and FDI flows in developing countries along the “one belt and one road” project for the period 1995-2016.	Panel data regression. The dependent variable is FDI. The control variables include exchange rate volatility, inflation, real GDP growth, interest rate, industrial growth, an economic-freedom index, and international trade.	Exchange rate volatility has a negative effect on FDI flows and international trade.

A summary of the empirical literature on foreign direct investment and financial development in developed economies

Paper	Objective of the study	Methodology	Findings
Dellis (2018)	To examine if a developed and deep financial system attracts foreign direct investment inflows in 39 advanced and emerging economies for the period 2005-2016.	Two-step generalized method of moments (GMM) estimator and the system GMM approach. Foreign direct investment is measured as inward FDI flows in millions of US dollars. Financial development is measured using 25 different variables drawn from different financial databases covering financial depth, financial efficiency, and financial access.	The depth of domestic financial markets and ease of access to credit are significant determinants for FDI inflows. More specifically, an increase in the financial development index and financial market index spurs an increase in FDI inflows.
Desbordes & Wei (2017)	To investigate the effects of source and destination countries financial development on real manufacturing FDI projects in 83 source countries and 125 destination developed and developing countries for the period 2003-2006.	Poisson fixed effects estimator (conditional maximum likelihood version) and the Fixed effects logit estimator.	Both source and destination country financial development have a significant and positive effect on greenfield, expansion, and mergers and acquisition FDI inflows.

Bayar & Gavriletea (2018)	To analyse the short-run and long-run interactions between financial development and FDI inflows for a panel of 11 Central and Eastern European Union (CEEU) countries for the period 1996-2015.	Panel cointegration and causality test.	FDI inflows does not have a significant effect on financial development in the short-run and long-run. However, financial development had a significant effect on FDI inflows in the countries examined. Financial development in CEEU countries increases FDI inflows.
Bilir, Chor, & Manova (2019)	To evaluate the influence of host country financial conditions on the global operations of multinational firms at the aggregate level and at the affiliate-level using detailed data of US multinationals abroad for the period 1989-2009.	Panel fixed effect estimation	Financial development in the host country is associated with an increase in the entry of multinational affiliates with the effects more pronounced in financially more vulnerable sectors.
Dellis (2019)	To examine whether financial system heterogeneity acts as a detrimental factor for FDI flows across organization for economic cooperation and development countries for the period 2005-2016.	Poisson pseudo maximum likelihood estimation (PPMLE).	Heterogeneity in financial system indicators has a negative and significant effect on bilateral FDI flows among OECD countries.
Schmitz (2009)	To analyse the role of financial sector development in stimulating net capital inflows for European transition countries for the period 1995-2006.	Panel data methodology.	Banking sector reforms have a positive effect on gross capital inflows.
Gurler & Kara (2020)	To investigate the relationship between foreign direct investment and financial development for 36 OECD countries for the periods 1997, 2003 and 2006; and 2010-2016.	Panel data random and fixed effects estimators.	Financial development is a significant determinant of FDI inflows and vice-versa.

A summary of the empirical literature on foreign direct investment and financial development in developing and emerging economies.

Paper	Objective of the Study	Methodology	Findings
Pham, Gan, & Hu (2022)	To investigate the linkage between FDI and financial development in 30 Asian developing countries for the period 1986-2019.	System generalized method of moments estimator.	An increase in the levels of financial development significantly increased FDI inflows into the Asian developing countries (ADC). An increase in FDI inflows also affected the performance of Banks and stock markets in ADC positively.
Kaur, Yadav, & Gautam (2013)	To analyse the impact of financial development on FDI inflows with a focus on BRIC countries (Brazil, Russia, India, and China) for the period 1991-2010.	Panel data random and fixed effect models.	FDI inflows is positively affected by the size of stock market capitalization and size of the banking sector in BRIC countries.
Tsaurai & Makina (2017)	To investigate the financial development threshold levels that influence FDI inflows using a panel of 11 upper-middle income emerging economies for the period 2004-2014.	Dynamic panel threshold regression model.	Higher stock market development and banking sector development above the threshold levels have a significant and positive impact on FDI inflows.
Hajilee & Al Nasser (2015)	To examine the short-run and long-run effect of financial market development on FDI inflows in Latin American countries for the period 1980-2010.	Bounds testing approach to cointegration and error correction modelling.	Financial market development has a significant and long-run effect on increasing the FDI inflows of 11 out of the 14 countries sampled for the study.
Tsaurai (2022)	To examine the influence of financial sector development on FDI inflows in BRICS countries which include Brazil, Russia, India, China, and South Africa for the period 1991-2020.	Panel fixed effects, pooled ordinary least square, and fully modified ordinary least square method.	Financial development significantly increases FDI inflows into Brazil, Russia, India, China, and South Africa.
Soumare & Tchana Tchana (2011)	To examine the causal relationship between FDI and financial market development using 29 emerging	Panel vector autoregressive model.	Foreign direct investment and stock market development impact each other positively. However, there is an ambiguous causality between

	markets economy for the period 1994-2006.		banking sector development and foreign direct investment.
Abzari, Zarei, & Esfahani (2011)	To investigate the causal link between FDI and financial development using a panel of eight developing countries for the period 1976-2005.	Vector autoregressive model.	There is a significant causal link between FDI and financial markets development.
Haque, Biqiong, & Arshad (2022)	To investigate the long-run and short-run effects of different sources of financial development on FDI inflows for middle-income economies for the period 1980-2020.	Panel autoregressive distributive lag.	Financial market development has a positive and significant impact on FDI inflows in the short-run and long-run.
Alsmadi & Oudat (2019)	To analyse the short-run and long-run relationship between FDI and financial development in Bahrain for the period 1978-2015.	Autoregressive distributed lag approach.	There is a significant and positive relationship between financial development and foreign direct investment in the short-run and long-run. There is also a bidirectional causality relationship between financial development and foreign direct investment.
Kharabsheh & Aldaher (2020)	To examine the causal effect between FDI and financial market development (stock market development and banking sector development) in Jordan for the period 1978-2017.	Vector autoregressive model.	There is a positive and significant effect between stock market development and FDI; however, there is no evidence of such effect between banking sector development and FDI.

A summary of the empirical literature on foreign direct investment and financial development in Nigeria and Africa.

Paper	Objective of the study	Methodology	Findings
Nwosa & Emma-Ebere (2017)	To examine the relationship between foreign direct investment and financial development in Nigeria for the period 1980-2015	Vector error correction model	There is a positive relationship between financial market development and foreign direct investment in the short-run, while in

			the long-run there is a negative relationship between financial market development and foreign direct investment.
Gupta & Muruko-Jaezuruka (2020)	To investigate the impact of foreign direct investment on financial development in Namibia for the period 1990-2017.	Error correction model and Granger causality approach.	There is a positive and significant relationship between foreign direct investment and financial development as an increase in FDI inflows yields an increase in financial development.
Keho (2020)	To investigate the relationship between foreign direct investment and financial development for 10 member countries of the Economic Community of West African States for the period 1970-2017.	Common correlated effect mean group estimator.	There is no evidence of causality between financial development (domestic credit to private sector) and foreign direct investment. Using an alternative measure of financial development (money supply as a share of GDP), there is a bidirectional causality between financial development and foreign direct investment in the short run.
Ganiyu, Abidemi & Enitan (2018)	To investigate the link between foreign direct investment and financial development with the primary objective to examine if foreign direct investment is a substitute or complement to financial development in Economic Community of West African States (ECOWAS) for the period 1980-2014. 0	Two-step system generalized method of moment.	Financial sector development has a negative and significant effect on foreign direct investment inflows in ECOWAS. However, foreign direct investment inflows have a positive and significant effect on financial development in ECOWAS which indicates that FDI serves as a complement to financial sector development.
Agyapong, Asiamah, & Crabbe (2019)	To examine the effect of capital inflows on financial development in Ghana for the period 1970-2014.	Johansen-Juselius multivariate cointegration approach.	In the long run, foreign direct investment has a negative and significant impact on financial development while in the short run, there is no significant relationship

			between foreign direct investment and financial development.
Odhiambo (2021)	To examine the causal relationship between financial development and foreign direct investment in Sub-Saharan Africa (SSA) for the period 1980-2018.	Multivariate panel granger-causality model.	In the short and long run, there is a unidirectional causality from foreign direct investment to financial development when liquid liabilities are used as a proxy for financial development. In the long run, there is a unidirectional causal flow from financial development to FDI when deposit money bank assets are used as a proxy for financial development.
Adaramola & Obisesan (2015)	To assess the impact of foreign direct investment on capital market development in Nigeria for the period 1970-2010.	Ordinary least square regression.	Foreign direct investment has a significant and positive impact on market capitalization in Nigeria.
Henri, Luc, & Larissa (2019)	To analyse how FDI affects financial development in the short run and long run for a panel of 49 African countries for the period 1990-2016.	Panel autoregressive distributed lag model.	In the short run, the effect of FDI on financial development is negative while in the long run there is a positive and significant relationship between FDI and financial development in Africa.
Otchere, Soumare & Yourougou (2016)	To investigate the interaction between foreign direct investment and financial market development (FMD) in Africa for the period 1996-2009.	Dynamic panel data estimator with one step generalized methods of moment system.	There is a bidirectional causality between FDI and FMD, thus, FDI and FMD impact each other simultaneously. There is a positive relationship between FDI and FMD in Africa.
Pokou (2020)	To examine the causal relationship between FDI inflows and financial development in ECOWAS using a country-by-country study approach for the period 1980-2017.	Time domain granger technique and frequency domain test.	The causality between financial development and foreign direct investment is mixed across different frequencies having unidirectional causality, bidirectional causality, and absence of causality.

A summary of the empirical literature on exchange rate and financial development.

Paper	Objective of the study	Methodology	Findings
Hajilee & Al Nasser (2014)	To investigate the effect of exchange rate uncertainty on stock market development as one of the most important indicators of financial development for 12 emerging economies for the period 1980-2010.	Bounds testing approach and error correction model.	Exchange rate volatility has a negative effect on stock market development in China, Mexico, Pakistan, and Venezuela while in Philippines and South Africa exchange rate volatility positively affects stock market development.
Bristy (2014)	To analyse if the level of financial development has any impact on the exchange rate volatility and growth relationship in Bangladesh for the period 1980-2012.	Ordinary least square.	Exchange rate volatility has an adverse effect on the growth of Bangladesh because the financial market of the country isn't well developed.
Nafiseh, Mosayeb & Seyed (2020)	To examine the impact of exchange rate volatility on Banks performance in 14 Iranian Banks for the period 2007-2017.	Panel random effect model.	Exchange rate volatility has a negative effect on Banks capital return ratio, a positive effect on the loan to deposit ratio, and a positive effect on the ratio of lending to total bank deposits.
Sinha, Sahoo & Pattanaik (2015)	To explore the relationship between stock market performance (banking sector stock prices) and exchange rate for the period 2012-2014	Ordinary least square regression.	In the short run, exchange rate affects the performance of the stock market positively while in the long run it has no significant impact on performance of the stock market.
Raifu & Farayibi (2022)	To examine the effect of exchange rate volatility on financial development in Nigeria and South Africa for the period 1970-2017.	Autoregressive distributed lag model.	Exchange rate volatility has a negative effect on financial development in Nigeria while it has a positive effect on financial development in South Africa.
Fapetu, Adeyeye, Seyingbo, & Owoye. (2017)	To examine the impact of exchange rate volatility on stock market performance in Nigeria for the period 1986-2014.	Autoregressive conditional heteroscedasticity, Generalized conditional autoregressive heteroscedasticity, Exponential	Exchange rate volatility has a positive relationship on stock market capitalization rate.

		generalised autoregressive conditional heteroscedasticity, and threshold autoregressive conditional heteroscedasticity.	
Abanikanda (2022)	To examine the effect of exchange rate volatility on the depth and efficiency of Nigeria's financial sector for the period 1986-2018.	Autoregressive distributed lag cointegration.	In the short and long run, exchange rate volatility has a negative effect on financial institutions efficiency and depth. Exchange rate volatility has a negative effect on financial market depth in the short run, but it has no effect in the long run while it has a negative effect on financial market efficiency in the short and long run.
Ani, Ugwunta, & Okanya (2013)	To evaluate the overall effect of foreign exchange reforms on the financial depth of Nigeria for the period 1982-2009.	Ordinary least square.	Exchange rate movements has a negative relationship on financial deepening. Foreign exchange reforms have a negative effect on financial sector depth in Nigeria.
Ubesie (2016)	To examine the effect of variations in foreign exchange on the financial depth of the Nigerian economy for the period 1985-2015.	Ordinary least square multiple regression.	Variations in foreign exchange have a negative effect on the depth of the Nigerian financial sector.

