

## Does the Quality of Banking Assets Impact FDI Inflows? Evidence from 8 Western European Countries

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### Abstract

*This research paper focuses on the effects of banking assets quality on foreign direct investment (FDI) inflows in eight (8) western European nations using panel datasets spanning the period 2011 to 2018. Following theoretical backing on the variable selection which is in three-fold (Guyon and Andr e Elisseeff, 2003): to improve the prediction performance of the predictors, provide faster and more cost-effective predictors, and lastly to provide a better understanding of the underlying process that generated the data, five components of assets were selected to measure bank's asset quality. These are Total assets (TA), Loan loss reserves (LLR), net interest receivables (NIR), Loans and Profit/loss from bank real estate (RE). Findings from the panel data analysis showed a positive association between the quality of banking assets and the FDI inflows with other additional tests indicating the existence of long-run linkages between the variables. Also from the pairwise granger causality test, both bidirectional and unidirectional causal linkages were seen to exist between FDI inflows and the banking assets suggesting that pragmatic policies along these lines can help enhance these assets and as a result improve FDI inflows.*

**Keywords;** Panel data analysis, FDI inflows, Banking assets, Long run relationship, Western European countries, policies, variable selection techniques.

### 1. Introduction

Economies develop when a solid financial system is framework functioning admirably. Nations with banks that keep a robust asset quality throughout the years been perceived as being monetarily steady and as such blessed with high monetary and liquidity strength. Additionally, the financial houses or firms in these propelled nations can move past the shores of their own borders and put resources into both developed and emerging markets alike in order to gain enduring interest for those business sectors. These opportunities are generally done by way of mergers and acquisitions and it is exceptionally normal with European banks. As indicated by OECD (Organization for Economic Co-operation and Development), lasting interest is determined when the contributing association acquires a minimum of 10% of voting power in the other organization. The benefits derived from such ventures are immeasurable and include increased employment and economic growth, an increase in exports, stimulation of economic development, improved capital flow and exchange rate stability. Also there is the propensity to boost foreign direct investment (FDI) inflows in that direction. Moreover, from unequivocal examinations led by **Wong and Tang, 2011; Trevino and Mixon, 2004; Campos and Kinoshita, 2008**, it is obvious that the significance of foreign direct investment (FDI) for economic development are tremendous to the host country with another spillover effects being supplying capital, providing a source of technology and know-how. This gives an indication of some sort of bidirectional causal linkages running from the direct investments of these financial houses to economic emancipation. Hypothetically, banking assets are extensively founded on several of these comparison factors; the adequacy of underwriting standards, safe administrative practices, effective risk monitoring practices, the adequacy of the allowance for mortgage and loan losses, the nature of performing and non-performing on and off balance sheet transactions, commercial and standby letters of credit, the diversification and quality of loans and investment portfolios. (**Ferrouhi, El Mehdi, 2018**).

In this paper, we will consider using a different lens to examine the variable selection technique of the components of quality banking asset and afterward attempt to establish a relation between the inflows received from foreign direct investment (Capital investment) of 8 western European countries (Belgium, France, Germany, Netherlands, United Kingdom, Luxembourg, Switzerland and Ireland) and these banking

assets for the periods 2011 to 2018. In spite of lots of written works highlighting the way that well-functioning banking institutions and financial markets contribute to economic growth by decreasing transaction costs none of them has studied how countries are having banks with quality assets impact a country's foreign direct investments (FDI) inflows. To come to an extremely educational end result, both the fixed effect model and the random effect model will be employed on the panel secondary data and further use the Hausman test to select the appropriate model to clarify our discoveries. To test if the variables are stationary, the Panel unit root technique will be used and the data differenced where stationary. To investigate the hypothesis that there is a statistically significant connection between the variables the panel cointegration technique will be applied. The granger causality test will also be utilized in accessing the unidirectional and/or bidirectional linkages between the foreign direct inflows (FDI) and the asset quality of banks.

The core aim of this research will be to provide answers and solutions to the following questions; <sup>1</sup>can countries with banks that have high positive credit constraint be in a better position for capital investment in other advanced or emerging markets, <sup>2</sup>can huge total asset base of banks lead to an improvement in foreign direct investment inflows through capital investments, <sup>3</sup>if there exists a significant linkage between the qualities of assets owned by banks in a particular country and the country's ability to grow economically by means of inflows from their foreign direct investment. The hypothetical theories that will rouse our selection of factors and furthermore methodology for this study will be based on advanced research work conducted by various researchers such as **Dr. Emeritus Elisabeta JABA, Dr. Ioan-Bogdan ROBU, Dr. Christiana Brigitte BALAN(2017) ,Dimple Goyal and Ritu Jain (2014), Prince Jaiblai and Vijay Shenai (2019), Louzis, Vouldis & Metaxas (2010), Klein, (2013)**. Statistical methodologies including the Fixed and Random effect model would be applied and some very important tests such as the panel unit root and cointegration test will also be performed to identify the long or short run relationship between the response and explanatory variables. The findings from the research will be the premise on which to conclude if the FDI of the 8 western European nations is truly impacted by the asset quality of Banks or not. One major contribution of this research will be the information overflows to the scholastic writing of other future research and to other parts of the economies being discussed. Again from this study, regulations that will bolster the advancement of financial markets in these countries understudy will be made by policy makers hence improving foreign direct investment inflows (FDI) in the long term. Some other end-effect benefits will be the ability of these countries to pull in foreign investors who may bring additional financing to help quicken the investment process and economic growth.

The Paper will be composed and organized in reasonable, concise, and well-formatted sections, comprehensively sorted as **Section 2** detailed theoretical literature reviews, **Section 3** elaborates on the country level FDI's and banking asset quality, **Section 4** data type and methodology and, **Section 5** analytical results and interpretation and **Section 6** the conclusion.

## 2. Theoretical literature review

In theoretical studies, the linkages between this study and previous research work can be structured into three major segments namely; the FDI and its importance, the factors affecting FDI and the Asset quality of Banks.

### 2.1. The FDI and its importance

**Dimple Goyal and Ritu Jain (2014)** studied the effect of FDI on the Indian economy by breaking down the pattern of FDI value inflows in various segments and regional offices. Secondary data from the periods of 2000-2013 gathered from different journals, books, newspapers and websites were utilized and the method employed was Statistical tool percentages. The outcomes indicated that India got the most extreme FDI inflows and advantages, for example, cheaper wages, special investment privileges (e.g. tax exemptions), employment generation, poverty reduction, capital formation and an increase in the level of standard transfer of new technology from Mauritius and Singapore. **Paula Nistor (2014)** learned about the FDI and economic growth of Romania. She applied regression models on a series of data from the World Bank crossing the

period 1990-2012. Her dependent variable was the gross domestic product (GDP) and the independent variables, foreign direct investment inflows (FDI), government expenditure (GE) and gross fixed capital formation (GFCF). The findings revealed that there is a correlation between FDI and economic growth and that FDI inflows have a positive influence on GDP. **(Carkovic and Levine 2002; Buckley et al. 2002; Feenestra and Markusen 1994)** speculated that FDI is a significant source of technological change and a way to improve the human capital and have the effect of promoting modern technology in the host country. **(Borensztein et al.1998)** used regression analysis methods for her research. As a result of the research, there is strong support that FDI can be viewed as a functioning element in the development and adaptation to the market economy and competitiveness. In the case of Romania FDI is an element that conditions the achievement of the proposed restructuring program of financial change. Her outcomes indicated a significant connection between FDI and economy growth more than domestic investments. **Milan Šušić (2018)** examined how direct investments have financed the economy of Bosnia and Herzegovina and furthermore on its significance on the worldwide scale by placing emphasis on activities that must be done so as to realize those investments. The variables used were Gross domestic product at market prices (Current prices, million units of national currency: GDP and main aggregates) of 28 European countries obtained from Eurostat. She used both statistical and quantitative diagnostic techniques to show whether the inflow of foreign capital is an essential prerequisite for creating and quickening of economic improvement when all is said in done. The findings of her research demonstrated that; first, FDI increases the domestic investment rates and rates of doing business. Further benefits received by Bosnia were the transfer of experiences, new knowledge and new technologies.

## 2.2 The Factors affecting FDI

**Prince Jaiblai and Vijay Shenai (2019)** in their exploration investigated the determinants of FDI in ten sub-Saharan economies: Liberia, Sierra Leone, Ivory Coast, Ghana, Nigeria, Mali, Mauritania, Niger, Cameroun, and Senegal by using a set of cross-sectional data over the period 1990–2017. Two econometric models were assessed with FDI/GDP (the ratio of Foreign Direct Investment to Gross Domestic Product) as the dependent variable, and with inflation, exchange rate changes, openness, economy size (GDP), income levels (GNI/capita (Gross National Income) per capita), and infrastructure as the independent variables. The sources of data collected for dependent and independent variables included the World Bank, IMF and other journals. Their study revealed that over the period, higher inflows of FDI in relation to GDP seem to have been pulled in to the business sectors with a better framework, smaller markets, and lower income levels and with higher openness. **Dr. Sevinç GÜLER ÖZÇALIK, Garmonyou Gerald Gibson (2016)** studied about the components influencing Flow of Foreign Direct Investment of South Africa from 1970-2014. Sources of the data were websites of the World Bank and the Reserve Bank of South Africa and the technique utilized for the investigation was the Multiple Linear Regression. The main idea of the exploration was to set up a connection between Foreign Direct Investment and Gross Domestic Product, Real Interest Rates, Gross National Income, Gross National Expenditure, Official Exchange Rate and Gross Fixed Capital Formation. The empirical results from the research showed that Gross Domestic Product, Gross National Income, and Gross Fixed Capital Formation are profoundly huge and decidedly influence FDI stream to the Rainbow Nation while National Expenditure negatively influenced FDI stream. Notwithstanding, Official Exchange Rate and Real Interest Rates have no statistically significant relationship with the FDI inflow to South Africa. **Goldberg and Klein (1998)** considered the relationship existing between trade, FDI and the real exchange rate of South East Asia and Latin American Countries by using Japan and the United States as the case study. The outcomes demonstrated that FDI by both the United States and Japan to the East Asian countries were significantly related to real exchange rates. Likewise from the outcome, it was seen that trade significantly affected FDI. **Abdela et al (2015)** researched the determinants of FDI to 33 Sub-Saharan African countries for a 14 year period from 1998-2012. With the end goal of his exploration, he sorted his factors into five main parts: Economic Determinants (Market Size, Rate of Return, Government Consumption, Exchange Rate, & Inflation); Institutional Factors (Trade Openness, and Official Development Assistant); Infrastructural variables (Telephone line per 100 people & Electricity production); Human Capital Accumulation variables ( Total Labour Force, Primary and Secondary school completion as well as Enrolment Rates); and Natural Resource variable (Natural Resource rents). The fixed effect regression

method was employed by the researcher and his findings revealed that Rate of return, Trade openness, Official development assistance, Electricity production, Natural resource rent and Human capital accumulation are significant determinants of FDI inflow. On the other hand Inflation negatively affected FDI inflow. **Antwi et al. (2013)** studied the connection between FDI and economic growth in Ghana. His study depended on yearly time series data from 1980-2010. The researcher employed the simple ordinary least square (OLS) regressions for his analysis and he used GDP growth rate, GDP, GNI, External Debt Stock, manufacturing value added, trade, inflation, Industry Value Added and FDI as factors. As indicated by his outcomes GDP growth rate, GDP, GNI, Manufacturing value added, and trade significantly influenced and explained FDI at the within a 95 percent confidence interval. **Pham and Duc Nguyen (2013)** attempted to establish a linkage between FDI, Real Exchange rate and export in a cointegration framework in Vietnam. The result indicated that exports are essentially influenced by Real Exchange Rates while exports are also significantly affected by FDI. **Adrino et al. (2012)** built up a linkage between the impacts of FDI on economic growth. He used real GDP as his response variable and domestic investment, real exchange rate, foreign marketable debt and FDI as his regressors. From the research findings he proposed that the long run relationship between FDI, real exchange rate and foreign marketable debts and growth was significantly negative. However the short run results indicated that FDI impacts growth positively. **Brzozowski et al. (2003)** in his research paper the Exchange Rate Variability and Foreign Direct Investment: Consequences of EMU (European Economic and Monetary Union) Enlargement studied about the impact of the reduction in exchange rate uncertainty due to the European Economic and Monetary Union accession on the intensity of FDI inflow into accession countries. The findings indicated that exchange rate volatility negatively impacts the capital investment decisions in accession countries. The work of **Boahen and Evans (2014)** showed a short-run and long-run movement of interest rate volatility, exchange rate volatility and FDI when the vector auto regression model was employed. From their findings it very well may be seen that the instability of interest rate affects exchange rate and market attractiveness and thus affect FDI in the long run. In addition, the results further indicated that a stable exchange rate and interest rate increase FDI inflow in Ghana. Studies from **Kyereboah-Coleman & Agyire-Tettey (2008)** on exchange rate volatility and its effect on FDI in Sub Saharan Africa gave similar results. Their findings showed that exchange rate volatility negatively affects FDI inflow however political factors are most likely to attract foreign investors. Their results also stated that these investors are not so much interested in the market size in making decisions to invest in Ghana. **Awan et al. (2014)** studied the relationship between FDI and Gross Capital Formation, Gross National Income, Import, Export, External Debt and Military Expenditure of Pakistan. Multiple linear regressions were employed to analyse his datasets. His results indicated that gross capital formation, exports, gross national income have a significant and positive effect on FDI flow to Pakistan. In the interim, external debt also was significant but negatively affected FDI flow while imports have a negative relationship with FDI inflow to Pakistan. The outcomes however demonstrated that Expenditures have a negative relationship with FDI inflow. **Jadhav et al. (2012)** studied the determinants of FDI in BRICS Economies by breaking down economic, institutional and political factors. The BRICS countries used for the study include Brazil, Russia, India, China and South Africa. The analyst utilized panel data and multiple regression methods for the 10 years span study (2000-2009). The variables used were Trade openness, Market size, Natural Resources as economic determinants while macroeconomic stability in the form of interest rate; Political Stability (No violence), Control of Corruption, Government effectiveness, Regulatory quality, Voice and Accountability, Rule of Law used as institutional and political determinants of FDI. The overall outcome showed that economic factors are more significant than political and institutional factors that drive FDI flow in BRICS economies. Furthermore, the results proposed that market size which is a measure of real GDP is significant and that most investment in the BRICS countries is driven by market advertisement. In the studies of **Gichamo et al. (2012)** on the determinants of Foreign Direct Investment inflows to Sub Saharan Africa: a data analysis approach, the research found that Gross Fixed Capital Formation, GDP, GDP per capita, Trade Openness, GDP growth, Inflation are significant explanatory variables for the flow of FDI to Sub Saharan African Countries. As per the discoveries of **Chen and Démurger (2002)**, FDI is a significant supporter of the absolute factor productivity and income growth in host economies more than domestic investment. They further strengthen their contention that policies advancing indigenous technological capacity, like technical training, formal higher education as well as research and development increase the aggregate rate of technology transfer



from FDI. According to them export promoting trade regimes are significantly the basis for positive impact on FDI.

### 2.3 The Asset quality of Banks

**Petar Kasavica and Zoran Jović (2015)** investigated the effect of asset quality on the bank's profitability by studying commercial banks in Serbia. Parameters utilized as key markers of the effect on productivity were; maturity of the portfolio, clients' ratings, NPL (Non-Performing) loans, effective coverage of the total portfolio with collaterals and effective coverage of NPL portfolio with collaterals. To test the impact of these parameters on the dependent variable, they used the fixed effect regression model. The findings of their examination demonstrated that the impact of asset quality on the profitability of commercial banks resulted in low FDI inflows since a higher level of NPLs increases the provisions towards the defaulters and reduces the level of profitability and ability to pursue investment decisions. **Klein et al. (2013)** studied the quality loans and their impact at the macroeconomic level, banking sector level and individual banks. Data for the research were based on NPLs in Central, Eastern and South-eastern Europe (CESEE) in the period of 1998-2011 and method used was the panel vector auto-regression (VAR) analysis. The findings revealed that macroeconomic factors (unemployment, the change in credit-to-GDP ratio and inflation) that impact FDI negatively were also the determinants of increases in NPLs. From his findings a positive linkage can be made between an increase in FDI inflows and the quality of Loans of Banks. Likewise, it very well may be expressed that FDI and Quality of loans have a significant positive relationship since from the studies of **Louzis, Vouldis & Metaxas, (2010)**, after they applied the dynamic panel data methods for testing the determinants of non-performing loans (NPLs) in the Greek banking sector, for every class of loans such as consumer loans, business loans and mortgage loans, their findings showed that both macroeconomic factors (unemployment, the change in credit-to-GDP ratio and inflation) which have an impact on FDI inflow also impacted the credit quality and asset quality of banks. **Angebazo et al (1997)** explored whether banks with more risky loans and greater exposure to interest rates risks concentrate most of their investments in a diversified portfolio of securities and off-balance hedging instruments. The datasets were based on commercial banks for the period 1989-1993 and the Regression models were used for the analysis. The findings indicated that banks would want to take part in direct investments to boost the net interest margins since net interest margins of the biggest banks were influenced by the danger of default (non-return) obligations, but not the interest rate risk, and is consistent with a higher concentration of their investments in a diversified portfolio of securities and off-balance hedging instruments. It can hence be inferred from their research that Banks invest in increasing their net interest margins which further boost the FDI inflows of a nation. **Festus Kimanzi Nzoka (2015)** examined the impacts of assets quality on the financial performance of commercial Banks in Kenya, between the years 2010 to 2014 and the method applied was the regression analysis. The secondary data was obtained from the annual Central bank of Kenya Banks's supervision reports. The analysis showed that all the asset quality factors had a fairly statistically significant impact on financial performance. This was because asset quality cannot exclusively decide the financial performance of commercial banks, unless other factors such as capital adequacy, management efficiency, earnings performance and liquidity are considered. In view of the discoveries, the investigation prescribed that for high asset quality levels to be achieved, improved investment assets levels and the low rate of Non-Performing Assets are to be realized through credit risk identification, measurement, monitoring and controlling. In light of the findings their research tends to be the reason that improved quality assets of banks enhance the financial performances which can better aid in direct investments, hence improving FDI inflows and its associated benefits.

### 2.4 Comments on the literature review

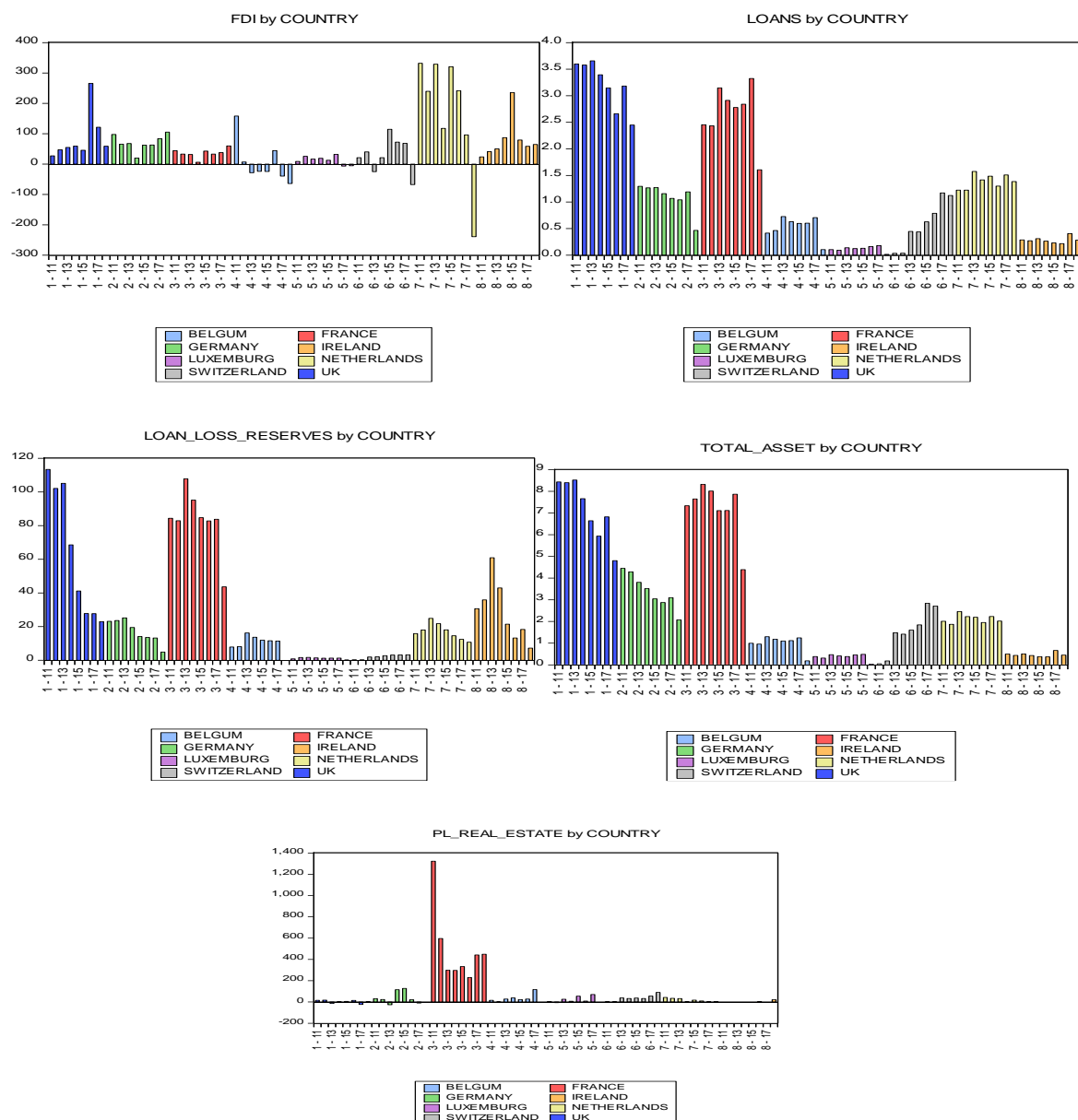
The literature work of other researchers has given a more extensive comprehension of how FDI's are significant and also how banking quality assets impact a nation's development through FDI's. However, the benefits of FDI's to the host and home nations which are cheaper wages, special investment privileges (e.g. tax exemptions), employment generation, poverty reduction, capital formation and increase in the level of standard transfer of new technology can be completely accomplished just when businesslike approaches are

very much evolved and actualized. Thus from broad hypothetical information, it is clear that government agencies and policy makers be increasingly centred around utilizing limited resources to pull in a subset of FDI flows, instead of FDI all in all. One of the most significant indicators that have demonstrated to be essential for attracting investors, is the ability of government to promote policies that enhance the domestic capacity of its inhabitant and also target drawing specifically some categories of FDI that are capable of generating overflow impacts in the general economy. Some areas of host nation meriting policy promotion include Gross Domestic Product, Gross National Income, and Gross Fixed Capital Formation, higher openness for increased international competitiveness and exports since these factors are highly significant and positively affect FDI flow to those nations. Additionally, these policies must tone down the Gross National Expenditure, Inflation, external debt and exchange rate volatility since these factors negatively affect FDI flow. The general wisdom here is that economies must move to the phase where elusive advantages of FDI's such as improved technologies, development of local human resources and skills transfers are considered in formulating policies. On the other hand, it is important that banks and companies with good asset quality look for better investment positions in other nations and emerging economies to capitalize on profit and growth.

### **3.0. Country level FDI inflows and banking asset quality**

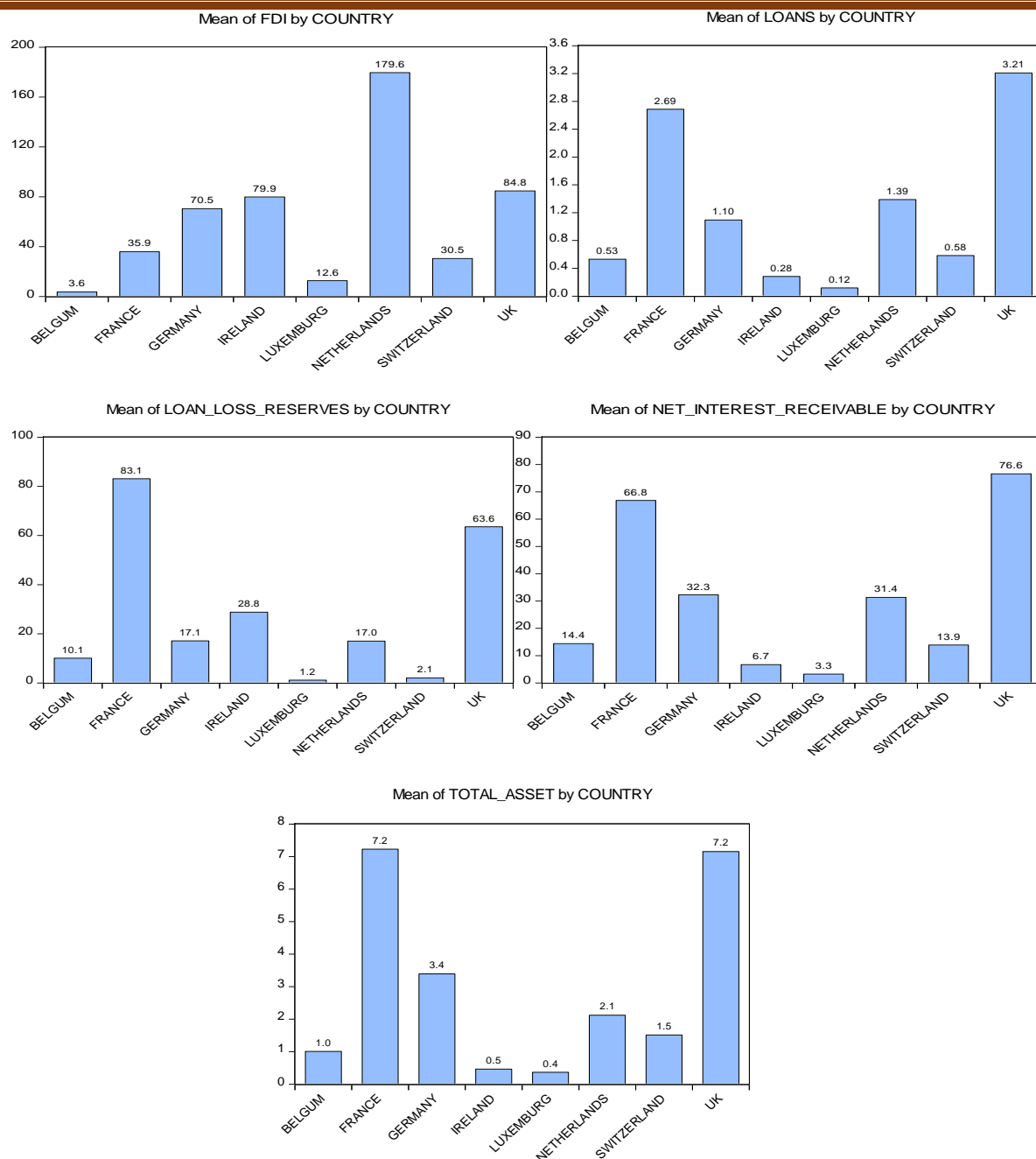
To readily comprehend the nature of the asset quality of banks as well as the FDI inflows of the 8 western European countries understudy we construct a year on year measure of these factors. The approaches to be employed here will be strictly descriptive in nature and dependent on graphical representations. We used two kinds of bar graphs. The first highlights raw figures in USD dollars on year by year basis of the variables and the second being the averages.

#### **Figure 1**



From **Figure 1** above it can be observed that FDI inflows over the period of 2011 to 2018 for the 8 western European countries have not been very consistent hence witnessed an upward and downward trend either way. None the less, of all these uncertainties some important understandings can be drawn from the entire figure. Most importantly over the period, countries like the Netherlands, United Kingdom, Ireland and Germany have had genuinely stable FDI inflows attributable to the way that asset quality of banks such as total asset (TA), Loans and Loan loss reserves (LLR) steadily managed. Furthermore, we saw that in spite of France keeping exceptionally high figures in these factors throughout the years, the country still bagged low FDI inflows due to high profit/loss in real estate figures.

**Figure 2**



It is observed that amidst all the components of bank asset qualities used, FDI inflow figures turn to be on an upsurge in countries with a fair balance in the banking asset components such as the Loans, Loan loss reserves and Net interest receivables. Netherlands drew the lion's share in average FDI inflows as depicted in **Figure 2** with USD 179.6million, followed by the United Kingdom claiming the second top slots in FDI inflows with an average inflow of USD 84.4million. From the critical observation of these two countries it is seen that Netherlands had the highest FDI inflows because it's components of the banking asset quality (Loans- USD 1.39 million, Loan loss reserve (LLR) - USD 0.017 million and Net interest receivable (NIR) - USD 0.031million) were fairly balanced as compared to the United kingdom that recorded very high Loans with an average of USD 3.21 million, USD 0.064 million for Loan loss reserve and USD 0.077 million of net interest receivable. On the other hand it is observed from the output that, a country like France despite having high average Loans (USD 2.69 million), high LLR (USD 0.083 million) and NIR (USD 0.067 million) and as a result expected to have high FDI inflows rather recorded one of the lowest FDI inflows (USD 35.9 million), probably owing to a huge upsurge in RE. These further buttressing the intuition of keeping average net profit/loss in real estate at a minimum. For Luxemburg the average FDI inflows (USD 12.6 million) were very much at the lowest because average Loans (USD 0.12 million), average loan loss



reserves (USD 0.001million), and average net interest receivable (USD 0.003 million) were all at their lowest. It is therefore right to state that high-performing Loans, moderate LLR and high or fairly moderate NIR in banking activities can continue to help improve a country's FDI inflows provided banks and financial houses invest in nations with preferred and sustainable market characteristics.

## 4. Data Type and Methodology

### 4.1. Data type and collection procedure

Our data for the study comprise of detailed secondary panel data on the total asset, loans, loan loss reserves, net interest receivables and profit/loss of real estate gathered from five hundred and eight (508) banks in eight (8) western European countries for the period 2011 to 2018. For the purposes of the investigation we chose Belgium, France, Germany, Netherlands, United Kingdom, Luxembourg, Switzerland and Ireland as our sample countries. The banking asset data was acquired from Bank focus, and that of the FDI inflows from the World Bank official site. BankFocus is a credible online platform that gives dependable data on more than 55,700 banks over the globe since 1990. Their datasets are institutionalized, definite, thorough and easy to understand. It is highly prescribed to utilize information from BankFocus because of its capacity to include clearness, profundity and expansiveness to the research work and increase efficiency. Other significant and imperative data were acquired from the sites of both the European central Bank (ECB) and the respective banks and nations under investigation. Our dependent variable will be the Foreign direct investment inflows represented as (FDI) and the independent variables will be Total assets (TA), net interest revenue (NIR), loans (LOANS), loans loss reserves (LLR) and net gains/loss on real estate (RE).

### 4.2. Methodology

The research will utilize different approaches such as the panel data analysis techniques and the granger causality test. Other techniques, for example, the variable and model selection techniques will highlight some model determination procedures by considering various literary works of other researchers in cutting edge data analysis and data science. The panel data analysis technique on the other hand will comprise of the panel unit root test and the panel cointegration test. To best fit the datasets to model the panel fixed/random model would be employed. The study will further adopt the granger causality test to analyse the causal relationship between the banking asset quality and FDI inflows of these 8 selected countries. Some fundamental test to be directed for stationary will be the **Levin-Lin & Chu LLC (Levin et al., 2002)**, **Im-Pesaran& Shim IPS (Im et al., 2003)**, **Augmented Dickey Fuller (ADF) - Fisher Chi-square and Phillips and Perron (PP) (1999)** test. Likewise the **Pedroni (Engle Granger based)(1999)** and the **Kao (Engel- Granger based)** test will be used to decide whether there exists a long run relationship between the response variable (FDI) and the banking asset of those countries under study.

#### 4.2.1. Variable selection

Following the work of **Guyon and Andr'e Elisseeff (2003)** it turns out that the goal of variable determination is in three-fold: <sup>1</sup>to improve the prediction performance of the indicators, <sup>2</sup>provide faster and more cost-effective predictors, <sup>3</sup>and in conclusion to give a superior comprehension of the fundamental procedure that generated the data. In line with this understanding and those from several papers detailing the importance of foreign direct investment (FDI) inflows for economic development in the host country (i.e. its role of supplying capital, providing a source of technology and know-how spillover), we chose our dependent variable as the net FDI inflow (**Wong and Tang, 2011; Trevino and Mixon, 2004; Campos and Kinoshita, 2008**).

It is worth noting that from the Basel criteria (**Basel III, 2010**) determined by the Basel Committee, within the scope of effective banking sector supervision, the asset quality of banks is measured by considering the capital adequacy of the banks. In accordance with the guidelines of Basel, asset quality is

one of the most basic criteria in deciding the general state of a bank. The essential factor influencing overall asset quality is the quality of the loan portfolio which we will utilize the **Loans (L)** and the **Loan loss reserve (LLR)** to quantify. Loans typically comprise a greater part of a bank's assets and convey the best measure of risk to their capital. The securities and investment portfolio likewise comprise an enormous portion of the assets and also contain significant risks. Thus we will use the **Net interest receivables (NIR)** from these portfolios of the various banks as a way to gauge one of the elements influencing asset quality of Banks. Other items that can impact asset quality are other real estate, other assets, off-balance sheet items and to lesser degree cash and due from accounts, and premises and fixed assets. For these components affecting asset quality we will employ the **Total assets (TA)** of the banks under study and also the **Net gain/loss on real estate (RE)**. (Scott & Arias, 2011 Miljković, Filipović & Tanasković, 2013, Petar Kasavica1 & Zoran Jović, 2015, Prince Jaiblai 1 & Vijay Shenai).

#### 4.2.2. Model Selection

As indicated by practices of **Cheng Hsiao (2003)** in his research Panel Data Analysis — Advantages and Challenges and also from studies conducted by **Dr. Emeritus Elisabeta JABA, Dr. Ioan-Bogdan ROBU, Dr. Christiana Brigitte BALAN(2017)**, we will estimate the datasets in a panel setting methodology due to the nature of the data acquired. The study will begin by checking for stationary in the datasets and this will be accomplished by following studies of **Phillips, P. C. B., & Perron, P. 1988**, (Testing for a unit root in time series regression), **Im, K. S., Pesaran, M., & Shin, Y. 2003**. (Testing for unit roots in heterogeneous panels), **Dickey, D. A., & Fuller, W. A. ,1979** (Distribution of the Estimators for Autoregressive Time Series with a Unit Root) , **Thi Hong Hanh PHAM, Thinh Duc NGUYEN (2013)** ,**Emmanuel Adu Boahen & Oteng Evans (2014)** and **Parastou Dehnabi (2014)**. Then after **Gregory-Hansen (1996)** hypothetical knowledge will be employed to perform the residual based cointegration test to examine the presence of cointegration between FDI inflows and the explanatory variables using the panel cointegration as observed in research works of (**Menyah et al. 2014, Anwar & Nguyen, 2009, Vahid Puryan ,2017, King and Levine 1993**). The two models (Fixed effect model and random effect model) to be used will be adapted from the literary works of (**Dr. Emeritus Elisabeta JABA, Dr. Ioan-Bogdan ROBU, Dr. Christiana Brigitte BALAN 2017, Cheng Hsiao 2003, Nor Hakimah Haji Mohd. Nor, Soo-Wah Low, Abu Hassan Shaari Md Nor and Noor A. Ghazali, 2013, Arellano (2003), Baltagi (2001), M'aty'as and Sevestre (1996), and Nerlove 2002**).

#### 4.3. Panel data Analysis

Panel data analysis is a more efficient analytical technique used in analysing datasets that are panel in nature rather than by the simplified time series analysis or linear regression models. The panel dataset involves a variability of observations for the same individuals over a period of time thereby leading to a recording of  $N \cdot T$  observations (**Guiso et al., 2002**). These observations are cross-sectional in nature and contain at least two dimensions indicated by subscript  $i$ , and a time series dimension, indicated by subscript  $t$ . This double dimensional representation allows Panel data analysis to have some significant advantages in analysing panel datasets as compared to other data types more than any other traditional methodology would (**Sevestre, 2002**). Whenever the cross-sectional units have the same number of time series observations the panel is balanced, else it is unbalanced. Panel datasets are represented by the diagram below:

##### Cross-section

$$\begin{matrix} & \begin{matrix} Y_{11} & Y_{12} & \dots & Y_{i1} & \dots & Y_{N1} \\ Y_{12} & Y_{22} & \dots & Y_{i2} & \dots & Y_{N2} \\ \vdots & \vdots & & \vdots & & \vdots \\ Y_{1t} & Y_{2t} & \dots & Y_{it} & \dots & Y_{Nt} \\ \vdots & \vdots & & \vdots & & \vdots \\ Y_{1T} & Y_{2T} & \dots & Y_{iT} & \dots & Y_{NT} \end{matrix} \\ \text{Time series} & \end{matrix}$$

For the purpose of our investigation we will formulate this model equation and use it as the basis for the analysis.

$$FDI = \beta_0 + \beta_1 * TA + \beta_2 * NIR + \beta_3 * L + \beta_4 * LLR + \beta_5 * RE + \varepsilon$$

where FDI represents the response variable and TA, NIR, LOANS, LLR, RE are values for regressors  $\beta_0$  to  $\beta_5$  denote coefficients and  $\varepsilon$ , the error term (Sevestre, 2005). The coefficient varies with time and between individuals. Since values of observations change with time then there is the likelihood of an absence of homogeneity in the dependent variable and independent variables. It is therefore difficult to estimate the model using traditional methods. Also to examine the dynamic relation between the variables of this study a cointegration test is used; these techniques are used to establish long-run relationships between variables and an equilibrium relationship is said to exist when the variables in the model are co-integrated with each other.

#### 4.3.1. Model Assumptions

Assumptions to be made in order to estimate datasets by using the panel data analysis include: <sup>1</sup>The intercept and slope coefficients are constant across time and cross sections and the error term captures differences over time and over cross sections. <sup>2</sup>The slope coefficient is constant but the intercept varies over cross sections. <sup>3</sup>The slope coefficient is constant but the intercept varies over cross sections and over time. <sup>4</sup>All coefficients (intercept and slope) vary over cross sections. <sup>5</sup>The intercept as well as the slope vary over cross sections and time.

#### 4.3.2. Panel Unit root test

The foremost step is the unit root and stationary test which is necessary for identifying the permanent status of the variables. It is vital that all variables have the same level of differencing to assume stationary properties. Particularly, the variables should have a unit root at levels or be non-stationary and then be integrated of the same order - I (d). If the test detects any of the variables to be non stationary then the first or second level difference would be applied to make it stationary. Mostly variables that are integrated of the same order exhibit some level of cointegration. For the purpose of this research the **Levin-Lin & Chu LLC (Levin et al., 2002)**, **Im-Pesaran & Shim IPS (Im et al., 2003)**, **Augmented Dickey Fuller (ADF) - Fisher Chi-square and Phillips and Perron (PP) (1999)** are the various tests that will be used. The second step involves the determination of lag lengths to be included in the cointegration test. The choice of lag length is determined by using the Akaike information criterion (AIC).

#### 4.3.3. Panel Co-integration Test

After performing the panel unit root test, the panel co-integration test will be conducted due to the non-stationary nature of the data. Here, this test is employed to investigate whether a long-run relationship exists between the variables or not. To inspect this property the research employs two types of tests; the Pedroni's Engle-Granger based tests and the Kao Residual co-integration test

The Pedroni's Engle-Granger based test statistics are computed in a way such that a number of seven test statistics that test the null hypothesis of no co-integration in non-stationary panels are obtained for decision making. The seven test statistics allow heterogeneity in the panel, both in the short-run dynamics as well as in the long-run slope and intercept coefficients. Unlike regular time-series analysis, this tool does not consider normalization or the exact number of co-integrating relationships. Instead, the hypothesis tests simply the degree of evidence, or lack thereof, for co-integration in the panel among two or more variables. The seven test statistics are grouped into two categories: group-mean statistics that average the results of individual variable test statistics and panel statistics that pool the statistics along the within-dimension.

#### 4.4. Model determination and selection

In other to identify the appropriate model (Fixed effect or Random effect model) that best fits the datasets the F test and Hausman tests (Jaba et al., 2016) would be applied. The fixed effects models assume that the influence of the factor variables ( $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ ) on the dependent variable (FDI) are identical for all individuals during the entire analyzed period meaning ( $\beta_0=\beta_1=\beta_2=\beta_3=\beta_4=\beta_5 = \beta_n$ ). To estimate parameters of the fixed effects model we may consider the individual and temporal specificity by introducing specific effects also called fixed effects in individuals and periods that represent coefficients to be estimated. In the case of a model for a specific period, two countries that have the same observable features should have the same values for the response variables: on the other hand, in the random effect there is a differentiation of composed effect models from fixed effects models. Generally, composed effect models may be written as (Sevestre, 2002):

$$FDI = \beta_0 + \beta_1*TA + \beta_2*NIR + \beta_3*L + \beta_4*LLR + \beta_5*RE + \varepsilon$$

and

$$\varepsilon = s + v + at$$

Where, the specific individual (s) and temporal (v) effects are random, with zero mean and constant variance. The model may be easily broken down, the error factor is made up of three elements: a component that does not present autocorrelation (at) neither individually nor temporally, a component as an individual specific effect (s) and a component as a temporal specific effect (v) and not correlated between them or with themselves (Jaba et al., 2016). Depending on these features, the conditional mean of values FDI is In the case of the random effect model, individual effects (s) express unobservable personal features and they are uncorrelated with dependent observable variables.

## 5. Analytical results and interpretation

### 5.1. Descriptive statistics

In the first stage of our data analysis we will compute the summary statistics for the panels which include the mean, median, variances, standard deviations and the Jarque–Bera statistics. These statistics will shed some light on the factors that are worth considering in major policy formulation. Again these computations are necessary because it concentrates on the summary statistics of the individual factor components rather than as a group.

TABLE 1		DESCRIPTIVE STATISTICS				
	FDI	TA	LOANS	LLR	NIR	RE
Mean	62.19	2.91	1.24	27.87	30.67	80.47
Median	44.89	1.98	1.06	15.19	23.29	17.01
Maximum	331.84	8.52	3.66	113.38	86.47	1322.67
Minimum	-239.27	0.03	0.01	0.00	0.00	-26.20
Std. Dev.	95.61	2.76	1.12	32.28	26.76	199.58
Skewness	0.83	0.89	0.85	1.38	0.77	4.37
Kurtosis	5.56	2.35	2.44	3.61	2.28	25.39
Jarque-Bera	24.76	9.54	8.61	21.25	7.78	1540.43
Probability	0.00	0.01	0.01	0.00	0.02	0.00
Observations	64.00	64.00	64.00	64.00	64.00	64.00

The mean and standard deviation values reveal considerable heterogeneity in our factors as such implying that economic growth, FDI inflows and banking asset quality of banks and financial institutions cannot be uniform across all the countries under investigation. However it is worth considering the fact that countries above the mean or within the maximum limits of the summary statistics of the various components of asset quality are in a better position of enhancing their FDI inflow figures with the right policies in place while those below the central points or within the minimum regions have to do a lot more.

Moreover the outputs of **Table 1** reports that the mean and the median are closely related for all the variables except for profit/loss on the Real estate (RE) and the Jarque-Bera test affirm that the greater part of the factors is not normally distributed. The Kurtosis test confirms that the variables are positive and leptokurtic, also the skewness test reports that the factors are positively skewed. FDI inflows over the time frame for the 8 countries averaged USD 62.19 billion while banking asset stood at USD 2.91 billion, USD 1.24 billion and USD 30.67 million with regards to total assets (TA), loans and net interest receivable (NIR).

## 5.2. Panel unit Root and cointegration Test

### 5.2.1. Panel unit root.

Under the null hypothesis the methodology states that the panel datasets are non-stationary or have a unit root while the alternative hypothesis assumes the opposite. The hypotheses may be written as:

$$H_0 = \rho > 0 \text{ and } H_A = \rho \leq 0 \text{ where } \rho \text{ denotes the } p\text{-value.}$$

The rejection of the panel unit root hypothesis should be interpreted as evidence that a statistically significant proportion of the data are stationary. Accordingly, in the event of a rejection, and in applications where the time dimension of the panel is relatively large, it recommends the test outcome to be augmented with an estimate of the proportion of the cross-section units for which the individual unit root tests are rejected.

**TABLE 2** PANEL UNIT ROOT (LLC,PP,ADF& IM,PESARAN)

ADF - Fisher Chi-square					PP - Fisher Chi-square				
VARIABLES	AT LEVEL		AT DIFFERENCE		VARIABLES	AT LEVEL		AT DIFFERENCE	
	statistic	p-value	statistic	p-value		statistic	p-value	statistic	p-value
FDI	21.6679	0.1542	36.3454	0.0026***	FDI	27.9249	0.0323**	46.4322	0.0001***
TA	15.6937	0.4745	34.321	0.0049***	TA	17.1873	0.3736	40.9857	0.0006***
LOANS	18.6161	0.2891	43.7427	0.0002***	LOANS	21.2461	0.1692	57.874	0.0000***
LLR	20.584	0.1951	17.5807	0.349	LLR	5.2864	0.9941	14.6203	0.5526
NIR	20.9278	0.1813	42.0548	0.0004***	NIR	11.8828	0.752	56.0445	0.0000***
RE	31.4696	0.0117***	62.9821	0.0000***	RE	40.219	0.0007***	87.0088	0.0000***

Levin, Lin & Chu t*					Im, Pesaran and Shin W-stat				
VARIABLES	AT LEVEL		AT DIFFERENCE		VARIABLES	AT LEVEL		AT DIFFERENCE	
	statistic	p-value	statistic	p-value		statistic	p-value	statistic	p-value
FDI	-3.4709	0.0003***	-7.1828	0.0000***	FDI	-0.8333	0.2023	-2.4634	0.0069***
TA	-1.0779	0.1405	-6.213	0.0000***	TA	-0.0275	0.4891	-2.2402	0.0125***
LOANS	-0.5978	0.275	-7.6919	0.0000***	LOANS	-0.0812	0.4677	-3.29	0.0005***
LLR	12.9889	0.0000***	-3.6344	0.0001***	LLR	-0.6478	0.2586	-0.4827	0.3147
NIR	-3.4174	0.0003***	-8.2951	0.0000***	NIR	-0.4933	0.3109	-3.0781	0.001***
RE	-3.1064	0.0009***	16.3745	0.0000***	RE	-0.2091	0.4172	-8.2533	0.0000***

Note: \*\*\* indicates 1% significance, \*\* indicates 5% significance and \* indicates 10% significance. Probabilities for the Fisher test are computed using an asymptotic chi-square distribution. Levin, Lin and chut\* test assume asymptotic normality.

**Table 2** presents the results of the panel unit root test of the variables considered in this paper. It can be observed that at a level the variables have a mixture of stationary and non stationary variables (ADF - Fisher Chi-square, Levin, Lin & Chu t\*, Im, Pesaran and Shin W-stat and PP - Fisher Chi-square) but



immediately becomes stationary after subjecting them to first differencing. All three tests were conducted under intercept and trend conditions. The evidence on the panel unit root test in **Table 2** thus dismissed the null hypothesis of non-stationarity at the first difference in light of the fact that the p-value  $\leq 0.05$  for the majority of the test. This has a great deal of economic and statistical implications for our study in the sense that since FDI inflows are one of the pointers of economic improvement, at that point of non-stationarity it implies there will be stunned to the factors. This will effectively affect our yield. On the practical side if the first differencing is not applied then our output would only not make a lot of economic sense but also lead us to implement policies that will have negative impacts on the FDI inflows when these components of banks asset quality are put into full force. The statistical implication of non-stationarity is that there is a likelihood of the Panel ordinary least squares (Panel fixed effect) estimator producing spurious outcomes.

### 5.2.2. Panel cointegration Test

The starting point of the residual-based panel co-integration test statistics of **Pedroni (1999)** is the computation of the residuals of the hypothesized co-integrating regression generally represented mathematically as;

$$y_{it,t} = \alpha_i + \beta_{1i}X_{1i,t} + \beta_{2i}X_{2i,t} + \dots + \beta_{Mi}X_{Mi,t} + \varepsilon_{it,t} \text{ for } t=1, \dots, T; i=1, \dots, N, \dots (1),$$

It is assumed here that the slope coefficients  $\beta_{1i}, \dots, \beta_{Mi}$ , and the member specific intercept  $\alpha_i$  can vary across each cross-section. To compute the relevant panel co-integration test statistics, first the co-integration regression in **equation (1)** is estimated by OLS, for each cross-section. In addition to this, the within-dimension based test statistics i.e. panel- $\rho$  a panel- $t$  statistics are computed by taking the first-difference of the original series and estimating the residuals of the regression as;

$$\Delta y_{it,t} = \beta_{1i}\Delta X_{1i,t} + \beta_{2i}\Delta X_{2i,t} + \dots + \beta_{Mi}\Delta X_{Mi,t} + \pi_{it,t}, \dots (2)$$

Using the residuals from the differenced regression **equation (2)**, with a **Newey & West (1987)** estimator, the long run variance of  $\pi_{it,t}$  is calculated. To calculate the non-parametric statistics, panel- $\rho$  and group- $\rho$ , the regression  $\varepsilon_{it,t} = \gamma_i \varepsilon_{it,t-1} + u_{it,t}$  is estimated using the residuals  $\varepsilon_{it,t}$  from the co-integration regression (1). Then the long-run variance ( $\sigma_i^2$ ) and the contemporaneous variance ( $s_i^2$ ) of  $u_{it,t}$  is computed. On the other hand the parametric test statistics, panel- $t$  and group- $t$ , are estimated with the help of the residuals  $\varepsilon_{it,t}$  from the co-integration regression (1). To determine the lag truncation order of the ADF  $t$ -statistics, the step-down procedure and the Akaike lag order selection criterion are used. After the calculation of the panel co-integration test statistics the appropriate mean and variance adjustment terms are applied, so that the test statistics are asymptotically standard normally distributed as;

$\frac{\kappa_{N,T} - \mu}{\sqrt{v}} \rightarrow N(0,1)$ , where  $\kappa_{N,T}$  is the standardized form of the test statistic with respect to  $N$  and  $T$ ,  $\mu$  and  $v$  are the functions of moments of the underlying Brownian motion functional.

The null hypothesis of no co-integration for the panel co-integration test is the same for each statistic and is given as; **H0:  $\rho > 0$**  and the alternative hypothesis for the between-dimension-based statistics is **H1:  $\rho \leq 0$** .

**TABLE 3** **PANEL PEDRONI CO-INTEGRATION TEST**

Pedroni Residual Cointegration Test-withn-Dimension				
Series : FDI LOANS LLR NIR				
Null Hypothesis: No cointegration				
	Statistics	P-value	Weighted Statistics	P-value
Panel v-Statistic	0.851704	0.1972	-0.562874	0.7132
Panel rho-Statistic	1.769134	0.9616	1.583371	0.9433

Panel PP-Statistic	-4.050723	0.0000***	-6.90888	0.0000***
Panel ADF-Statistic	-2.419983	0.0078***	-3.663535	0.0001***
Between-Dimension				
	Statistics	P-value		
Group rho-Statistic	2.954435	0.9984		
Group PP-Statistic	-9.478942	0.0000***		
Group ADF-Statistic	-4.000825	0.0000***		
Kao Residual Co-integration Test				
Null Hypothesis: No cointegration				
	Coefficient	t-Statistic	Prob.	
RESID(-1)	-0.789806	-4.44357	0.0000***	

Note: The Pedroni test is asymptotically normally distributed. \*\*\* (\*\*) indicates the rejection of the null hypothesis at a 1% (5%) significance level.

In the two tests used, the FDI inflow is the dependent variable. Based on the seven statistical tests generated from the output of the Pedroni test in **Table 3**, it is observed that cointegration exists in six out of the eleven models. This means that the panel pp-Statistic, panel ADF-Statistic of all the four within-Dimension and the Group PP-Statistic, Group ADF-Statistic for the Between-Dimension were significant with p-values  $\leq 0.05$  or in other words fell within the 95% confidence band. (ie. 0.0000, 0.0078, 0.0000, 0.0000, 0.0001 and 0.0000 respectively). This confirms that there is thus a significant association between FDI inflows and the components of asset quality of banks such as LOANS, LLR and NIR. Also the results of the Kao residual cointegration test further supports the claim of the existence of cointegration and hence the existence of long-run effects of the quality of banking assets on FDI inflows. The specifications in both tests are the same. Specifically, the t-statistics of the RESID (-1) from the Kao test is -4.44357 and significant at a 5% level since it has a p-value of 0.0000%. Hence under the alternative hypothesis, it can however be mentioned that the majority of the panel co-integration test statistics considered in this paper diverge to negative infinity. Thus, the left tail of the standard normal distribution is used to reject the null hypothesis of No co-integration and hence accept the Alternative hypothesis. The practical implications of these significant associations between the dependent and independent variables can be fully appreciated in economic and financial context using the understanding from the permanent income theory. (**Spurious regression and cointegration page 434 and 435**). In our study however, these concepts can be seen between the components measuring the quality of bank assets and the FDI inflows with the independent variables (Loan, loan loss reserves, net interest receivables and total assets) being the common trends. Hence it is prudent for policies that enhance the financial institutions in these western European nations to be instituted to boost their asset base aiding them to be in a better position to invest in other countries and emerging markets to shore up returns to beef up their FDI inflows. Another example is the Growth theory model which implies cointegration between income and investment, with productivity and economic growth being the common trend. These equilibrium relationships implied by these economic theories are referred to as long-run equilibrium relationships.

### 5.3 The Fixed and Random Effect model

This step estimates the datasets by utilising both the fixed effect model and the Random effect model. However results from the Hausman test will be the basis to select the appropriate model between the two that can be used for the modelling.

In order to estimate the fixed effects model an important assumption that the time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics must be considered. Also it is worth noting that if the error terms are correlated then the fixed effect is not

suitable since inferences may not be correct and hence need to model that relationship probably using random-effects.(Stock and Watson, 2003, p.289-290).

**TABLE 4**

PANEL FIXED EFFECT MODEL				PANEL RANDOM EFFECT MODEL			
Dependent Variable: FDI				Dependent Variable: FDI			
Variable	Coefficient	t-Statistic	Prob.	Variable	Coefficient	t-Statistic	Prob.
C	2.12447	3.783139	0.0005***	C	0.802318	1.88383	0.0646*
TA	100.6065	1.904077	0.0635*	TA	11.86658	0.315819	0.7533
LOANS	-70.42874	-0.568705	0.5724	LOANS	68.63005	0.710516	0.4802
LLR	-2.431175	-2.10397	0.0411**	LLR	-1.651942	-1.67725	0.0989*
NIR	-9.303892	-2.086813	0.0427**	NIR	-3.017397	-0.7532	0.4544
RE	-0.030529	-0.33299	0.7407	RE	0.014389	0.170558	0.8652
Effect Specification				Effect Specification			
R-squared	0.568651			Weighted Statistics		Unweighted Statistics	
Adj. R-squared	0.382387			R-squared	0.057592	R-squared	-0.0576
F-statistic	3.052924			Adj. R-squared	-0.02365	Durbin-Watson stat	0.82707
Prob(F-statistic)	0.00114***			F-statistic	0.708889		
AIC	2.51649			Prob(F-statistic)	0.619152		
Durbin-Watson stat	1.566569			Durbin-Watson stat	1.226242		

Note: \*\*\* indicates 1% significance, \*\* indicates 5% significance and \* indicates 10% significance respectively. The R-squared implies the amount of variability in the dependent variable explained by the independent variables.

From **Table 4** it can be observed that variables such as total asset (TA), loan loss reserves (LLR) and net interest receivable (NIR) were significant when the fixed effect model was applied but only showed significance in loan loss reserves when the random effect model was used. The parameter on the other hand was positive on both models and assumed to be the same for each cross-section and time period. The value of durbin-watson is very high hence giving an indication that the problem of misspecification and therefore the inconsistency of the estimated coefficient is not something to be worried about.

### 5.3.1 The Hausman Test

The Hausman test will be used to decide between the fixed or the random effects model which one is appropriate for the study. Under the Hausman test the null hypothesis states that the preferred model is the random effects model as against the alternative hypothesis (the fixed effects being an appropriate model). (Green, 2008, chapter 9).

TABLE 5	Hausmann Test for random effects		
	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section and period random	11.352181	5	0.0448**

Note: \*\*\* (\*\*) indicates the rejection of the null hypothesis at a 1% (5%) significance level.

It basically examines whether the difference between the random effects regression and the fixed effects regression is zero. The null hypothesis postulates that:

If the Hausman Test accepts  $H_0$  or  $p$  value  $> 0.05$  then the method chosen is a random effect.

If the Hausman Test receives  $H_1$  or  $p$  value  $< 0.05$  then the method chosen is the fixed effect.

From **Table 5** it was observed from the outcome that  $P \leq 0.05$  indicating the rejection of the random effect model and acceptance of the fixed effect model as the appropriate model. As a result the equation to be used to comprehend the econometric implications of the output will be based on the fixed effect model and given as:

$$FDI = 2.12 + 100.61*TA - 70.43*NIR - 2.43*LOANS - 9.30*LLR - 0.03*RE + \epsilon$$

The coefficient of the constant being positively significant implies that whenever the quality of the banking assets improves then it has the same directional impact on FDI inflows. As such a 1% rise in the intercept has a 2.12% impact on FDI inflows. It was also observed from **Table 4** that total assets (TA), net interest receivable (NIR) and loan loss reserves (LLR) were all significant further strengthening our claim that the components of banking asset have an effect on FDI inflows provided the right policies are in place that enables these financial institutions to invest in other countries with favourable market conditions. Again, it can further be interpreted as a 1% rise in the total asset of banks goes a long way to improve FDI inflows by 100.61% resulting from banking activities. Another understanding that can be gotten from the insignificance of the loans and profit/loss from real estate is that with an improvement of all other variables (LLR, NIR, and TA) FDI inflows will still be maximised even if profit/loss from real estate stays the same. The value of the R-squared suggests that about 57% of the FDI inflow variance is explained by the influence of components of the bank asset quality. From this statistic we can draw some inference that there may be other factors that can also impact FDI inflows as a result of banking activities in these countries understudy.

#### 5.4. The causal relationship between FDI and banking asset quality

To analyze the causal relationship between FDI inflows and the banking asset quality of these selected countries, the granger causality test which illuminates the heading of causality either bidirectional or unidirectional will be performed. This technique is utilized to certify granger causality linkage among the factors unquestionably. The null hypothesis postulates that no variable granger causes another and the Alternative hypothesis assumes otherwise.

Evidence from **Table 6** below reports that there is granger causality among the variables hence the null hypothesis that none of the variables granger causes the other is rejected. It is therefore proven that there is both unidirectional and bidirectional granger causality among the factors. The bidirectional causality linkage root from the Loans, loan loss reserves (LLR), net interest receivables (NIR) and profit/loss from real estate (RE) to FDI inflows and the other way around. The bidirectional causality insists that a change in any of the factors influences the other variable and vice versa. However, the unidirectional granger causality can be followed from the FDI inflows to Total assets. The unidirectional causality affirms that the primary variable granger causes the last mentioned however not the other way around.

**TABLE 6 GRANGER CASUALITY TEST**

Null Hypothesis:	F-Statistic	Prob.
TA does not Granger Cause FDI	2.66898	0.0808*
FDI does not Granger Cause TA	0.47989	0.6221
LOANS does not Granger Cause FDI	2.33911	0.1086
FDI does not Granger Cause LOANS	0.40542	0.6692
LLR does not Granger Cause FDI	1.20026	0.311
FDI does not Granger Cause LLR	0.05124	0.9501
NIR does not Granger Cause FDI	2.08291	0.137
FDI does not Granger Cause NIR	0.76573	0.4712
RE does not Granger Cause FDI	0.00382	0.9962
FDI does not Granger Cause RE	0.16009	0.8526
LOANS does not Granger Cause TA	2.69469	0.079*
TA does not Granger Cause LOANS	1.97946	0.1505
LLR does not Granger Cause TA	0.56519	0.5724
TA does not Granger Cause LLR	0.41781	0.6611
NIR does not Granger Cause TA	2.53879	0.0907*
TA does not Granger Cause NIR	0.58707	0.5603
RE does not Granger Cause TA	10.9875	0.0001***
TA does not Granger Cause RE	1.45449	0.2448
LLR does not Granger Cause LOANS	1.74407	0.1869
LOANS does not Granger Cause LLR	1.88042	0.1649
NIR does not Granger Cause LOANS	0.9008	0.4138
LOANS does not Granger Cause NIR	0.33932	0.7141
RE does not Granger Cause LOANS	13.8226	0.00002***
LOANS does not Granger Cause RE	1.67508	0.1993
NIR does not Granger Cause LLR	6.61043	0.0031***
LLR does not Granger Cause NIR	0.9669	0.3884
RE does not Granger Cause LLR	11.0241	0.0001***
LLR does not Granger Cause RE	2.11202	0.1334
RE does not Granger Cause NIR	13.0633	0.00004***
NIR does not Granger Cause RE	1.12442	0.3342

Note: \*\*\* indicates 1% significance, \*\* indicates 5% significance, \* indicates 10% significance

## 6. Conclusions

The main aim of this research is to investigate whether or not the components of banks' asset quality can impact FDI inflows in 8 western European nations, recommend meaningful policies that will help sustain economic growth and further study the casual relationship between these factors. The econometric analysis and estimation were made using panel data analysis and the granger causality test first to assess the effects of the components of quality banking assets on FDI inflows, investigate if there exists a long-run relationship between the dependent and independent variables and lastly to understand the bidirectional or unidirectional casual trend between the factors. The study used a secondary panel dataset spanning the period of 2011 to 2018.

From **Figures 1 and 2** of the study it was realized that FDI inflows of a country were highly influenced by the quality of loans, loan loss reserves and net interest receivables. However, to achieve a very encouraging FDI inflow figure owing to these factors, these 8 countries have a duty of sensitizing the banks



to keep these factors in a fair balance. The results obtained by applying all relevant tests found that the panel datasets had no unit root (stationary) at first differencing and there was also the existence of panel cointegration between the dependent and independent variables under study. This gave an indication of the existence of a long-run relationship between the variables since both the Pedroni cointegration and Kao residual test proved significant at a 95% confidence interval. The findings of the Hausman test presented in **Table 5** chose the fixed effect model as the appropriate model for the study. **Table 4** (fixed-effect model) revealed that the estimated asset quality of banks had a positive and statistically significant relationship with the FDI inflow represented by a constant coefficient of 2.12 and a p-value of 0.0005. Additional findings also showed that total asset (TA), loan loss reserves (LLR) and Net interest receivable all have a significant impact on FDI inflows. However, it is worth noting that the total assets have a positive and significant relationship on FDI inflows and as such a rise in its figures results in a rise in FDI inflows

Based on the obtained results from the pairwise granger causality test, it is right to conclude that the central banks of these 8 nations need to create and execute strategies, programs, and policies structured explicitly to empower the banking asset quality. This step is necessary because the bidirectional Granger causality test between FDI inflows and Loans, loan loss reserves (LLR), net interest receivables (NIR) and profit/loss from real estate (RE) all proved positive. On the other hand, unidirectional granger causality was witnessed flowing from FDI inflows to Total assets. The insights that one can draw from these discoveries are that banking asset quality enhances FDI inflows through solid banking supervision procedures and elaborate policies that reflect this significance.

Further research is recommended to be carried out on the contribution of banking assets quality on FDI inflows; the case of developed and developing countries or the factors of quality banking assets and the pattern of FDI inflows of developing countries by using the generalised linear models.

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