LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER IN

FINANCE

MASTER FINAL WORK

DISSERTATION

THE IMPACTS OF THE FINANCIAL SYSTEM IN ECONOMIC GROWTH

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ORIENTATION:

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ABSTRACT

This paper re-examines the relationship between the financial system and economic growth. A panel data for the periods of 2000-2017 and a simple OLS regression model were used to assess the link between finance and growth. We demonstrate that recent results obtained from panel data, although not as robust as previous works done on this subject, are of a positive relationship.

Keywords: Financial Developments, Economic Growth, Financial System, Financial crisis

JEL: G01, O1, O47

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Contents

I. INTRODUCTION

Quite a few studies were previously conducted about the financial system and its possible implications in economic growth. Thus, the link between the two is not only a long-debated issue, but one that has generated conflicting views amongst economist's opinions.

On one side, for many decades, numerous influential economists believed that finance is a relatively unimportant factor in economic development choosing to completely ignore it. Notably, "Joan Robinson (1952)", argued that financial development follows growth, and articulated this causality argument by suggesting that "where enterprise leads finance follows", meaning that economic development creates the demands for a determined financial arrangement and the financial system responds automatically, which also gives us a sense of causality from economic events to the financial system. Additionally, "Lucas (1988)", in his attempt to explain the mechanics of economic development, eliminated from his analysis all monetary matters as he considered the role of finance in the growth process as "over-stressed".

On another extreme, we have economists who have emphasized the importance of the financial system in economic growth. "Merton Miller (1988)" argues that, "financial markets contribute to economic growth is a proposition too obvious for serious discussion"; Joseph Schumpeter argued in 1911 that the services provided by the financial intermediaries are crucial to promote technological innovation which is itself important for growth.

Although recent literature has not reached a consensus regarding the causality, most is unanimous in concluding that there is indeed a positive link between financial deepening and economic growth. This link is mainly justified, as stressed by Schumpeter, with the common functions of the financial system, that is, reduction of information asymmetry, resource allocation, reduction of costs in business transactions, and so on. Additionally, it is also mentioned in the existing literature that the reasons that strengthen the importance of the financial system are also those that reflect its fragility. As history shows, financial crises are not exactly recent events.

The repercussions of the most recent crisis highlighted that an unhealthy financial system can have devastating consequences to the economy. Moreover, we can also say

that the link between finance and economic growth was underrated before, which resulted in a lack of understanding of the risks inherent to the financial system. Consequently, the policies developed at the time allowed financial institutions to find loopholes in capital regulation which permitted banks to increase significantly leverage while maintaining capital requirements. The crisis and all that came with it, marked an important turning point, where a shift of paradigm happened drawing special attention to the need to reexamine the finance-growth relationship. The lesson we can take from these events is that we cannot continue to ignore the relevance of the financial system as we have been.

So far, it is undisputable that the development of the financial system has impact on the economy and that this impact might not always be positive. Therefore, the question here is not whether the financial system impacts economic growth, but how it does so and what kind of impact, positive or negative, is that for a given set of countries.

All that was said so far, has the objective of building up the core of this dissertation. Understanding the relationship between Finance and Economic Growth is of extreme importance, since evidences on how this link is driven may influence how financial regulatory and development policies are made and ultimately shape how financial resources are allocated to generate more growth.

Besides providing a contribution to the existing literature and an empirical application on the finance-growth nexus, which is the main objective of this work, it is also in its scope to make the previous analysis in light of the 10 years after the financial crisis framework, trying to understand where we stand on the impact of financial developments in economic growth, considering the evolution of the financial sector as of today. Furthermore, it is also intended to make a final appraisal on whether we could be walking towards a new financial meltdown.

Likewise, it is also important to point out what is not in the scope of this work. Having said that, I have neither the time nor the knowledge to make any assessment regarding the causality between finance and growth, nor any distinction between Market and Bank based economies. As will be seen in the following section, it was proven in the collaborative work of "Thorsten Beck, Asli Demirguc-Kunt, Ross Levine and Vojislav Maksimovic (2000)" that the distinction between market and bank-based economies little has to do with growth.

Moving forward, as was mentioned in the beginning of this section, there is an extensive literature on this topic, therefore, to access the current knowledge on Finance-Growth nexus I will be reviewing the existing literature and drawing its main conclusions in section II.

The following section has the purpose of exploiting the main mechanisms through which finance can influence growth and making some important notes that will ease our way throughout the remainder parts of the body of this work.

Section IV will be dedicated to describing the methods and techniques used to pursue the objective here proposed, complemented by section V that will explain the results achieved and the main conclusions one can withdraw from them.

Section VI is the section in which it is briefly discussed how the 2007/2008 crisis came to be, where do we stand today, possible future implications.

Lastly, I will be using the concluding section to recap all that was said, highlight the main conclusions, recognize the difficulties encountered throughout this work's elaboration as well as areas needing additional research.

II. LITERATURE REVIEW

Without a shade of doubt, Schumpeter was one of the oldest contributors in the finance-growth link. In his book "The Theory of Economic Development", published in 1912, he starts his analysis by addressing what he called "the circular flow". According to him, it is a period in which the economic activity produces itself continuously at a constant rate, steady growth rate, through time. In other words, a state in which the economy is stagnated. In order to generate development, changes such as the emergence of a new products, new ways of productions, new sources of raw material and so on, needed to take place in the circular flow. These changes in the current system of production or what he also calls "new combinations" are similar to what he defines as innovation. Therefore, innovation itself is crucial to development and as such had to be introduced by agents of innovation - entrepreneurs. But there is a catch, these new combinations could only be executed if these agents had purchasing power to acquire control over the means of production.

Here is where banks play an important role. The purchasing power is conceded to the entrepreneur in the form of credit, issued by the bank. Thus, when a bank issues a loan, it authorizes the implementation of the "new combinations" in the name of the whole society. Without banks, there is no purchasing power, no innovation and ultimately no development.

After the contributions of Schumpeter, many more rose to give support to his previous conclusions. For instance, "Goldsmith (1969)", whose work sought to trace the evolution of national financial systems during the process of economic development, assess whether the overall development of the financial system influences the rate of economic growth, and finally evaluate the impact of financial structure on the pace of economic development. He has been successful with documenting the evolution of the financial system during periods of development, and although not successful with assessing the link finance-growth (causality), he found a positive correlation between the two. As for the third objective, due to database limitations he was unable to provide extensive conclusions.

"Thorsten Beck, Asli Demirguc-Kunt, Ross Levine and Vojislav Maksimovic (2000)", gave continuity to Goldsmith's work using a more extensive database which his work lacked. Their objective was to evaluate the impact of financial structure on the pace of economic development using three different views: country level, industry level and firm level. Their conclusions show that the segregation between market-based or bank-based economies does not help explain growth. They conclude that countries do not grow faster, financially dependent industries do not expand at higher rates, firms are not created more easily, firm's access to external finance is not higher and firms do not grow faster in either bank or market based financial systems. These results are consistent with the financial services and law and finance views, meaning that the legal system is the primary determinant of the financial services effectiveness. Summing up, it does not matter if a financial system is more bank or market based, what truly matters is the efficiency of the law system that will produce more efficient financial services and generate growth.

Another influential author in this matter is Merton Miller. In his 1998 paper "Financial Markets and Growth", taking Japan 1990's crisis as an example, he defends that the Banking System must be substituted for Financial Markets. In other words, having a wide spectrum of Financial Markets available keeps a country from having to pull all its development eggs in one basket (commercial banks). He truly believed that the crisis

that spread throughout Eastern Asia was aggravated by the excessive reliance on the Banking System instead of Financial Market. Although, he is fond of Financial Markets rather than banks he recognizes that banks might be useful for countries starting their process to development, but stresses that with the progressing of time a shift should be made. Regardless of the distinction he makes between market or bank-based economies, what should be withdrawn is the fact that according to him financial markets as part of the financial system contribute to growth, in fact according to him this is a proposition too obvious for serious discussion.

Also in favor of the Financial System we have "McKinnon (1973)". In this work, he is in favor of the liberalization of the Financial System, meaning that alleviating restrictions can exert a positive effect on growth rates as interest rates rise towards their competitive market equilibrium. The hypothesis is that higher interest rates lead to higher saving rates and the last in its turn will lead to more investment and finally growth.

Recently, numerous authors have examined the relationship between financial development and economic growth, giving important theoretical and empirical arguments.

"King and Levine (1993a)" try to support Schumpeter's views by examining a cross-section database of approximately 80 countries for the period between 1960-1969. Their findings show that higher levels of financial development are positively associated with faster rates of economic growth, the rate of physical capital accumulation, and economic efficiency improvements. Their article is extensive and possesses important conclusions, however, their definition of financial system was narrow, as it did not include Financial Markets.

"Levine and Zervos (1988)", investigated whether measures of stock market liquidity, size, volatility and integration with world capital markets are robustly correlated with current and future rates of economic growth, capital accumulation, productivity improvements and saving rates using data on 47 countries from 1976 through 1933. Their results show that even after controlling for many factors associated with growth, banks and financial markets are positively correlated with growth. Additionally, greater ability to trade ownership of an economy's productive technologies facilitates efficient resource allocation, physical capital formation, and faster economic growth. Moreover, they suggest that banks and financial markets offer different financial services, meaning that

they can pose as complementary, therefore, according to them, to truly understand the link between finance and growth we need theories in which banks and markets evolve simultaneously providing a different bundle of services to the economy.

"Thorsten Beck, Ross Levine and Norman Loayza (2000)" paper examined the impact of financial development on the sources of economic growth. This paper finds a robust, positive relation between financial development and both growth and productivity growth. Furthermore, its results support the view that better functioning financial intermediaries improve resource allocation and accelerate total factor productivity growth with positive repercussions for long-run economic growth.

"Hanssan et al (2011)", criticizes the fact that many of the previous works on this subject used cross-country data, since it has many limitations. Contrarily, he uses time series to investigate the finance-growth link across geographic regions and income groups (low, mid and high). His findings show that in short run there is a two-way causality relationship for all the regions studied except the poorest ones. In the poorest regions growth leads finance, which means that there must exist growth to improve their undeveloped financial systems. Therefore, finance, might be important but not necessary to growth in these countries. Overall, regardless of the type of income of the country they believe that a well-functioning financial system might lead to growth. They also believe that the link between finance and growth will keep on being a topic for enormous debate since they can only make conclusions on what has happened rather than what is still to be.

We could continue describing past works done in this subject, but overall, the literature provides broad theorical and empirical evidence of a positive relation between finance and economic growth, with the papers mainly differing in the data coverage regarding countries, time periods, estimation methods and variables selected. A resume of the literature can be found in the appendix Table I.

Furthermore, we can agree that financial developments impact the economy through its services. Therefore, it makes sense that before continuing, it is of extreme importance taking a step back to understand what kind of services these are as well as how they can influence growth. This is precisely what the next section is about: a brief description of the services or functions of the financial system while building up a better understanding of what we can consider financial developments.

III. FINANCE-GROWTH MECHANISMS

The objective of this section is to provide a better understanding of the mechanisms trough which finance can affect growth. Think of this as a warm-up for the upcoming sections. Having said that, let's begin by understanding what Financial Developments are.

According to The World Bank the financial system is the set of institutions, instruments, markets, as well as the legal and regulatory framework that permits transactions to be made by extending credit. The Financial System is also defined as the set of rules or arrangements that allows the exchange of funds between lenders, investors and borrowers.

Still according to World Bank, the five key functions of a financial system are: (i) producing information ex ante about possible investments and allocate capital; (ii) monitoring investments and exerting corporate governance after providing finance; (iii) facilitating the trading, diversification, and management of risk; (iv) mobilizing and pooling savings; and (v) easing the exchange of goods and services.

Financial sector development thus occurs when financial instruments, markets, and intermediaries ease the effects and overcome the costs inherent to acquiring information, enforcement of contracts, reduction of transactions costs and therefore do a correspondingly better job at providing the key functions of the financial sector in the economy.

The main functions of the Financial System, according to the literature are the key to explaining the finance-growth nexus. Therefore, the remainder of this section describes how these functions can contribute to growth.

(i) Production of information and allocation of capital

Acquiring information can be costly when you lack the resources to do so. Individual savers are risk averse by nature; therefore, they are reluctant to invest their money without reliable information about the project. Consequently, higher information costs can prevent capital from flowing to the most profitable projects.

History says that Banks are somehow specialized in pooling of information, due to its lasting/private relationship with its depositors. Hence, with

their resources they can acquire and process information in ways that individual investors cannot, and thereby improve resource allocation by making sure that investment goes to the projects that have higher probabilities of being successful. As one can imagine a better resource allocation will ultimately accelerate growth.

Larger and more liquid financial markets implicate more access to individual investors to trade in it. But the issue remains, individual investors do not have the capacity to acquire and process information regarding firms and their projects. Therefore, financial markets, create incentives for agents researching firms and later on trade this information in the market impacting positively the resource allocation.

(ii) Monitoring investments and exerting corporate governance

The extent to which providers of capital can monitor how firms use that capital has serious ramifications on investment decisions and resource allocation. Diffuse shareholders exert corporate governance through voting rights and the election of board of directors and diffuse debt holders limit managerial discretion through bond covenants. In a perfect world by exerting corporate governance equity and debt holders will induce managers to maximize firm value. This has as underlying assumptions that both debt and equity holders have access to the same information managers have.

In the real world, that is not how things work. Usually, small investors have a difficult time exerting corporate governance because of informational asymmetries and poor legal enforcement of the rights of minority shareholders. Small investors usually lack the expertise and incentives, that is they do not have enough money to close the information gap. These informational asymmetries might help managers to influence stakeholders to vote in a way that would benefit them and not the stakeholders or the society in general. Once again, large information costs can prevent resources from flowing to the most profitable firms or projects. As explained previously banks and financial markets have lower costs for acquiring information. That suggests they would be better at monitoring investments and exerting corporate governance.

For instance, in the case of markets, public traded stocks allow owners to link stock price to managerial compensation, which helps align the interests of

managers with stockholders or even a fluent takeover market would create incentives for managers to act in the best interest of shareholders.

In the case of financial intermediaries, they can pool the savings from investors and act as delegated monitor on behalf of the investors. Since firms develop long relationships with firms, asymmetries in information can be reduced.

(iii) Facilitating the trading, diversification, and management of risk

Usually savers are risk averse and high return projects are normally riskier. Banks, mutual funds, financial markets provide vehicles that allow for pooling and sharing of risks by allowing investors to hold diversified portfolios, access to contracts such as forwards, futures and other derivatives that allow them to offset adverse effects of price movements in assets acquired. In this way helping them manage risk. Furthermore, financial markets provide investors with liquid markets where they can easily convert their claims in real money.

If the Financial System did not provide this service, savers would not be willing to invest in high return/high risk projects, and as one can imagine projects that promote technological innovation, that according to Schumpeter are necessary for economic growth, do not come from low return/low risk projects. Thus, once again financial system's services help allocate resources efficiently.

(iv) Mobilizing and pooling savings

Pooling of savings is another very important function of financial intermediaries. Financial intermediaries rely on the soundness of their institutions to convince savers that their money is safe. Additionally, they provide vehicles where thousands of investors entrust their wealth to intermediaries that invest their money into projects.

This function is very important since many projects cannot be brought to life due to lack of capital. In this way, the Financial System can help connect those with funds with those in need of funds by allocating these funds to most prosperous projects and thus generating growth.

(v) Easing the exchange of goods and services

The reduction of transaction costs can facilitate the exchange of goods and services by providing payment services. It is needless to say that a sound payment system and reduced transaction costs are crucial for economic development.

So far, we have seen that the Financial System helps shape savings and investment decisions that translate into better resource allocation and ultimately conduct to growth. But resource allocation is not all the Financial system can do. By providing its services Financial system can also have impact on income distribution and consequently on poverty alleviation.

Financial imperfections represent severe constraints to poor individuals opening their own businesses because poor individuals have little collateral. Theory suggests that allowing poor individuals to become entrepreneurs will help them pulling their selves out of poverty. Combined with high costs of schooling, financial imperfections represent barriers for poor individuals purchasing education, perpetuating income inequality. A better functioning financial system makes financial services available to a larger proportion of the population. Financial services such as capital lending, might be the line separating the poor from better life conditions.

I have tried to provide in this section a general vision of how financial intermediation can contribute to economic growth by explaining the main functions of the Financial System.

After this, we know what to expect from the model and of how our variables will relate to each other. We are ready to move to next section.

IV. DATA, VARIBALES AND METHODOLOGY

Many works on this topic investigate the impact of the operations of the financial system on economic growth by measuring whether its impact is economically large and by assessing which components of the financial system, e.g., banks and stock markets, play a particularly important role in fostering growth. We have seen in the previous sections some of the mechanisms through which this can happen. For instance, we can retrieve from the later section that financial intermediaries and markets can stimulate growth by promoting a better allocation of resources, that is, reducing costs of transaction,

asymmetries of information, by exerting corporate governance, facilitating risk management amongst many other functions.

This section, however, is organized around the econometric approach used to examining the finance-growth relationship which is the main objective of this work. In order to explore this relationship, there are a couple of things we need to go through first, such as the source of the data, estimators for financial developments and a measure for economic growth.

a. Data

As for the source of data, please assume the data is annual and was retrieved from Global Financial Development Database, as I will be discriminating when such is not the case. This database has information for more than 150 countries for over 100 variables from 1960-2017. However, for this study it will be used country level data for the 28 members of the European Union, covering the period comprehended between 2000-2017. The data collected was used to compile a panel database for the variables and countries selected. Using panel data will bring us many benefits as it will allow us to exploit the time-series and cross-sectional variations in the data, that is, it will help us analyze the behavior of our variables for 28 countries throughout many years.

Amongst the many benefits of panel data, one of them is controlling for individual heterogeneity. That is, panel data suggests that individuals, firms, states or countries are heterogeneous and time-series and cross-country studies by not controlling this heterogeneity incur the risk of obtaining biased results. Another benefit is that panel data gives more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency. As we know one of the biggest issues of time-series studies is multicollinearity the cross-sectional dimension of panel data will add more variability to the data and with more variability more accurate estimators can be produced.

Of course, panel data does not bring only benefits and as such has many limitations. One of the limitations of panel data is short time-series dimension, that is having annual data covering a short period of time for each individual. Moreover, cross-section dependence is also a big limitation of panel data because when using country level

data, not accounting for country dependencies might lead to misleading conclusions. Another downside of using panel data is that it requires knowledge of advanced econometric techniques, as it can be difficult to analyze the data and diagnose possible issues.

b. Variables

After explaining the sources and type of data, the next step is to analyze the variables used.

I think it is safe to start with our dependent variable: GDP per capita (annual percentage growth rate), which is the gross domestic product divided by midyear population. The data for this variable was taken from World Bank Database.

It was mentioned earlier in this section that we needed an estimator for financial development. Nevertheless, there is not just one measure to account for it. Traditionally, various measures have been used in studies to proxy for the level of financial development such as Domestic Credit Provided by Banking Sector (% GDP), Domestic Credit to the Private Sector (% GDP), Broad Money as a percentage of GDP, Market Capitalization, and many others to account for size and financial deepening. In this work, the proxies used will include besides depth other measures for both banks and markets that are worth looking into.

Therefore, to better understand the level of Financial Development for each country we will look at 4 indicators:

- **Access**

  Until recently, most studies on the finance-growth link or the financial system in general focus on depth, efficiency and stability. Less attention has been given to financial outreach and inclusiveness: the extent to which individuals can have direct access to financial services. Although it has been proven by countless works that a well-functioning financial system is good for growth, most forget that providing financial services to as many people as possible is also very important having large impacts on alleviating inequality and poverty.

  Without an inclusive financial system, the talented poor and the promising small enterprise have to rely on their own limited finances,

probably costing the economy opportunities for growth. Additionally, an uninclusive financial system is prone to have most of its assets and benefits sitting in the hands of very few individuals, and as we know that can be dangerous.

When talking about financial inclusion it is important to distinguish between use and access to financial services, one might have access and not make use it. One of the most used measures to account for financial access on the financial institutions' side is the number of Bank Branches per 100,00 adults (BnkBr). While some customers might be able to access some financial services using a phone or computer through the internet, others might have to visit a branch or an ATM. It is important to understand the density of branches per km or per capita to have a glimpse on how far costumers are from the nearest branch. This measure has a limitation, we can have in an area as many bank branches as would be desirable but having them not geographically well distributed.

For the financial markets we have Corporate Bond Issuance Volume to GDP (CBond), that is basically the quantity of new bonds issued by private companies divided by GDP.

According to these measures, the more bank branches or corporate bonds issued, the higher is the access to financial services.

- **Depth**

Financial depth captures the financial sector relative to the economy, that is why most works on finance-growth link focus more on depth rather than other measures.

A proxy variable that has been extensively used in empirical literature, and here also, is Private Credit by Deposit Money Banks relative to Gross Domestic Product (Priv). This measure has a downside which is it considers only credit from deposit money banks ignoring other financial institutions, but the reason why this is most common used variable is because the data for non-bank financial institutions is far less comprehensive.

For financial markets, earlier work from Levine and Zervos (1988), show that Market Capitalization (Mcap) is a good proxy for financial deepening.

- **Efficiency**

It is understandable that it does not matter how large the financial system is if it is not efficient. By efficient I mean capable of functioning in the best manner possible, that is generating positive results with minimum waste of resources. An efficient financial system is more capable of better allocating the resources.

To measure bank's efficiency, it will be used, Bank Return on Assets (BankROA) which is a measure of how profitable banks are relative to their total assets. For markets' efficiency it will be used the Stock Market Turnover Ratio (SMT) that is simply a measure of the liquidity of shares traded in the markets.

- **Stability**

A stable financial system is capable of not only efficiently allocating resources, but also assessing and managing financial risks. The true value of financial stability is best illustrated in its absence, in periods of financial instability.

The z-score is a common measure used to proxy for stability at the level of individual institutions. Other approaches to measuring institution-level stability is Bank Non-Performing Loans (BNPL), which is the one used here. It represents the level of credits at default or close to default relative to total loans issued by banks. As one can imagine the higher this ratio the less stable banks are.

To account for the stability of the financial markets the classic measure used is Stock Price Volatility (Volatility). The more volatile the stock prices the less stable is the market.

Besides these two measures, another measure was chosen to account for banking crisis. It is dummy variable with value 1 in 2008-2012 and 0 in the remaining years.

Since the objective of this work is to understand the effect of finance in growth, and because there are many variables that influence growth, there is the need to define control variables. They will be very useful to isolate the effect of finance on growth from the effect of other variables that affect growth, this way the results will without a shade of doubt more accurate. The control variables, retrieved from World Bank Database, are:

- Trade, sum of exports and imports of goods and services as a share of gross domestic product. As we have seen in many models of growth, trade openness has always been a source of exchange of knowledge and specialization.
- General Government Final Consumption Expenditure (GovExp), which includes all government current expenditures for purchases of goods and services (including compensation of employees) both as a percentage of GDP.
- School enrollment (Enrollment), to measure the impact of human capital. As we now more recent theories of grow stresses that investment in human capital is key to development and growth.

More detailed information of the variables can be found in tables II.1, II.2 and III in the appendix section.

c. Methodology

Now that we went through the variables, we can now specify mathematically the equation we are interested in estimating. It is important to point out that many studies opted to follow a neoclassical model as in Barro (1993). In this paper, I will be following a simpler approach:

$$GROWTH_{i,t} = \beta_0 + \beta_i FD_{i,t} + \Upsilon_i CS_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where:

1. Growth, is the annual percentage of GDP observed for the i^{th} country at time t;
2. FD represents the measure of Financial Development. That is, it includes all measures of access, depth, efficiency and stability mentioned previously;

3. CS represents the conditional set that is composed of government expenditure, trade and school enrolment;
4. Finally, $\varepsilon_{i,t}$ that represent the error term that accounts for all the effects that are not specified in the model.

I would expect a positive relationship between growth, access, depth and efficiency, and a negative correlation between growth and stability. We will be able to assess veracity of these expectations in the following sections.

V. ESTIMATIONS AND RESULTS

To start with panel data analysis, we need, before anything, to confirm the basic assumptions of the Classical Linear Regression Model (CLRM), that is, check the dataset normality, heteroscedasticity, autocorrelations, multicollinearity and unit roots. This first step is done even before using sophisticated techniques, such as fixed or random effects models, to address this type of data.

My first approach was to use a pooled regression model, which is a model that has constant coefficients to both intercepts and slopes, meaning that it disregards any effect that is specific of a determined individual of the sample. In other words, it is basically an Ordinary Least Squares (OLS) model run for panel data. The pooled model regressed can be seen in Table IV in the appendix. For now, let's not pay too much attention to the coefficients and signal of the regressors until we find the model that best fits the dataset.

To test for multicollinearity, the frequently used indicator is Variance Inflation Factor (VIF) which quantifies how much the variance of our estimators is inflated by the presence of correlation. A VIF of 1 means absence of multicollinearity whereas a VIF exceeding 10 indicates serious multicollinearity requiring correction. Our dataset has not multicollinearity issues as can be seen in Table V.

For heteroskedasticity, the test chosen was the famous Breusch-Pagan. If the test statistic has p-value below 0.05 we can reject the null hypothesis of homoskedasticity and heteroskedasticity is assumed. For our dataset, as the p-value is superior than 0,05 we can assume homoskedasticity – Table VII.

Finally, to test normality the residuals of the pooled regression were estimated and afterwards the Shapiro-Wilk test for normality was ran indicating normally distributed residuals. In Table VII it can be seen that the test's p-value is superior to 0,05 which indicates that the null hypothesis is accepted, and we assume normally distributed residuals.

The next step is to understand whether the pooled model is a good fit for the data being analyzed. To do so, dummies for each country were created, and the model was estimated once more with the dummies. After, a global significance test for the dummies was ran to understand if the dummy variables were statistically significant. As we can see in Table VII, they are statistically significant (Prob > F = 0.000) meaning that there some effects that specific to each country in the sample that not well captured in the pooled regression model. The pooled model is not a good fit.

Before moving on to the fixed and random effect models, it is imperative to test for the absence of unit roots problem since this data also carries time dimensions. What is intended here is to understand whether these variables are stationary, that is, if they follow always the same process throughout time. One of the most used tests to detect non-stationarity is the Levin-Lin-Chu. However, it only works for balanced panel data which is not the case of the dataset being analyzed in this work. Here, the test used is the Fisher-type tests which combines the p-values from the panel-specific unit-root tests using four methods proposed by Choi (2001).

The null hypothesis being tested is that all panels contain a unit root. In tables VIII.1, III.2 and III.3 it possible to see that all variables are stationary except for BnkBr, BNPL, Trade, GovExp, Enrollment and Priv which were added to the model in first differences, as the first differences are stationary.

As was seen previously the pooled effects model is not the most adequate to model the dataset we are analyzing. Therefore, we need to try more sophisticated types of models. When it comes to panel data, usually, we have two models the fixed and random effects. A fixed effects model is one that accounts for the specific effects of each individual of the series assuming that this specific effect is equal to all and constant over time, whereas a random effect model assumes the specific effects to be random across the individual.

Both fixed and random effects were estimated in tables IX and X, respectively, and the Hausman test was ran, Table XI. This test is widely used to help choose between fixed and random effects. The null hypothesis is that the random effects model is consistent. As the p-value is inferior than 0.05 we safely reject the null hypothesis and chose the fixed effects model to describe our data. Therefore, the model estimated is the following:

$$GROWTH_{i,t} = \beta_0 + \beta_1 dBnkBr_{i,t} + \beta_2 CBond_{i,t} + \beta_3 dPriv_{i,t} + \beta_4 MCap_{i,t} + \beta_5 BnkROA_{i,t} + \beta_6 SMT_{i,t} + \beta_7 dBNPL_{i,t} + \beta_8 Volatility_{i,t} + \beta_9 BnkCrisis_{i,t} + \beta_{10} dGovExp_{i,t} + \beta_{11} dTrade_{i,t} + \beta_{12} dEnrollment_{i,t} + \varepsilon_i \quad (2)$$

We can now analyze our final model, fixed effects, and see what we can conclude from it. We can do it by looking at each one of the indicators: access, depth, efficiency and stability.

In terms of access, we would expect both measures to be positively correlated with growth, but only Bank Branches per 100,000 adults is. One could say that up until today, on average, companies and the economy itself seek for financing from institutions such as banks rather than financial markets. Although this tendency suffered a slight shift since the 2008 crisis because the availability of bank lending shrank, it was not enough to make the economy benefit from its effects.

Additionally, none of the access measures are statistically significant. It is important to point out that our database is composed mostly of high-income countries, meaning that access to financial services is not as important to boast growth as it would be, for instance, for a low-income country. Studies such as World Bank, 2007 show that the very low access to finance in poor regions such as Africa constitute a restriction to reduction of poverty and inequality and consequently to growth.

According to Arcand, Jean-Louis, Enrico Berkes, and Ugo Panizza (2011), in their work "Too Much Finance", the assumption that larger financial systems are always good for growth is put to rest. This paper shows that countries with large financial systems are more likely to have a negative correlation between financial depth and growth. Moreover, their results are in harmony with the "vanishing effects" theory, meaning that finance up to certain point will no longer contribute to growth. The paper even suggests that for some countries a smaller financial system would be desirable. One of the reasons why a large

financial system, measured by credit to the private sector, can hurt the economy is the increasing volatility.

Coming back to our model we can see that measures of depth on the financial institutions side is negative and not statistically significant. As was previously mentioned, our database is composed of high-income countries with large financial systems. This fact and the results of our model are in accordance with the findings of "Too Much Finance" paper. Perhaps the financial systems of these countries have grown so much that its effects became hurtful to the economy.

On the other side, we have that market capitalization, a proxy for financial market's depth, is positively correlated with growth and is statistically significant at 5% significance level. These results might bring us back to Miller, M. H. (1998) in which he advocates for the transition to a more financial market-based economies. It is clear by the results from our model that investing in financial markets might be good for the economy helping in the process to alleviate the burden from banks and other financial institutions from the task of financing the economy.

As expected, efficiency in the financial institutions side and market's side is positively correlated with growth and is statistically significant at 5% significance level both. This is in accordance with what was described in section III. One of the mechanisms through which finance can affect growth is through efficient allocation of resources, meaning that having an inefficient large financial system operating is no different perhaps than not having one.

Another very crucial component is stability. Stable financial systems are very important for the functioning of the economy. As we have seen an unstable financial system can lead to financial meltdowns, the worst part about instability is that is can reveal weakness never seen before giving very little time to prepare and adjust culminating in catastrophic outcomes. In our model both measures of stability are negatively correlated with growth, as expected, and are statistically significant at 5% significance level.

As for the control variables, we have government expenditure that is statistically significant; Trade, which is also significant and positively correlated with growth. This is not a surprise because most economic theories defend that trade openness is a way for countries to specialize and acquire new knowledge consequently contributing to growth;

Enrollment, is not significant and is negatively correlated with growth, this is probably because in developed countries most people seek for a superior education when they leave high school, meaning that after secondary school people don't usually join the work force and contribute to the economy, they go to college.

Overall, the model has a relatively high R-Squared, which means our dependent variable is explained in approximately 76% by the regressors of the model. However, the results are not as robust as the ones presented in several other papers mentioned in this work, but we can see that they match the current reality.

And from all of the above explanations we can conclude that for the countries studied and the variables used the link between finance and growth is positive, but one could argue that indeed it is necessary that high income economies from Europe diversify giving a chance to financial markets to have a more active role on their economies.

According to the Report on Financial Structures from the ECB, from October 2017, it is true that monetary financial institutions still represent the largest share of the financial sector in most European countries. Still in this report, the non-bank financial institutions sector has been increasing steadily since the 2008 crisis but still does not surpasses the banking sector which is still the leader and the biggest source of financing.

More recent reports, such as Financial Integration and Structure in the Euro Area, from March 2020, show that this tendency is still true. That is, Europe is still moving from a strong bank dominant regime to a more mixed/balanced one in which the non-bank financial institutions take a bigger slice of the cake.

Both of these reports show that financial markets are still not as relevant as banks and other financial institutions in European financial markets, these findings are in line with what our model shows.

VI. ADDITIONAL CONSIDERATIONS

This section begins with a retrospective regarding the factors that originated the financial crisis, then it moves to how are we more than 10 years later culminating in some assessments about the future. The objective is to understand why is still relevant today discuss the financial stability, crisis and the link between finance and growth.

The exact causes of the 2007-08 financial crisis are a matter of dispute among economists. Numerous factors were to blame in what happened, although there is some divergence regarding their relative importance.

It is general agreement that the American housing market played a pivotal role on the development of the crisis, some would even cite this as the event that initiated a chain of other events that would lead to what we know today as the Great Depression. However, there are other pivotal events that should be considered.

One of these events is the reduction of the overnight borrowing rate by the FED to nearly 1% to keep the economy strong, as a response to the events of 9/11. That was not very stimulating for the investors but in the other hand it meant more capital available for banks. This encouraged banks to lend money to prime and subprime borrowers which took advantage of cheap credit and invested amongst other good in houses. The increasing prices of the housing market made this deal even more attractive for both banks and consumers since it allowed home owners to either readjust their mortgages or even sell their houses at profit paying their mortgages and banks, in case of default, to repossess the houses and sell them at a price higher than the initial mortgage.

Moreover, the securitization allowed investment bankers to bundle together hundreds of mortgages, dividing them into three tranches according to risk, and resell them to investors passing on risk from one party to another. It was a win-win situation for every party involved until the subprime mortgage owners started to default, as expect, and investment bankers started to have in their balance sheets more houses than actual mortgages payments. At some point the supply of houses became bigger than the demand and the increase in housing price started to slow down to eventually decrease.

When more homeowners started to default, the lenders tried to sell their mortgages to investment bankers, which tried to sell their collaterized debt obligations (CDO's) to investors, which were also trying to sell the CDO's they had already bought. The financial system froze and eventually many banks started to go bankrupt. The existence of too big to fail banks, a direct consequence of the deregulation of banking activities, allowed the risk to spread even faster affecting everybody that invested in CDO's including homeowners, entire governments, and investors from across the globe. That's how the crisis surpassed the borders of the United States of America and instead of a domestic crisis it became global one.

Before the Lehman Brother's default, policy makers did not understand the origins of the instability in the financial system. They considered it a cyclical event and as such used temporary measures to tackle it.

Most policy responses started after the Lehman Brother's bankruptcy, central banks applied measures such as massive liquidity provision, takeovers/bail outs, cuts in short-term interest rates of the main financial operations and many more. The objective was to regain trust and stabilize the economy.

Although the measures above described had some positive effect in tackling the crisis, they were nothing but quick fixes for a permanent situation. More structural reforms were needed to prevent situations like this from ever happening again. As a response for the need for more structural reforms, the Dodd-Frank act[1] (2010) and Basel III[2] (2009) reforms were created at US and international levels respectively.

Although it has been more than a decade since the financial crisis hit, the effects of this recession are still alive, and the global economic recovery has been fairly weak in comparison to what would have been had we not had the financial meltdown of 2008.

According to the Global Financial Stability reports of 2018 and 2019, we have learned that the global economic recovery has been uneven fueling inward-looking policies increasing policy uncertainty; low interest rates in US are risk appetitive, creating an incentive for institutional investors to invest in riskier and more illiquid assets; debt levels to nonfinancial sector have been increasing significantly across countries; and the new financial structure that has emerged after the Global Financial Crisis is yet to be tested.

Regulators insist that the global financial system has been altered since 2008 and that safety measures have been considerably enhanced. For this reason, many believe that the global financial system is stronger today than it was a decade ago and this is the truth. In fact, the financial system is stronger today than it was 10 years ago, but does it mean it is perfectly safe? No. More threats continue to arise as the system evolves, which means there is still work to do.

[1] The Dodd-Frank Wall Street Reform and Consumer Protection Act—typically shortened to just the Dodd-Frank Act—established a number of new government agencies tasked with overseeing the various components of the act and, by extension, various aspects of the financial system.

[2] Basel III, which is alternatively referred to as the Third Basel Accord or Basel Standards, is part of the continuing effort to enhance the international banking regulatory framework. It specifically builds on the Basel I and Basel II documents in a campaign to improve the banking sector's ability to deal with financial stress, improve risk management, and promote transparency. On a more granular level, Basel III seeks to strengthen the resilience of individual banks in order to reduce the risk of system-wide shocks and prevent future economic meltdowns.

For those wondering whether this type of economic crisis can happen again, the short answer is yes, because anything is possible. Although we are somewhat stable now, the conditions that promote this stability can rapidly change. It is necessary that financial regulators remain attentive to the evolution of the financial system and its future challenges.

VII. CONCLUSIONS

This paper reviewed theoretical and empirically the existing works on the relationship between financial system and economic growth. Theory shows that this relationship only exists because of the many functions the financial institutions and markets execute when proving us with its financial services. Although not conclusive in many aspects, there is broad evidence that support the idea that finance impacts growth differing only in methodology, period, data coverage and variables selected.

In terms of empirical work, this dissertation was able to prove that there is a positive relationship between finance and growth and that for the countries studied banks still have more weight than financial markets, which suggests that perhaps European economies should work on developing their financial markets even more as an attempt to diversify their financial system. Diversification of the financial system has proven to be vital to financial stability and it is believed to be even more important now as we are not out of danger. The financial system is forever evolving, and it is necessary to keep an attentive eye to possible threats to the current stability.

As for difficulties encountered throughout the realization of this work, one that could be mentioned is the process of choosing the indicators of financial development. The absence of data for the period and countries chosen shrinked our database considerably. There is the need to improve the quality and amount of data at the access level which is a very important component if one were to study the impacts of finance on growth. Therefore, I believe this is one area that needs improvement.

This was a simple work, nothing like the other works full of sophisticated methodologies. Even so, I am satisfied with the results achieved and the way this work was conducted.

REFERENCES

Arcand, Jean-Louis, Enrico Berkes, and Ugo Panizza (2011), “Too much finance?”, VoxEU.org, 7 April.

Arestis, P., Demetriades, P. O., and Luintel, K., (2001), "Financial Development and Economic Growth: The Role of Stock Markets," Journal of Money, Credit and Banking, 33(1), 16-41.

Ayadi, R., Sami Ben-Naceur, E. & De Groen, W., 2013. Financial Development, Bank Efficiency and Economic Growth across the Mediterranean, European Commission European Research Area: MEDPRO Technical Paper, MEDPRO Project.

Ayyagari, Meghana & Beck, Thorsten & Hoseini, Mohammad, 2013. "Finance and Poverty: Evidence from India," CEPR Discussion Papers 9497, C.E.P.R. Discussion Papers.

Bagehot, W. (1873), Lombard Street, Homewood, IL: Richard D. Irwin, (1962 Edition)

Baltagi, B., 2005. Econometric Analysis of Panel Data. 3rd ed. s.l.:John Wiley.

Bank Regulation and Supervision a Decade after the Global Crisis 2019/2020, ECB

Barro, R., 1991. Economic growth in a cross section of countries. Quarterly Journal of Economics 56, 407}443.

Beck, T. and R. Levine (2004), “Stock Markets, Banks and Growth: Panel Evidence”, Journal of Banking and Finance, 423-442.

Beck, T., R. Levine and N. Loayza (2000), “Finance and the Sources of Growth”, Journal of Financial Economics, 58: 261–300.

Beck, Thorsten & Demirguc-Kunt, Asli & Levine, Ross & Maksimovic, Vojislav, 2000. "Financial structure and economic development - firm, industry, and country evidence," Policy Research Working Paper Series 2423, The World Bank.

Beck, Thorsten, 2006. "Creating an efficient financial system : challenges in a global economy," Policy Research Working Paper Series 3856, The World Bank.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross Levine. 2000. "A New Database on the Structure and Development of the Financial Sector." World Bank Economic Review 14 (3): 597–605.

Caprio Jr., G. and R. Levine (2002), "Corporate Governance in Finance: Concepts and International Observations" in Financial Sector Governance: The Roles of the Public and Private Sectors, Eds. R.E. Litan, M. Pomerleano, and V. Sundararajan, Washington DC: The Brookings Institution, 17-50.

Cecchetti, S. & Kharroubi, E., 2012. Reassessing the impact of finance on growth, Basel: BIS Working Paper, No. 381.

Čihák, Martin, Asli Demirgüç-Kunt, Erik Feyen, and Ross Levine. 2012. "Benchmarking Financial Development Around the World." Policy Research Working Paper 6175, World Bank, Washington, DC

Claessens, S., Kose, A., Laeven, L., & Valencia, F. (2014). *Financial Crises: Causes, Consequences, and Policy Responses*. USA: INTERNATIONAL MONETARY FUND. doi: https://doi.org/10.5089/9781475543407.071

Eken, Mehmet & Kale, Süleyman & Selimler, Hüseyin. (2013). The Evolution of Regulations in Banking: A Cycle Based Approach. ACRN Journal of Finance and Risk Perspectives. 2. 15-26.

Financial integration and Structure in the Euro Area, March 2020 ECB

Financial Soundness Indicators

Global Financial stability report 2018, IMF

Global Financial stability report 2019, IMF

Goldsmith, R. W., (1969), Financial Structure and Development. New Haven: Yale University Press.

Hassan, M.K., Sanchez, B. and Yu, J.S. (2011), "Financial development and economic growth: new evidence from panel data". The Quarterly Review of Economics and Finance, Vol. 51 No. 1, pp. 88-104

Honohan, Patrick & Beck, Thorsten & Demirguc-Kunt, Asli. (2009). Access to Financial Services: Measurement, Impact, and Policies. World Bank Research Observer. 24. 119-145. 10.1093/wbro/lkn008. The impact of private debt on growth

Hull (2009), “The Credit Crunch of 2007: What Went Wrong? Why? What Lessons Can Be Learned?”, The Journal of Credit Risk, Volume 5/Number 2, Summer.

King, Robert G. and Levine, Ross, 1993. "Finance and growth : Schumpeter might be right," Policy Research Working Paper Series 1083, The World Bank.

Levine, R. and S. Zervos (1998a), “Stock Markets, Banks, and Economic Growth”, American Economic Review, 88: 537-558.

Levine, R. and S. Zervos (1998b), “Capital Control Liberalization and Stock Market Development”, World Development, 26: 1169-1184.

Levine, Ross (2005), “Finance and Growth: Theory and Evidence”, in Handbook of Economic Growth, Volume 1A, edited by Philippe Aghion and Steven N. Durlauf, Elsevier, Chapter 12.

Mankiw, N. (1995). The Growth of the Nations. Brooking Papers on Economic Activities, 1, 275-310.

MARWA Nyankomo & ZHANJE Stephen, 2015. "A Review Of Finance–Growth Nexus Theories: How Does Development Finance Fits In?," Studies in Business and Economics, Lucian Blaga University of Sibiu, Faculty of Economic Sciences, vol. 10(1), pages 83-91, April.

McKinnon, R. I. (1973), Money and Capital in Economic Development, Washington, DC: Brookings Institution.

Miller, M. H. (1998), "Financial Markets and Economic Growth", Journal of Applied Corporate Finance, 11: 8-14.

Popov, Alexander, 2017. "Evidence on finance and economic growth," Working Paper Series 2115, European Central Bank.

Rajan, Raghuram G. (1998), “The Past and Future of Commercial Banking Viewed through an Incomplete Contract Lens”, Journal of Money, Credit, and Banking, Vol. 30, No. 3 (August, Part 2).

Randveer, Martti & Uusküla, Lenno & Kulu, Liina. (2011). The impact of private debt on economic growth.

Reports on Financial Structure, October 2017 ECB

Schumpeter, J. A. (1912), “Theorie der Wirtschaftlichen Entwicklung. Leipzig: Dunker & Humblot”, [The Theory of Economic Development, 1912, translated by R. Opie. Cambridge, MA: Harvard University Press, 1934.]

Shan, J., 2005. Does financial development 'lead' economic growth? A vector auto-regression appraisal. In: Applied Economics. London: Routledge, pp. 1353-1367.

Shan, J., Morris, A. & Sun, F., 2001. Financial Development and economic growth: An egg-chicken problem?. Review of International Economics, Volume 9, pp. 443-454.

The World Bank annual report 2007 (English). Washington, D.C. : World Bank Group.

Using a Dynamic Panel Estimator to Model Change in Panel Data

Wenjie Chen & Mico Mrkaic & Malhar S Nabar, 2019. "The Global Economic Recovery 10 Years After the 2008 Financial Crisis," IMF Working Papers 2019/083, International Monetary Fund.

World Bank. 2007. Finance for All? Policies and Pitfalls in Expanding Access. Washington, DC.

APPENDIX

Table I – Literature Review[3]

Literature	Main Conclusions
Schumpeter, J. A. (1912)	Banks and Credit play a pivotal role in economic development.
Goldsmith, Raymond W. (1969)	Documented a positive correlation between financial and economic development.
Beck, Thorsten & Demirguc-Kunt, Asli & Levine, Ross & Maksimovic, Vojislav, 2000	Distinction between a bank-based and market based financial system does not help explain economic growth.
Miller, M. H. (1998)	In the long run banking system should be substituted by financial markets.
McKinnon (1973)	Liberalization and alleviation of restrictions upon the financial system might stimulate economic growth
King and Levine (1993a)	Indicators of financial development are strongly and robustly correlated with growth and constitute a good predictor for growth.
Levine and Zervos (1988)	Stock market liquidity and banking development are both positively and robustly correlated with contemporaneous and future rates of economic growth, capital accumulation, and productivity growth
Beck, T., R. Levine and N. Loayza (2000)	Positive and robust relationship between financial development and both growth and productivity growth.
Hanssan et al (2011)	Overall, this paper concludes that a well-functioning financial system might indeed lead to growth.

[3] It is important to note that for many of the works included in this table, one might be able to take many other conclusions, but we are focusing on the conclusions we find more relevant and in line with what is the scope of this work.

Table II.1 – Detailed Variables Description

Variables	Unit of measure	Name	Source	Description
Bank Branches per 100,000 adults	Gross	BnkBr	Global Financial Development Database	For each country calculated as: 100,000*reported number of commercial bank branches/adult population in the reporting country.
Bank Non-Performing Loans to Gross Loans	%	BNPL	Global Financial Development Database	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).
Bank Return on Assets, after tax	%	BankROA	Global Financial Development Database	Commercial banks' after-tax net income to yearly averaged total assets.
Banking Crisis	-	BnkCrisis	Global Financial Development Database	Dummy variable for the presence of banking crisis (1=banking crisis, 0=none)
Corporate Bond Issuance Volume to GDP	% of GDP	CBond	Global Financial Development Database	Total volume of newly issued corporate bonds by private entities in industries other than finance, holding companies and insurance, divided by GDP in current USD. GDP is from World Development Indicators.
GDP per capita	Annual %	Growth	Global Financial Development Database	GDP per Capita (Constant 2005 USD)

Table II.2 – Detailed Variables Description (Continuation)

Variables	Unit of measure	Name	Source	Description
General Government Final Consumption Expenditure	% of GDP	GovExp	World Bank Database	Includes all government current expenditures for purchases of goods and most expenditures on national defense and security but excludes government military.
Private Credit by deposit money banks to GDP	% of GDP	Priv	Global Financial Development Database	Financial resources provided to the private sector by domestic money banks (commercial banks and other financial institutions that accept transferable deposits, such as demand deposits) as a share of GDP.
Stock Market Capitalization to GDP	% of GDP	Mcap	Global Financial Development Database	Total value of all listed shares in a stock market as a percentage of GDP.
School Enrollment, secondary	Gross %	Enrollment	World Bank Database	Is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.
Stock Market Turnover Ratio	%	SMT	Global Financial Development Database	Total value of shares traded during the period divided by the average market capitalization for the period.
Stock Price Volatility	Annual %	Volatility	Global Financial Development Database	Stock price volatility is the average of the 360-day volatility of the national stock market index.
Trade	% of GDP	Trade	World Bank Database	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

Table III – Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
BnkBr	391	37.06	2152	1.43	110.93
BNPL	466	5.88	7.19	0.1	48.68
BnkROA	504	0.53	1.27	-10.47	4.24
BnkCrisis	504	0.15	0.36	0	1
CBond	387	1.97	2.13	0.001	17.72
Growth	503	2.19	3.57	-14.27	12.92
GovExp	504	19.77	2.79	11.98	27.93
Priv	491	85.76	40.94	11.13	211.92
MCap	450	57.09	49.99	0.74	263.75
Enrollment	495	106.47	15.71	79.78	163.93
SMT	440	53.0	51.55	0.13	361.64
Volatility	488	21.03	8.78	6.34	61.33
Trade	504	115.12	64.1	45.42	408.362

Table IV – Pooled Regression Model

Source	**SS**	**DF**	**MS**	**Nbr of obs**	**=**	**235**
Model	1759.8508	12	146.654133	**F (12, 222)**	**=**	**23.78**
				Prob>F	**=**	**0.0000**
Residual	1369.31079	222	6.16806662	**R-squared**	**=**	**0.5624**
				Adj R-sqd	**=**	**0.5387**
Total	3129.16159	234	13.3724854	**Root MSE**	**=**	**2.4836**

Growth	**Coef.**	**Std. Err.**	**T**	**P>|t|**	**[95%conf.**	**Interval]**
BnkBr	-.0021214	.0084013	-0.25	0.801	-.0186779	0.14435
CBond	-.3321818	.1064338	-3.12	0.002	-.5419317	-.1224319
Priv	-.0120732	.0052927	2.28	0.023	-.0225035	-.0016429
MCap	.0079704	.0047126	1.69	0.092	-.0013168	.0172575
BnkROA	.6010389	.181153	3.32	0.01	.2440393	.9580385
SMT	-.0049388	.0037228	-1.33	0.186	-.0122753	.0023978
BNPL	-.0112454	.0305645	-0.37	0.713	-.0714791	.0489883
Volatility	-.1502969	.0260404	-5.77	0.000	-.2016149	-.0989789
BnkCrisis	-1.239326	.4905425	-2.53	0.012	-2.206042	-.2726107
Trade	.0003151	.0036509	0.09	0.931	-.0068798	.00751
GovExp	-.2446257	.0805397	-3.04	0.003	-.4033459	.0859054
Enrollment	-.0046647	.0128723	-0.36	0.717	-.0300322	.0207029
Cons	11.90944	1.738768	6.85	0.000	8.482835	15.33604

Table VI – VIF

Variable	VIF	1/VIF
BnkBr	1.43	0.699432
BNPL	1.51	0.661207
BnkROA	1.64	0.607928
BnkCrisis	1.68	0.593702
CBond	1.72	0.580402
GovExp	2.03	0.493279
Priv	1.91	0.524464
MCap	2.21	0.451591
Enrollment	1.40	0.713678
SMT	1.36	0.735516
Volatility	1.75	0.572706
Trade	2.16	0.462020
Mean VIF	1.73	

Table VII – Tests

Breusch-Pagan Test					
Chi2(1)	1.07				
Prob>Chi2	0.3010				
Swilk Test					
Variable	**Obs**	**W**	**V**	**Z**	**Prob>Z**
	235	0.99311	1.184	0.391	0.34783
F - Test					
F (26, 196)	4.62				
Prob > F	0.0000				

Table VIII.1 – Stationarity Tests

Variables	Lags	Statistic-name[4]	Statistic	P-value
BnkBr		**P**	**32.9452**	**0.9940**
	0	**Z**	**4.2269**	**1.0000**
		L*	**4.6792**	**1.0000**
		Pm	**-2.1785**	**0.9853**
dBnkBr		**P**	**196.0148**	**0.0000**
	-1	**Z**	**-8.1134**	**0.0000**
		L*	**-9.5704**	**0.0000**
		Pm	**13.2302**	**0.0000**
CBond		**P**	**236.8719**	**0.0000**
	0	**Z**	**-10.8586**	**0.0000**
		L*	**-13.4821**	**0.0000**
		Pm	**19.2767**	**0.0000**
Mcap		**P**	**81.5238**	**0.0146**
	0	**Z**	**-2.4308**	**0.0075**
		L*	**-2.4618**	**0.0075**
		Pm	**2.4118**	**0.0079**
BnkROA		**P**	**177.7325**	**0.0000**
	0	**Z**	**-8.0636**	**0.0000**
		L*	**-8.7858**	**0.0000**
		Pm	**11.5026**	**0.0000**
SMT		**P**	**288.4894**	**0.0000**
	0	**Z**	**-7.6983**	**0.0000**
		L*	**-13.6673**	**0.0000**
		Pm	**21.9682**	**0.0000**
BNPL		**P**	**175.2669**	**0.0000**
	0	**Z**	**-1.1722**	**0.1206**
		L*	**-5.2747**	**0.0000**
		Pm	**11.2697**	**0.0000**

[4] Where: P – Inverse Chi-squared (56); Z – Inverse normal; L*– Inverse logit(144); Pm – Modified inv. Chi-squared.

Table VIII.3 – Stationarity Tests (Continuation)

Variables	Lags	Statistic-name[5]	Statistic	P-value
dBNPL		**P**	**449.2046**	**0.0000**
	-1	**Z**	**-13.0374**	**0.0000**
		L*	**-22.9585**	**0.0000**
		Pm	**37.1543**	**0.0000**
Volatility		**P**	**83.6739**	**0.0097**
	0	**Z**	**-3.3004**	**0.0005**
		L*	**-3.1749**	**0.0009**
		Pm	**2.6149**	**0.0045**
Trade		**P**	**23.2937**	**1.0000**
	0	**Z**	**3.3262**	**0.9996**
		L*	**3.2596**	**0.0090**
		Pm	**-3.0905**	**0.9990**
dTrade		**P**	**1348.8471**	**0.0000**
	-1	**Z**	**-32.7968**	**0.0000**
		L*	**-70.4977**	**0.0000**
		Pm	**122.1626**	**0.0000**
GovExp		**P**	**63.1906**	**0.2374**
	0	**Z**	**-1.4313**	**0.0762**
		L*	**-1.3332**	**0.0923**
		Pm	**0.6794**	**0.2484**
dGovExp		**P**	**870.8595**	**0.0000**
	-1	**Z**	**-24.7126**	**0.0000**
		L*	**-45.5167**	**0.0000**
		Pm	**76.9970**	**0.0000**
Enrollment		**P**	**89.6552**	**0.0029**
	0	**Z**	**0.1209**	**0.5481**
		L*	**-0.7214**	**0.2359**
		Pm	**3.1801**	**0.0007**

[5] Where: P – Inverse Chi-squared (56); Z – Inverse normal; L*– Inverse logit(144); Pm – Modified inv. Chi-squared.

Table VIII.3 – Stationarity Tests (Continuation)

Variables	Lags	Statistic-name[6]	Statistic	P-value
dEnrollment		**P**	**1213.5243**	**0.0000**
	-1	**Z**	**-30.5394**	**0.0000**
		L*	**-63.4334**	**0.0000**
		Pm	**109.3758**	**0.0000**
Priv		**P**	**111.3103**	**0.0000**
	0	**Z**	**-0.5793**	**0.2812**
		L*	**-1.9768**	**0.0250**
		Pm	**5.2263**	**0.0000**
Priv		**P**	**1068.9058**	**0.0000**
	-1	**Z**	**-26.6495**	**0.0000**
		L*	**-55.7049**	**0.0000**
		Pm	**95.7106**	**0.0000**
Growth		**P**	**191.3805**	**0.0000**
	0	**Z**	**-8.9072**	**0.0000**
		L*	**-9.6211**	**0.0000**
		Pm	**12.7923**	**0.0000**

[6] Where: P – Inverse Chi-squared (56); Z – Inverse normal; L*– Inverse logit(144); Pm – Modified inv. Chi-squared.

Table IX - Random Effects Model

R-sq:				**Nbr of obs**	=	**206**
				Nbr of Groups	=	**27**
				Obs per group:		
Within	0.6797			**Min**	=	**2**
Between	0.5614			**Avg**	=	**7.6**
Overall	0.6189			**Max**	=	**13**
				Wald Chi2 (12)	=	**369.03**
Corr (u_i,X)	= 0 (assumed)			**Prob > Chi2**	=	**0.0000**

Growth	**Coef.**	**Std. Err.**	**Z**	**P>|t|**	**[95%conf. Interval]**	
dBnkBr	0.13483	0.0634753	2.12	0.034	0.0104207	.2592393
CBond	-0.2578706	0.1051408	-2.45	0.014	-0.4639428	-0.0517985
dPriv	-0.0177461	0.0239472	-0.74	0.459	-0.0646817	0.0095834
MCap	-0.0019179	0.0058681	-0.33	0.7440	-0.0134192	0.0095834
BnkROA	0.659376	0.1577993	4.18	0.000	0.3500951	0.9686569
SMT	0.0021169	0.0045974	0.46	0.645	-0.0068938	0.0111277
BNPL	-0.3386955	0.1057522	-3.2	0.001	-0.5459659	-0.131425
Volatility	-0.08214	0.0263048	-3.12	0.002	-0.1336964	-0.0305836
BnkCrisis	-0.7864369	0.444245	-1.77	0.077	-1.657141	0.0842672
dTrade	0.0452039	0.0258018	1.75	0.08	-0.0053667	0.0957746
dGovExp	-1.584082	0.2746053	-5.77	0.000	-2.122298	-1.045865
dEnrollment	-.0204597	0.0451715	-0.45	0.651	-0.1089943	0.0680749
Cons	4.156331	0.7637527	5.44	0.000	2.659403	5.653258
sigma_u	1.4137463					
sigma_e	1.7890174					
rho	0.38441583					

Table X – Fixed Effect Model

R-sq:				**Nbr of obs**	=	**206**
				Nbr of Groups	=	**27**
				Obs per group:		
Within	0.7047			**Min**	=	**2**
Between	0.0319			**Avg**	=	**7.6**
Overall	0.4187			**Max**	=	**13**
				Wald Chi2 (12)	=	**33.21**
Corr (u_i,Xb)	= -0.2187			**Prob > Chi2**	=	**0.0000**

Growth	**Coef.**	**Std. Err.**	**T**	**P>|t|**	**[95%conf. Interval]**	
dBnkBr	0.0964461	0.0607696	1.59	0.114	-0.0235295	0.2164218
CBond	-0.1318986	0.1136422	-1.16	0.247	-0.3562591	0.092462
dPriv	-0.0294659	0.0226968	-1.3	0.196	-0.0742755	0.0153437
MCap	0.0181732	0.0091176	1.99	0.048	0.0001726	0.0361738
BnkROA	0.4775388	0.1541558	3.1	0.002	0.1731935	0.7818842
SMT	0.0153836	0.0054252	2.84	0.005	0.0046727	0.0260944
dBNPL	-0.4023454	0.1003963	-4.01	0.000	-0.6005549	-0.2041358
Volatility	-0.0611614	0.026014	-2.35	0.020	-0.1125201	-0.0098027
BnkCrisis	-1.08279	0.4386808	-2.47	0.015	-1.948864	-0.2167148
dTrade	0.056322	0.0261074	2.16	0.032	0.004779	0.1078651
dGovExp	-1.50498	0.2654753	-5.67	0.000	-2.0291	0.9808601
dEnrollment	-0.0162812	0.0425549	-0.38	0.703	-0.1002961	0.0677337
Cons	1.117744	0.9516114	1.17	0.242	-0.7609947	2.996483
sigma_u	3.2113094					
sigma_e	1.7890174					
rho	.76314944					

Table XI – Hausman Test

Hausman	P-value
Prob>chi2	0.0001