The effect of financial development on per capita income: A panel data analysis for heterogeneous countries between 1980 and 2020

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Abstract:

This paper aims to investigate the relationship between the development of the financial market and per capita income. For this, panel data methods were used to analyze proxy variables of depth, risk and liquidity of the financial system for a heterogeneous sample of 95 countries from 1980 to 2020. The results suggest that while depth and liquidity of the financial system are positively related to per capita income, the risk level of the financial system is negatively related to it. Furthermore, bank credit was shown to be more significant in increasing the level of per capita income for developing countries. In developed countries, however, capital market variables most affected per capita income.

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According to Levine (2005), financial development occurs when financial instruments – through financial institutions – improve the effect of information application, reduce transaction costs, and more efficiently promote the five financial functions. These are: (i) producing ex ante information about possible investments, (ii) improving corporate governance (iii) trading, diversification and risk management, (iv) mobilizing and pooling of savings and (v) facilitating the exchange of goods and services through financial services as well-working payment system and vi) increasing the willingness of investors to finance new projects of investment through ex post monitoring.

Economic literature underlines optimal resource allocation as an essential aspect for sustaining per capita income growth. The financial market, which operates as an intermediary between savers and borrowers, plays an important role in this optimization. Intermediary institutions are relevant for individual investors, institutional investors, and the government, through their capitalization via the public and private securities markets (such as company shares, debentures, commercial papers, etc.)

Dornbusch and Reynoso (1989) explain that per capita economic growth derives from two variables: physical accumulation of capital and better use of resources. In this process, the financial market affects growth in these two variables by making savings available and by optimizing the allocation of these investments. In the same vein, Miller (2012) argues that a well-developed set of financial markets and associated institutions means that a country can also reduce its dependence on the banking system and boost economic growth.

More recent research suggests that the finance-growth nexus is non-linear and not always positive. Arcand et al. (2015), for example, state that countries with very large financial sectors present no positive correlation between financial depth and economic growth. The positive correlation between finance and growth was found in countries with small and intermediate financial sectors. As the authors used credit to the private sector to GDP as proxy for financial development, they found that there is a threshold above which finance starts having a negative effect on economic growth. Cecchetti and Kharroubi (2012) also found that high credit level has a negative effect on growth. They argue that financial sector size has an inverted U-shaped effect on productivity growth. Therefore, these studies challenge or qualify the existence of a relationship between financial depth and economic growth.

Based on this discussion, financial development influences the level of per capita income and the economic growth rate of countries. However, this influence is not uniform across all countries, as variations in institutional, economic, and structural characteristics lead to non-linear and heterogeneous effects. Moreover, the role of financial market risks and liquidity in shaping per capita income has been insufficiently explored in the literature (Panizza, 2013). Additionally, evidence supporting a positive correlation between financial development and economic growth, widely documented in earlier studies, has been challenged by more recent findings, which suggest that this relationship is not robust when applied to updated datasets (Rousseau and Wachtel, 2002).[1] Therefore, the objective of this article is to empirically analyze how the financial market affected the per capita income level for a heterogeneous sample of developed and developing countries in the 1980-2020 period considering different measures of its risks, depth, and liquidity.[2]

The specific objectives of this article are: i) to analyze, based on estimates for panel data, how different variables (related to depth, risk, and liquidity) of the banking sector and capital markets affect per capita income over the analyzed period for the sample of countries; ii) to check for a heterogeneous sample of countries whether there is empirical evidence for growth based on the preponderance of banks (bank-based view) or the capital market (market-based view); iii) to analyze whether the banking crises identified in the period affected the per capita income of the countries. A deeper analysis of how financial markets affect per capita output growth is particularly relevant for developing countries, where there is a greater shortage of capital compared to developed countries.

Arcand et al. (2015), for example, use a much narrower definition of financial depth, which is an imperfect proxy for the much broader concept of financial development. Specifically, they use credit to the private sector over GDP (extended by deposit banks and other financial institutions) as an empirical proxy for financial development. Arcand et al. (2011) used the turnover ratio in the stock market as another indicator of financial depth. In this paper, we use five different

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[1] These specific issues are better discussed on section 1.

[2] The country classification in the World Economic Outlook (WEO) from the International Monetary Fund (IMF) divides the world into two major groups: advanced economies and emerging and developing economies. In this article, we used 'developed' for advanced economies and 'developing' for emerging and developing economies. The aggregations of countries following this criterion can be found in Appendix A.

variables for financial depth, covering debentures, notes, money market or negotiable debt, bank concentration, stock market total value traded to GDP, among others, which deepens the analysis of the impact of financial depth on income. Moreover, we use eight proxies for financial system risk, covering the bank nonperforming loans to gross loans ratio, interest rates and stock market volatility. For the financial system's liquidity variables, we use five different proxies considering different measures of bank deposits to GDP and domestic credit provided by different institutions.

This paper innovates by adding new elements associated with risk, liquidity, and the depth of the financial system to understand its impact on per capita income level, which have not been fully addressed in recent literature. To fulfill these objectives, this paper is divided into four sections. Section 1 discusses the relationship between financial development and the per capita income level. Section 2 presents the econometric specifications and discusses the variables used. In section 3, the results and analysis are presented. The final considerations can be found in section 4.

1. Financial development, the state and the per capita income level: a brief overview

In a modern economy, as argued by Vazakidis and Adamopoulos (2009), banking and stock markets constitute the largest part of the financial system. While banks tend to finance only well-established and safe projects, the stock market typically finances riskier, more productive and/or innovative investment projects.

In a cross-country analysis, Levine (2002) sought to understand which financial system is better to promote long-term economic growth: a financial system based on banks or a capital market. For this, the author built a database of financial variables from 48 countries for the 1980-1995 period in order to investigate the relationship between economic growth and the degree to which countries are more bank-based or market-based.

According to Levine (2002), there are generally three distinct visions depending on which type of financial system is the most efficient in promoting long-term economic growth. The first one is the bank-based view, which argues that, particularly at early stages of economic development and in weak institutional settings, banks perform better in their function of mobilizing savings, allocating capital and exerting corporate control.[3] In contrast, the second, market-based view understands that the capital market is the one that provides the most relevant financial services to stimulate innovation and long-term economic growth. Thirdly, the financial services view minimizes the bank versus market debate and emphasizes that what matters is the quality of financial services produced by the entire financial system (Levine, 2002, p. 23).

Levine's results imply that the financial services view emphasizes the role of banking institutions and the capital market the analysis of companies, exerting control over their management and creating risk mitigation mechanisms. However, these results did not provide any evidence that one system is more effective in generating economic growth – that is, distinguishing countries based on their financial structure was not effective in explaining cross-country differences in long-term economic performance. Rather, distinguishing countries based

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[3] Banks are not simply financial intermediaries. According to Cline and Mazumder (2022) they are important institutions for investment, securitization (such as mortgage-backed securities, asset-backed securities, and so on), different kinds of digital money (which are not directly dependent of central bank money supply), ex post monitoring of projects financed by them, issuing assets such as private securities, and so on (Sudria and Blasco-Martel, 2019). Furthermore, it is noteworthy that in the modern banking system banks lend based on customer demand and qualified credit. Then, they ensure reserve requirements after the lending. Therefore, deposits and reserves do not constrain banks' lending activities, per se (Nektarios, 2021; Cline and Mazumder, 2022).

on overall financial development could explain the difference in cross-country growth rate. When measuring the level of development in aggregate, it is observed that countries with higher levels of financial development tend to have a substantially higher economic growth rate. Stock market liquidity – measured as the ratio of total traded value – and banking sector activity – specified as credit to the private sector – were strong predictors of economic growth. Finally, the data were consistent with the view of the importance of the legal system in promoting the financial efforts that lead to growth.

The financial development component, defined by investors' legal rights and efficiency in enforcing contracts, was strongly associated with growth. It was concluded, therefore, that the evidence found in the cross-country analysis is consistent with the view based on financial services that more developed financial systems positively influence economic growth (Levine, 2002).

Popov (2017) demonstrated that as economies develop, the services provided by securities markets become more important for economic activity, while those provided by banks become less important. As per capita income increases, financial structures tend to move towards non-bank financing. Market-based intermediation has grown faster than banking, notably in advanced countries, also due to advances in technology, greater availability of information and more internationalized financial systems. The literature on the real effects of financial structures has largely concluded that both markets and banks have a positive effect on economic growth. However, Popov (2017) argues that more recent analyses have shown that the marginal contribution of banks to economic growth has declined, while that of capital markets has increased with financial development, mainly because market finance is better at promoting innovation, productivity and financing new sources of growth.

La Porta et al. (1998) discuss the importance of the legal system as a fourth possibility related to the determinants of economic development from its effect on the financial system through the allocation of capital. In an empirical analysis of how investor protection laws differ across 49 countries, they examined variations in the enforcement quality of these laws and their impact on corporate ownership standards worldwide. Their findings revealed that countries with stronger enforcement of investor protection laws experienced better economic growth compared to those with weaker legal systems. Furthermore, good accounting standards and shareholder protection measures are associated with lower ownership concentration, indicating that concentration is a response to poor investor protection laws and, consequently, leads to a worse allocation of resources in the economy.

Although authors such as Levine (2002) defend the view that the relevant point to generate economic growth is the level of financial development of a country, that is, the capacity of the financial system to allocate resources in order to maximize its capacity to generate value, Vitols (2001) argues that there is considerable structural diversity in the financial systems of industrialized countries. It has been observed that there are degrees to which a country can tend toward an economy either more fostered by banks or by capital markets. Differentiating these systems is key to identifying broader distinctions in the dynamics of capital across countries.

According to Vitols (2001), in bank-based systems, most financial assets and liabilities consist of bank deposits and direct loans. In this system, normally, there is the advantage of banks creating stable long-term ties with companies. On the other hand, in capital market-based systems securities tradable in financial markets are the dominant form of financial asset. In the latter, despite being more volatile, funds are channeled more quickly to new companies in growing industries.

Moreover, for Levine (2005), banks can make investments without revealing their decisions immediately on the markets and this creates incentives for them to research companies, managers and market conditions with positive outcomes in the allocation of resources and growth. In contrast, capital markets would not be able to acquire and process corporate information, inspect managers, and finance industrial expansion as efficiently as banks.

Regarding the stock market, Levine and Zervos (1996) examined whether there is a strong empirical association between stock market development and long-term economic growth. Through a cross-country analysis for 41 countries in the 1976-1993 period, the authors concluded that there is a significant and positive correlation between predetermined components of stock market development (such as size, liquidity, and risk diversification) and the level of long-term per capita income. A developed stock market reduces the cost of mobilizing savings and therefore facilitates investment in the most productive technologies. Even though many profitable investments require a long-term commitment of capital, investors do not like to relinquish their savings for long periods of time. A liquid stock market eases this tension by providing investors with the possibility of trading their stocks quickly and cheaply. As a result, markets without liquidity or other financial arrangements that promote liquidity end up discouraging investments in high-return projects.

Ndikumana (2005) provides evidence that the banking and stock market are complementary and that it may not be efficient to spend resources to promote a particular type of financial structure, especially in developing countries where resources tend to be scarcer. Instead, countries could benefit from reducing political uncertainty, strengthening the regulatory framework and strengthening investors' credit rights. This would create a more conducive environment for the development of financial institutions, banking or stock market, which would stimulate domestic investment.

In this regard, the literature points out that there is a positive relationship between financial development, per capita income, and economic growth. Furthermore, it is necessary to discriminate between developed and developing countries, in order to observe how the behavior of certain financial variables changes in relation to the degree of economic development of each country. In this sense, Masten et al. (2008) and Arcand et al. (2015) suggest that while financial deepening may be helpful for transition economies with a relatively small financial sector, the process of financial deepening is no longer necessary for advanced economies. The implication seems to be that there are decreasing returns to financial deepening or, in other terms, that its effects on per capita income depend on the developing stage.

Recent research suggests that the finance-growth nexus is non-linear. Arcand et al. (2015), for example, state that for countries with very large financial sectors, there is no positive correlation between financial depth and economic growth. The positive correlation between finance and growth was found in countries with small and intermediate financial sectors. As the authors used credit to the private sector to GDP as proxy for financial development, they found that there is a threshold around 80-120% of GDP above which finance starts having a negative effect on economic growth. The negative effect that high credit level has on growth was also found by Cecchetti and Kharroubi (2012). They argued that financial sector size has an inverted U-shaped effect on productivity growth. This result is in accordance with Beck et al. (2000), which also show that the link between financial depth and economic growth goes through productivity growth and not through factor accumulation.

On the other hand, according to Demetriades et al. (2023), literature has placed disproportionate weight on explanations of financial development that rely on the amount of credit supply because of the difficulties in measuring the quality of this financial development.

The authors used three measures to quantify the 'fragility' of the financial system: the Z-score, impaired loans, and liquid assets. The estimations on their cross-country sample show that financial fragility and increased private credit have negative effects on growth. This work stresses the relevance of including risk, or measures of 'fragility' of the financial system to attempt to quantify the quality of the credit supplied.

Loayza and Ranciere (2006) show that a positive long-run relationship between financial development and economic growth coexists with a negative short-run relationship between these two variables and that this negative short-run relationship is mostly driven by financial crises. Moreover, Rousseau and Wachtel (2002) show that the positive correlation between finance and growth found in other studies does not stand up when using more recent data. Specifically, they use both cross-sectional and panel data and find that credit to the private sector has no statistically significant impact on GDP growth for regressions that include the post 2000 period.

This discussion highlights the importance of including risk variables to accurately assess the role of the financial system in influencing per capita income and economic growth. Additionally, it emphasizes the need to test the relationship among different proxies of financial depth and liquidity, particularly for the period after 2000. Furthermore, as the banking market liquidity level rises – as is usual in more developed economies – there is evidence that capital market becomes the more important financing channel (Popov, 2017). So, to test this, we must consider the effect that the financial structure has on developing and developed countries.

2. Countries sample, database, and economic specification

2.1. Countries sample and database

We used data for 95 countries[4] on an annual basis for the 1980-2020 period. Countries were also classified as either developed or developing countries. The country classification is based on the World Economic Outlook (WEO) from the International Monetary Fund (IMF), which divides the world into two major groups: advanced economies and emerging and developing economies. In this article we used 'developed' for advanced economies and 'developing' for emerging and developing economies.

The financial variables used and discussed below were classified according to three dimensions of the financial system: depth (table 1), risk (table 2) and liquidity (table 3). In terms of depth, what we seek to analyze with these variables is whether a larger financial system can generate a higher level of GDP per capita. Below, we explain the motivation for each variable used as a proxy for the financial depth in different financial structures.

To capture the depth of the market for fixed income and short-term investment funds, we used the gross portfolio debt assets *gdpassets* and liabilities *liabilities* to GDP (%). The study by Thumrongvit et al. (2013) explains that the debt securities market is relevant as it complements the role of banks and stock market and therefore helps in the development of the financial system. By reducing information asymmetry, this market can improve resource allocation.

Bank concentration, according to Diallo (2017), has a negative effect on the growth of industries that depend on financing. Furthermore, for countries with a high level of corporate governance, bank concentration proves to be less harmful to economic growth.

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[4] All samples of countries are presented in the appendix.

Table 1 – *Financial system depth variables*

Depth	Variable	Definition and construction	Source
assets	Gross portfolio debt assets to GDP (%)	Ratio of gross portfolio debt assets to GDP. Debt assets cover (1) bonds, debentures, notes, etc.; and (2) money market or negotiable debt instruments.	The World Bank
liabilities	Gross portfolio debt liabilities to GDP (%)	Ratio of gross portfolio debt liabilities to GDP. Debt liabilities cover (1) bonds, debentures, notes, etc.; and (2) money market or negotiable debt instruments.	The World Bank
concen	Bank concentration (%)	Assets of three largest commercial banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets.	The World Bank
traded	Stock market total value traded to GDP (%)	Total value of all traded shares in a stock market exchange as a percentage of GDP.	The World Bank
listed	Listed companies per 1 million people	Number of domestically incorporated companies listed on the country's stock exchanges at the end of the year per 1,000,000 people (does not include investment companies, mutual funds, or other collective investment vehicles).	The World Bank

*Source***:** The World Bank (https://data.worldbank.org/).

Regarding the size of the stock market, we used the total value traded in proportion to GDP *traded*, as in Levine and Zervos (1996). They argue that the stock markets can be large but inactive and financing large projects often takes time that many investors are unwilling to offer. Thus, a higher level of trading can encourage investors.

The number of companies listed on the stock exchange, as a measure of the stock market's depth, was also used in the study by Nieuwerburgh et al. (2006). An increase in the number of companies that go public (IPO) leads to a decrease in capital concentration, which may be an indicator of financial deepening. According to the authors, the (cumulative) number of initial public offerings also significantly leads economic growth (Nieuwerburgh et al., 2006, p. 33).

Variables that capture the risk of the financial system were also considered. If the systematic risk is large enough, it can discourage investments. Stock price volatility (*spvol*) is the first variable chosen as a proxy for risk. The more volatile a market is, the greater is the risk one incurs investing in it. Babatunde (2013) explains that the way stock market volatility affects long-term economic growth remains a controversial topic. According to the author, if stock prices truly reflect the fundamentals, then stock prices should be used as the main indicators of future economic activity. Likewise, since the value of corporate equity at the aggregate level depends on the state of the economy, it is plausible that a change in the level of uncertainty about future economic growth could produce a change in the stock market. However, in poorly developed financial markets,

mainly in developing countries, the stock market may not represent the general state of the economy due to short-term speculation by small investors (Babatunde, 2013, p. 207).

Table 2 – *Financial system risk variables*

Risk	Variable	Definition and construction	Source
volatility	Stock price volatility	Stock price volatility is the average of the 360-day volatility of the national stock market index.	The World Bank
loans	Bank nonperforming loans to gross loans (%)	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). The loan amount recorded as nonperforming includes the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.	The World Bank
interest	Lending interest rate (%)	Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing.	The World Bank
regulatory	Bank regulatory capital to risk-weighted assets (%)	The capital adequacy of deposit takers. It is a ratio of total regulatory capital to its assets held, weighted according to risk of those assets.	The World Bank
score	Bank Z-score	It captures the probability of default of a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns.	The World Bank
crisis	Banking crises dummy	Dummy variable for the presence of banking crisis (1=banking crisis, 0=none)	The World Bank
smreturn	Stock market return (%, year-on-year)	Stock market return is the growth rate of annual average stock market index.	The World Bank
deposit	Deposit interest rate (%)	Deposit interest rate is the rate paid by commercial or similar banks for demand, time, or savings deposits.	The World Bank

On the other hand, nonperforming bank loans is a variable that can influence interest due to the risk associated with the default probability. Higher default rates increase the loan interest rate. Apan and Islamoglu (2019) showed that there is a negative relationship between bank loan defaults and GDP growth. During times of poor GDP performance, an increase in the default rate was observed.

In order to predict future economic activity many financial agents look at the economy's interest rate. This paper also analyzes whether the financial variable lending interest rate

(*interest*) has significant impact on the level of GDP per capita. Dotsey (1998) sought to understand whether bank spread has predictive power of future economic growth. The author concludes that there is evidence that the spread has been a useful advanced indicator of economic activity, however this variable is advised to be used with caution, as the predictive power of this variable, although widely used by literature, has its limitations.

Bank regulatory capital to risk-weighted assets is one of the central themes addressed since the first Basel Accord in 1988. Liberman et al. (2018) argue that the regulatory strategy is important to avoid bank failure problems which usually have undesirable economic and social consequences that can be amplified depending on the relationship between the financial agents and the real economy. Furthermore, estimates by Liberman et al. (2018) for the banking sector in Brazil showed that the adjustment of the regulatory capital requirements that an institution must maintain, as synthesized by the Basel Index, proved to have an inverse relationship with the possibility of bank failure.

The Z score is a commonly used variable to represent the risk of the banking system. Li et al. (2017) explain that the basic principle of the z-score measure is to relate a bank's capital level to the variability in its returns. With this measure, the bank can assess how much risk (variability) can be absorbed by its capital without becoming insolvent.

A banking crisis dummy was also added in the analysis. The study by Kroszner et al. (2007) sought to understand the impact of banking crises on industries with different levels of dependence on external capital. A more developed financial system seems to relax credit constraints, allowing dependent sectors to grow faster, but when periods of crisis were examined, the opposite relationship was found. It was observed that financial crises have a disproportionately negative impact on the variation in the added value of companies whose sectors depend heavily on external sources of financing. Since dependent companies tend to obtain relatively less external financing in less developed financial systems, a crisis in these countries has less effect on the growth of these sectors. However, companies in these emerging markets also suffer from lower growth in non-crisis periods. The authors point out that the results do not suggest that companies that are externally dependent on capital do worse in more developed financial systems than in more incipient ones.

The deposit interest rate (*deposit*) is another variable used in the regression and that may be related to banking crises and economic growth. Kraft and Galac (2007) argue that although bank deregulation can bring long-term economic benefits, it can also cause short-term financial instability due to the increase in deposit interest rates. More aggressive banks raise their deposit interest rates to fund their risky lending strategies. The increase in these rates can create a negative externality, where more risk-averse banks are forced to increase the risk of their operations in order to be able to offer more competitive deposit interest rates and keep their customers. However, the increase in market share via an increase in this rate usually occurs only in competitive banking markets. When a given economy goes through a period of banking crisis, Kraft and Galac (2007) observed that solid foreign banks benefitted by receiving large amounts of deposits even at low deposit interest rates. This could partly explain the success of foreign banks in developing countries.

The stock market return (*smreturn*), which measures the performance of the listed companies, is seen as the public's expectation in relation to future economic activity (Oskooe, 2010). That is, changes in real GDP are significant in predicting movements in stock prices. The possible reason is that GDP growth increases the expected future cash flow, the firm's economic opportunities and profitability. Thus, share prices rise.

Table 3 – *Financial system's liquidity variables*

Liquidity	Variable	Definition and construction	Source
creditratio	Bank credit to bank deposits (%)	The financial resources provided to the private sector by domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time and saving deposits in deposit money banks.	The World Bank
creditbranks	Domestic credit to private sector by banks (% of GDP)	Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.	The World Bank
commercial	Bank deposits to GDP (%)	The total value of demand, time and saving deposits at domestic deposit money banks as a share of GDP. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.	The World Bank
financial	Domestic credit provided by financial sector (% of GDP)	Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis, except for credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available (including corporations that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.	The World Bank
cprivate	Domestic credit to private sector (% of GDP)	Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.	The World Bank

Source: The World Bank (https://data.worldbank.org/).

Table 4 – *Dependent and control variables*

Dependent var.	Variable	Definition and construction	Source
income	GDP per capita (constant 2015 US$)	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2015 U.S. dollars.	The World Bank

Control var.	Variable	Definition and construction	Source
eci	Economic Complexity Index	It measures the complexity of an economy as the average complexity of its products and is the result of the export matrix vector. This allows the calculation of the degree of ubiquity and productive diversity. It can assume negative values.	MIT's Observatory of Economic Complexity
price	Consumer price index (2010 = 100)	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used. Data are period averages.	The World Bank
expenditure	General government final consumption expenditure (% of GDP)	General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security but excludes government military expenditures that are part of government capital formation.	The World Bank
investment	Gross fixed capital formation (% of GDP)	Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.	The World Bank
terms	Trade (% of GDP)	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	The World Bank

Source: The World Bank (https://data.worldbank.org/) and MIT's Observatory of Economic Complexity (https://oec.world/en/resources/bulk-download/international).

Finally, we selected a group of variables that capture the financial system's liquidity. For the banking system, we used the bank credit ratio and domestic credit to the private sector (*creditratio* and *creditbranks*, respectively). For Rousseau and Wachtel (2002), bank loans can bring economic growth, but this depends on the level of development of the financial system. A large credit expansion could weaken the banking system and put pressure on inflation. Leitão (2012) showed that savings generate growth, but inflation and domestic credit are negatively correlated with economic growth. In Hung and Cothren (2002), bank credit may have an ambiguous result towards economic growth depending on whether this market fosters the consumer market or is redirected to real investments.

Bank deposits to GDP (*commercial*) is another relevant variable that affects the banking system's liquidity. For Moyo and Le Roux (2018), the real bank deposit, defined as the deposit rate discounted from inflation, has a positive and significant effect on savings. In turn, savings are essential for short-term and long-term investments. The authors' results also suggest that the effect of an increase in the deposit rate outweighs the negative effect of an increase in borrowing costs. Therefore, analyzing bank deposit becomes relevant to explain its effect on investment and, consequently, on economic growth.

Credit from the financial system plays an important role in boosting financial growth. In our analysis, two variables related to credit were used: domestic credit provided by the financial sector (*financial*) and domestic credit to the private sector (*cprivate*). Adamopoulos (2010) argues that economic growth favors the development of the credit market in periods of low inflation. In turn, the availability of money in the financial system is transformed into credit to finance economic activity and thus generate economic growth. The more developed the financial system, the more efficient it will be in providing this intermediation service and the greater the economic growth.

Finally, a series of control variables were used (table 4) and in Appendix B a brief descriptive statistic of all variables is shown.

2.2 Econometric specification

Levine (2005) explains that the pioneering work of Goldsmith (1969), which uses cross-country analyses to determine whether finance has a causal effect on economic growth, fails to provide much evidence due to the absence of data on the development of the securities market for a wide range of countries. Furthermore, the close association between financial system size and growth does not identify the direction of causality and does not systematically control for other factors that influence economic growth or per capita income level. In turn, Levine and Zervos (1996) provide evidence that many cross-country regression results are fragile to changes in the set of conditioning information.

On the other hand, Levine (2005) explains that panel data techniques, pure time series methodologies and case studies can improve a series of statistical problems related to purely cross-country analyses. According to the author, the first benefit of switching to panel analysis is the ability to explore the time series and cross-sectional data variation. The second benefit of switching to a panel is that it avoids biases associated with cross-country regressions: in this type of regression, the unobservable country-specific effect is part of the error term, so its correlation between the explanatory variables results in biased estimates of the coefficient. The third benefit of switching to a panel is that it allows the use of instrumental variables for all regressions and thus provides more accurate estimates of the financial development-growth relationship.

Based on this discussion, panel analysis is more suitable to the main research question and may produce better estimates of the financial development-growth data. Moreover, since the effect of the risk of the financial market on per capita income has been partly neglected, panel data estimates can control for the different effects of it on heterogenous countries. Therefore, considering different measures of its risks, depth, and liquidity available a panel data specification is set. From Levine and Zervos (1996) and Levine (2005) the econometric specification of panel data to be estimated in this work is of the log-linear type:

$$\ln(y_{ct}) = \alpha + \sum_{w=1}^{K} \beta_w depth_{i,tw} + \sum_{y=1}^{K} \beta_y risk_{i,ty} + \sum_{j=1}^{K} \beta_j liquidity_{i,tj} + \sum_{x=1}^{K} \beta_x Z_{i,tj} + \mu_t + c_i + \varepsilon_{it} \quad (1)$$

where $i = 1, \dots, 95$; $t = 1, \dots, 40$; $w = 1, \dots, K$; $y = 1, \dots, K$; $j = 1, \dots, K$, $x = 1, \dots, K$. The β's are the parameters to be estimated for each group of independent variables. In equation (1), y_{ct} represents the countries' per capita income level. The degree of financial development is decomposed into 3 dimensions related to depth, risk and liquidity of the financial system. $Z_{i,tj}$ is the vector of the control variables, c_i measures the unobservable effect of each country i which is invariable over time, μ_t measures the specific effect of time and ε_{it} measures the idiosyncratic error term.[5]

3. Results and discussion

Chow's test based on F statistic indicates that the fixed effects model is better than the pooled model, with a 1% significance level (prob > F = 0.00), for all panels estimations. Furthermore, Hausman's test indicates that for the estimations (also taking the controls into account) fixed effects are suitable when compared to random effects (with 1% statistical significance) for all panels estimations. It is worth mentioning that an important assumption of the fixed effect model is that those time-invariant characteristics are unique to the country (entity) and should not be correlated with other country's characteristics. Furthermore, autocorrelation and heteroscedasticity were detected by Wooldridge's and Modified Wald's tests, respectively, at a 5% significance level. It was therefore decided to estimate the different specifications of equation (1) by the estimators of Driscoll and Kraay (1998), which are robust estimators for the problems detected, considering fixed effects.[6]

The fixed effects regressions with Driscoll-Kraay standard errors were used to identify the effect of the variables of interest on the level of per capita income. In the tables below, the results of the same regression are separated into developed countries (on the right of the panel) and developing countries (on the left of the panel). The period of analysis started from 1980 until the most recent data of 2020. First, an analysis of the variables more relevant to the stock market is carried out (table 5). Next, we analyze the banking variables (table 6) and, finally, the variables of the non-banking fixed income securities, mainly table 7.

Tables 5, 6 and 7 show the estimates of specification equation (1).[7] Stock price volatility (*volatility*, panel A), which seeks to measure how risky it is to invest in listed companies, seems to have a more significant effect in developed countries. An increase of one standard deviation measured over twelve months based on market returns leads to an expected decrease in the per capita income level of approximately 0.06% for developing countries and 0.3% for developed

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[5] Furthermore, VIF (variance inflation factor) tests for the estimated models did not present multicollinearity problems.
[6] All tests considered the different samples used in each table, for each panel data estimated (i.e., A, B, C, D, E and F).
[7] In Appendix C the full sample of countries for each estimation are presented, according to the data available.

countries. Therefore, stock price volatility negatively influences per capita income five times more in developed countries.

Table 5 – *Effect of financial variables on per capita income level – Driscoll-Kraay standard errors*

	PANEL A		PANEL B	
Countries	**Developing**	**Developed**	**Developing**	**Developed**
Variables	**ln(income)**	**ln(income)**	**ln(income)**	**ln(income)**
volatility	–0.000608**	–0.00304***	–0.000704*	–0.000366
	(0.000257)	(0.000750)	(0.000350)	(0.00121)
traded	0.000438**	0.000223***	0.000610***	0.000910***
	(0.000191)	(4.66e–05)	(0.000105)	(0.000230)
smreturn	–0.000173**	–0.000671**	3.12e–05***	–0.000318
	(6.68e–05)	(0.000238)	(8.03e–06)	(0.000214)
listed	–	–	–0.000172	0.000957***
			(0.000306)	(0.000317)
creditbranks	0.00444***	0.000591***	–	–
	(0.000311)	(0.000176)	–	–
score	0.00651**	0.00455***	–	–
	(0.00290)	(0.000815)		
investment	0.00873***	0.00593***	0.00845***	0.00994***
	(0.00232)	(0.000514)	(0.00135)	(0.00300)
price	0.00244***	0.00342***	0.00362***	0.00677***
	(0.000450)	(0.000463)	(0.000469)	(0.00102)
expenditure	0.00399	–0.00507	0.0108**	0.00923**
	(0.00267)	(0.00314)	(0.00438)	(0.00383)
eci	0.0685**	0.0388***	0.272***	0.215***
	(0.0265)	(0.00792)	(0.0905)	(0.0648)
terms	–0.000475*	0.00221***	0.00128*	0.00305***
	(0.000270)	(0.000369)	(0.000649)	(0.000631)
Constant	7.848***	9.563***	7.839***	8.635***
	(0.0720)	(0.128)	(0.0775)	(0.281)
N	610	373	764	640

*Note***:** Standard errors in parentheses. Significance level: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The stock market total value traded (*traded*, panel A) is statistically significant and positively related to the GDP per capita level. The 1% increase in the volume of shares traded leads to an expected 0.044% increase in the per capita income level of developing countries and 0.022% for developed countries.

The number of listed companies on the stock exchange per million people (*listed*, panel B), is an alternative variable to measure the size of the capital market. Although this variable, by itself, does not discriminate the size of listed companies. The estimates showed that, unlike the volume

of shares traded, the number of listed companies was significant in explaining the per capita income level only for developed countries.

Finally, the stock market return (*smreturn*) was statistically insignificant and did not prove to be a good predictor of per capita income level. Regarding the liquidity of the banking system, domestic credit to the private sector by banks (*creditbranks*, panel A) and bank deposit (*commercial*, panel C) proved to be statistically significant in explaining the level of per capita income. For developed countries, a 1% increase in credit and a 1% increase in bank deposits increased the per capita GDP level by 0.059% and 0.182%, respectively. Regarding developing countries, the effect of these banking variables was even more relevant on the per capita income level: 0.44% for credit and 0.52% for bank deposits.

When the effect of several other financial institutions is included in conjunction with banks, as in domestic credit provided by the financial sector (*financial*, panel D) and domestic credit to private sector (*cprivate*, panel E), we can observe a similar result for variables exclusive to the banking sector: credit is significant and economically relevant to the per capita income level, especially in developing countries. For this last group, a 1% increase in *financial* leads to an expected increase of 0.472% in the per capita income level. This decreases to 0.0496% when looking at developed countries. Therefore, the credit provided by the financial sector is almost ten times more important to developing countries than developed countries.

The basic principle of Z-score measure, according to Li et al. (2017, p. 3), is to relate a bank's capital level to variability in its returns, so that one can know how much variability in returns can be absorbed by capital without the bank becoming insolvent. The counterpart is that a lower value of the Z-score indicates greater risk in the banking system. Through panel A, there are indications that the banking Z-Score is a significant variable and is positively related to the level of GDP per capita. That is, countries with a banking system with more diversified assets (less risky) have a positive impact on aggregate output. The results had greater significance for the group of developed countries than for the developing ones.

Still related to the risk variables of the banking system, the nonperforming loans (*loans*) proved to be significant at 0.1% and negatively related to the level of GDP per capita. As shown in panel C, the effect of default is greater in developed countries: an 1% increase in the bank default rate leads to an expected decrease of 1.15% in the level of GDP per capita. For developing countries, the decrease is 0.524%.

In turn, the lending interest rate (*interest*), in panel C, is more significative in explaining the per capita income level in developing countries than developed ones. The evidence shows that developing countries are more sensitive to bank loan fees.

Furthermore, this relationship is negative: a 1% increase in the lending interest rate leads to a 0.849% drop in the per capita GDP level in developing countries and 0.53% in developed countries. Higher interest rates increase the cost of capital and can discourage undertakings in the productive sector, thus affecting economic growth. The deposit interest rate (panel F) presented inconsistent and mixed results with respect to its effect on GDP per capita.

Banking crises (*bcrises*) were incorporated into the specification as dummies. That is, this variable does not measure the size of the banking crisis, only whether country *i* is experiencing a banking crisis in year *t*. Preliminary results in panel D show statistical significance at 1% only for the developing countries. Developing countries that are experiencing a banking crisis have an expected 23% average decrease in their level of per capita income. There are strong indications that banking crises are relevant because they negatively affect economic growth in developing countries, which may be a sign that there is a greater dependence of these countries on the banking system in relation to developed ones. Because they have a more diversified financial

system, the latter do not seem to suffer in the same way as countries that depend almost exclusively on the banking system. Therefore, the data suggest that the capital market is a structure that helps diversify the risks inherent in the financial system.

Table 6 – *Effect of financial variables on per capita income level – Driscoll-Kraay standard errors*

Countries	PANEL C		PANEL D	
Variables	Developing ln(income)	Developed ln(income)	Developing ln(income)	Developed ln(income)
loans	−0.00524***	−0.0115***	–	–
	(0.00128)	(0.00127)		
assets	−0.000627	−0.000884**	–	–
	(0.000803)	(0.000341)		
interest	−0.00849***	−0.00530*	–	–
	(0.00258)	(0.00255)		
commercial	0.00526***	0.00182**	–	–
	(0.000339)	(0.000741)		
regulatory	0.00124	0.00373	–	–
	(0.00305)	(0.00227)		
deposit	–	–	−0.00154	0.0219***
			(0.00148)	(0.00335)
concen	–	–	−0.000771**	0.000245
			(0.000294)	(0.000191)
crisis	–	–	−0.230***	−0.0180
			(0.0146)	(0.0123)
financial	–	–	0.00472***	0.000496**
			(0.000306)	(0.000234)
volatility	–	–	−0.000753***	−0.00374***
			(0.000109)	(0.000704)
investment	0.00630***	−7.69e−05	0.0101***	−0.0105**
	(0.00170)	(0.000917)	(0.00149)	(0.00413)
price	0.00190***	0.00235***	0.00240***	0.0143***
	(0.000341)	(0.000635)	(0.000201)	(0.00167)
expenditure	−0.00925***	−0.00112	−0.0359***	−0.00618
	(0.00106)	(0.00784)	(0.00386)	(0.00531)
eci	0.0737***	0.0634**	−0.0460**	0.00936
	(0.0187)	(0.0234)	(0.0175)	(0.0114)
terms	−0.00120***	0.00255***	−0.00154***	0.00183***
	(0.000186)	(0.000182)	(0.000474)	(0.000382)
Constant	8.359***	9.429***	8.651***	9.202***
	(0.0924)	(0.225)	(0.118)	(0.121)
N	589	196	180	160

Note: Standard errors in parentheses. Significance level: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7 – *Effect of financial variables on per capita income level – Driscoll-Kraay standard errors*

Countries	Panel E		Panel F	
	Developing	Developed	Developing	Developed
Variables	ln(income)	ln(income)	ln(income)	ln(income)
volatility	−0.00106***	−0.00150***	−0.000468***	−0.00183**
	(0.000286)	(0.000441)	(0.000158)	(0.000807)
liabilities	−0.000590	2.45e−05	–	–
	(0.000594)	(0.000114)		
loans	−0.00748***	−0.00826***	–	–
	(0.00162)	(0.000605)		
cprivate	0.00458***	0.000960***	–	–
	(0.000128)	(0.000144)		
regulatory	0.00472**	0.00655***	–	–
	(0.00212)	(0.00113)		
creditratio	–	–	0.000109	8.99e−05
			(0.000323)	(0.000274)
crisis	–	–	−0.0159	0.00682
			(0.0309)	(0.0114)
deposit	–	–	1.84e−05***	−0.0130**
			(5.99e−06)	(0.00482)
listed	–	–	0.000875	0.00650***
			(0.000617)	(0.000353)
investment	0.000673	0.00182**	0.00915***	0.00315**
	(0.00121)	(0.000735)	(0.00192)	(0.00155)
price	0.00288***	0.00292***	0.00319***	0.00290***
	(0.000306)	(0.000686)	(0.000391)	(0.000911)
expenditure	−0.00929***	−0.0124***	0.0159**	0.0276***
	(0.00137)	(0.00268)	(0.00602)	(0.00424)
eci	6.71e−05	0.0720***	0.353***	−0.0167
	(0.0138)	(0.0207)	(0.114)	(0.0138)
terms	0.000116	0.00292***	0.00150**	0.00255***
	(0.000290)	(0.000304)	(0.000677)	(0.000279)
Constant	8.160***	9.637***	7.695***	8.843***
	(0.0724)	(0.133)	(0.0451)	(0.213)
N	493	453	679	264

Note: Standard errors in parentheses. Significance level: *** p<0.01, ** p<0.05, *p<0.1

Banking concentration (*concen*), in panel D, had no statistical relevance to explain variations in the GDP per capita of developed countries. However, this variable was statistically relevant for the group of developing countries. A 1% increase in banking concentration has a negative impact on the per capita income level of 0.077%.

Bank regulatory capital for risk-weighted assets (*regulatory*, panel E) showed statistical significance and a positive correlation with per capita income level, mainly for the developed countries group. According to Stolz (2002), as banks may be encouraged to take excessive risk, regulatory requirements may mitigate this problem because banks would be obliged to hold more capital and keep their own funds more. The greater statistical effect of regulatory capital in developed countries may be because these countries tend to have more competitive credit market than in developing markets, so banks in competitive financial systems may take more aggressive and riskier investment decisions to generate value to shareholders.

While gross portfolio debt liabilities (*liabilities*, panel E) had no statistical relevance to explain the per capita income level, gross portfolio debt assets (*gpdassets*, panel C) were negative and significant at 5% only for the developed countries group. A 1% increase in gross portfolio debt assets led to a decrease of 0.088% in the level of per capita income. As a large part of the issuance of fixed income securities belongs to the government, this may give an initial indication that over-indebtedness in developed countries may not bring the best result in terms of generating economic growth.

Through the analysis of several banking and capital market variables, we have sought to understand the impact of each of them on per capita income levels. We observed that most of the main risk, liquidity and depth variables showed statistical significance and relevant economic impact on GDP per capita in both developed and developing countries. Thus, there are strong indications that both sectors – banking and capital markets – play an important role in boosting per capita income.

Although both financial structures generate an economic impact in developed and developing countries, it has been shown that the impact of variables linked to the banking sector was greater in developing countries while capital market variables had a greater impact on the GDP per capita of developed countries.[8] It is possible to observe this trend through the coefficients of the variables *creditbranks* (panel A), *financial* (panel D), *cprivate* (panel E) which were higher for developing countries. While variables related to capital markets such as *traded* (panel B), *volatility* (panels E and F) and *listed* (panel F) presented a higher coefficient for developed countries.

4. Conclusion

This research looks for new evidence of how financial markets influence the per capita income level and investigates whether or not a specific financial structure (banks or capital markets) plays a more important role in this process. As discussed, financial development ends up influencing the level of per capita income and the economic growth rate of countries, but not in all country samples and not in a linear way. Moreover, the effect that the risk and liquidity of the financial markets have on per capita income has been partly ignored and the positive correlation between finance and growth found in other studies does not stand up when more recent data is used.

In this context, we used a broad database over the behavior of several variables of depth, liquidity and risk of the financial system for the 1980-2020 period. The econometric specification chosen was panel data due to its ability to explore the time series and cross-sectional variation in data, in addition to avoiding biases associated with cross-country regressions. The results suggest

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[8] The regressions presented in this work were reestimated by adding new control variables to give greater robustness to the econometric analysis. It was observed that, even after adding other relevant economic variables as a control, the financial variables maintained their statistical significance.

that there is a strong relationship between financial development and the level of per capita income, even after inserting several control variables in the specifications.

Financial market structures (banks and capital markets) operate differently in the economy. Both structures proved to affect the per capita income level of countries. Therefore, when a country's capital market thrives in an economy, this new structure will diversify investment and contribute to innovation and economic development. However, the general results suggest that for developing countries, the effect of banking variables related to credit were more relevant on the per capita income. Differently, stock market variables were more important to developed countries. Banking crises, for example, do not seem to affect developed economies as much as they do in developing countries. This is because the relevant financial structure to the sample of countries relies on less diversified institutions in the supply of credit.

Concerning the main results about risk, stock price volatility has a more significant effect in developed countries. However, countries with a banking system with more diversified assets (less risky) have a positive impact on aggregate output. The results had greater significance for the group of developed countries than for the developing ones. For the former group of countries, the results suggest that the banking system is more important in its impact on per capita income.

Developing countries that are experiencing a banking crisis have an expected 23% average decrease in their level of per capita income. There are strong indications that banking crises are relevant because they negatively affect economic growth in developing countries, which may be a sign of that there is a greater dependence in these countries on the banking system than in developed ones. Because they have a more diversified financial system, the latter do not seem to suffer in the same way as countries that depend almost exclusively on the banking system. Therefore, the data suggests that the capital market is a structure that helps diversify the risks inherent in the financial system.

It is important that policy makers create mechanisms to avoid excessive risk-taking by financial institutions through supervision and the adoption of good practices such as – for banks – those discussed at the Basel accord, which can be monitored by the Central Bank or through regulations of the Securities and Exchange Commission for the capital market. Another relevant point is to implement a set of laws that protect investors and create an environment of clear rules, increasing the credibility of the financial system and stimulating aggregate savings.

Appendix

Appendix A

Table A1 – Group of developing and developed countries

Developing countries		Developed countries
Albania	Lebanon	Australia
Argentina	Malaysia	Austria
Armenia	Malta	Belgium
Aruba	Mauritius	Canada
Azerbaijan	Mexico	Czech Republic

Developing countries		Developed countries
Bahrain	Mongolia	Denmark
Bangladesh	Morocco	Estonia
Barbados	Namibia	Finland
Belarus	Nigeria	France
Bermuda	Oman	Germany
Bolivia	Pakistan	Greece
Bosnia and Herzegovina	Panama	Iceland
Botswana	Papua New Guinea	Ireland
Brazil	Peru	Israel
Bulgaria	Philippines	Italy
Chile	Poland	Japan
China	Qatar	Korea, Rep.
Colombia	Romania	Latvia
Costa Rica	Russian Federation	Lithuania
Croatia	Saudi Arabia	Luxembourg
Cyprus	Serbia	Netherlands
Ecuador	Slovenia	New Zealand
Egypt, Arab Rep.	South Africa	Norway
Ghana	Sri Lanka	Portugal
Honduras	Tanzania	Singapore
India	Thailand	Spain
Indonesia	Tunisia	Sweden
Jamaica	Turkey	Switzerland
Jordan	Ukraine	United Kingdom
Kazakhstan	United Arab Emirates	United States
Kenya	Uruguay	
Kuwait	Vietnam	
Lao PDR		
n=65		n=30

Appendix B

Table A2 – *Descriptive statistics, developed countries, 1980-2020*

Variable	Obs	Mean	Std. Dev.	Min	Max
eci	1093	1.2	.647	−.846	2.625
volatility	907	19.208	8.47	6.814	98.384
assets	582	47.002	56.859	.178	489.152
liabilities	593	61.45	63.663	1.538	562.189
traded	933	42.168	52.377	0	321.117
creditratio	1055	111.184	46.527	16.518	376.008
loans	620	4.053	5.614	.1	45.572
regulatory	634	14.802	3.877	8.2	35.653
score	582	15.741	9.764	−1.843	53.367
concen	584	73.274	19.095	21.451	100
commercial	1025	80.607	59.071	10.401	484.928

Variable	Obs	Mean	Std. Dev.	Min	Max
crisis	1230	.09	.287	0	1
listed	966	36.325	53.848	.29	935.941
smreturn	899	8.439	24.481	−88.713	186.927
income	1084	31308.663	18142.905	364.016	112417.88
expenditure	1093	19.358	3.895	6.308	27.935
investment	1093	23.197	5.147	−2.424	54.698
price	1118	78.546	30.151	.033	265.646
interest	436	9.798	8.48	0	62.833
realinterest	400	3.554	6.27	−51.617	27.146
terms	1111	82.716	52.344	15.81	380.104
deposit	372	5.721	6.126	.036	54.667
financial	116	203.887	75.938	82.102	389.233
cprivate	777	87.199	50.146	1.604	304.575
creditbranks	811	79.618	44.474	1.522	304.575
income	1084	10.088	.952	5.897	11.63

Table A3 – *Descriptive statistics, developing countries, 1980-2020*

Variable	Obs	Mean	Std. Dev.	Min	Max
eci	2157	−.132	.674	−2.764	1.663
volatility	1190	24.467	31.141	3.234	441.957
assets	984	17.5	49.086	0	497.028
liabilities	981	12.438	21.744	0	383.935
traded	1364	22.223	71.187	0	952.667
creditratio	2209	96.711	106.995	2.928	2861.013
loans	1061	8.239	7.862	.51	54.541
regulatory	1069	16.365	4.038	1.755	41.8
score	1255	16.196	10.05	−.321	70.969
concen	1264	65.037	19.807	22.307	100
commercial	2254	48.23	43.73	2.019	413.704
crisis	2665	.069	.254	0	1
listed	1447	22.72	48.709	0	468.651
smreturn	1216	28.22	244.38	−74.798	6539.978
income	2457	10903.509	17672.175	387.641	128757.88
expenditure	2326	14.624	5.565	.911	76.222
investment	2340	24.552	8.076	−.693	89.381
price	2221	73.304	52.551	0	536.543
interest	1652	22.667	117.7	1	4260.014
realinterest	1608	6.601	13.612	−91.721	139.964
terms	2357	83.316	52.098	6.32	442.62
deposit	1754	30.444	312.685	.01	9394.293
financial	424	70.905	40.767	10.522	194.022
cprivate	1744	49.696	39.974	0	258.43
creditbranks	2209	44.19	35.601	0	258.43
income	2457	8.542	1.182	5.96	11.766

Appendix C

Panel A – *Country sample used (according to data available)*

Developed	Developing
Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Rep., Luxembourg, Netherlands, New Zealand, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom and United States.	Argentina, Bahrain, Bangladesh, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Egypt, Arab Rep., Ghana, China, Indonesia, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Malaysia, Malta, Mauritius, Mexico, Morocco, Namibia, Nigeria, Oman, Pakistan, Peru, Philippines, Poland, Russian Federation, Saudi Arabia, Serbia, Slovenia, South Africa, Sri Lanka, Tanzania, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates and Vietnam.
n=27	n=47

Panel B – *Country sample used (according to data available)*

Developed	Developing
Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Rep., Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Switzerland, United Kingdom and United States.	Argentina, Bahrain, Bangladesh, Bermuda, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Egypt, Arab Rep., Ghana, China, Honduras, India, Indonesia, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Malaysia, Malta, Mauritius, Mexico, Morocco, Namibia, Nigeria, Oman, Pakistan, Panama, Peru, Philippines, Poland, Qatar, Russian Federation, Saudi Arabia, Serbia, Slovenia, South Africa, Sri Lanka, Tanzania, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates and Vietnam.
n=30	n=52

Panel C – *Country sample used (according to data available)*

Developed	Developing
Australia, Canada, Czech Republic, Iceland, Israel, Italy, Japan, Korea, Rep., Netherlands, New Zealand, Singapore, Switzerland, United Kingdom, and United States.	Albania, Argentina, Armenia, Bahrain, Bangladesh, Belarus, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Egypt, Arab Rep., China, India, Indonesia, Jordan, Kenya, Kuwait, Malaysia, Malta, Mauritius, Mexico, Namibia, Nigeria, Pakistan, Peru, Philippines, Poland, Romania, Russian Federation, Saudi Arabia, Serbia, South Africa, Sri Lanka, Tanzania, Thailand, Ukraine and Uruguay.
n=14	n=43

Panel D – *Country sample used (according to data available)*

Developed	Developing
Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Rep., Latvia Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Switzerland, United Kingdom and United States.	Argentina, Bangladesh, Belarus, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Ecuador, Egypt, Arab Rep., China, India, Indonesia, Jordan, Kenya, Kuwait, Malaysia, Mexico, Panama, Peru, Philippines, Poland, Romania, Russian Federation, Saudi Arabia, Serbia, Slovenia, South Africa, Tunisia, Turkey, Ukraine, Uruguay and Vietnam.
n=29	n=37

Panel E – *Country sample used (according to data available)*

Developed	Developing
Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Rep., Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Portugal, Singapore, Spain, United Kingdom and United States.	Argentina, Bahrain, Bangladesh, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Egypt, Arab Rep., Ghana, China, India, Indonesia, Jordan, Kazakhstan, Kenya, Kuwait, Malaysia, Malta, Mauritius, Mexico, Morocco, Namibia, Nigeria, Pakistan, Peru, Philippines, Poland, Russian Federation, Saudi Arabia, Serbia, Slovenia, South Africa, Sri Lanka, Tanzania, Thailand, Tunisia, Turkey and Ukraine.
n=25	n=45

Panel F – *Country sample used (according to data available)*

Developed	Developing
Australia, Canada, Czech Republic, Iceland, Israel, Italy, Japan, Korea, Rep., Netherlands, New Zealand, Singapore, Switzerland and United States.	Argentina, Bahrain, Bangladesh, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Egypt, Arab Rep., China, India, Indonesia, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Malta, Mauritius, Mexico, Namibia, Nigeria, Oman, Pakistan, Peru, Philippines, Poland, Russian Federation, Saudi Arabia, South Africa, Sri Lanka, Tanzania, Thailand, Ukraine and Vietnam.
n=13	n=39

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