

Institutions and financial development: Comparative analysis of developed and developing economies

Institutions
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development

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Abstract

Purpose – This article aims to investigate how institutional characteristics affect the level of financial development of economies collectively and compare between developed and undeveloped economies.

Design/methodology/approach – A dynamic panel with 131 countries, including developed and developing ones, was utilized; the estimators of the generalized method of moments system (GMM system) model were selected because they have econometric characteristics more suitable for analysis, providing superior statistical precision compared to traditional linear estimation methods.

Findings – The results from the full panel suggest that concrete and well-defined institutions are important for financial development, confirming previous research, with a more limited scope than the present work.

Research limitations/implications – Limitations of this research include the availability of data for all countries worldwide, which would make the research broader and more complete.

Originality/value – A panel of countries was used, divided into developed and developing countries, to analyze the impact of institutional variables on the financial development of these countries, which is one of the differentiators of this work. Another differentiator of this research is the presentation of estimates in six different configurations, with emphasis on the GMM system model in one and two steps, allowing for comparison between results.

Keywords Financial development, Institutions, Governance, Corruption, Economic stability, System GMM model

Paper type Research paper

1. Introduction

Academic studies (Greenwood & Jovanovic, 1990; De Gregorio & Guidotti, 1995; Demirgüç-Kunt & Levine, 2001; Beck & Levine, 2004; Levine, 2005; Luintel, Khan, Arestis, & Theodoridis, 2008; Masoud & Hardaker, 2012; Allen, Gu, & Kowalewski, 2018; Fufa & Kim, 2018; Yang, 2019; Beck, 2020) have illustrated that a well-regulated, efficient financial system with a mature banking sector and capital markets has been essential for driving economic growth in several nations. A fundamental precept to explain this phenomenon is that financial intermediation allows, for example, the transfer of resources from economic agents willing to save to companies looking for investment opportunities. This makes it possible for companies to explore profitable opportunities and develop technological innovations, which cannot be realized without the necessary financial resources. Therefore, well-developed

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financial systems enable economic development in several ways, primarily through the efficient allocation of capital (Levine, 1997; Levine & Zervos, 1998; Beck, Levine, & Loayza, 2000; Rioja & Valev, 2004; Beck, 2020), the promotion of innovation (King & Levine, 1993; Huang & Xu, 1999; Pecé, Simona & Salisteanu, 2015; Rau, Wardrop, & Zingales, 2021) and the stimulation of savings (Arestis, Demetriades, & Luintel, 2001; Demirgüç-Kunt & Levine, 2001; Beck, Demirgüç-Kunt & Levine, 2004; Levine, 2005; Adeniyi, Omisakin, Egwaikhide, & Oyinlola, 2012; Bandura & Dzingirai, 2019). This makes an advanced financial system essential for the growth of economies (Thiel, 2001). In this sense, there has been increased interest in identifying the factors that explain such differences in financial performance among countries.

Institutional quality has been described as encompassing the existence of formal regulations, the effective implementation of these rules, and the trustworthiness of legal institutions (Acemoglu, 2010; Coase, 2012; La Porta, Lopez-de-Silanes, & Shleifer, 2013; Acemoglu, Gallego, & Robinson, 2014). At a macroeconomic level, financial development measures a country's monetary, banking, and financial sector activities (Levine, 1997; Beck *et al.*, 2000; Demetriades & Law, 2006; Chang, 2011; Van den Berg, 2016). Countries that have higher levels of financial development tend to have positive economic outcomes, such as prominent levels of economic growth and lower levels of inequality and poverty (Demirgüç-Kunt & Levine, 2001; Levine, 2005; Erol, Seven, Aydoğan, & Tunc, 2013; Coşkun, 2016) [1].

A factor of significant importance for financial systems to fulfill their role is the existence of institutions, such as government rules on human behavior and the structuring of social interactions. These factors are considered relevant for growth and economic development, helping explain successes and failures in resource allocation (Janvry & Sadoulet, 2020). Although their importance has been long recognized, they have gained visibility with the rise of New Institutional Economics (NIE), which explains the emergence of institutions as innovations to reduce market failures and transaction costs that result in adverse selection, moral hazard, and cooperation failures.

The importance of institutional resilience is evident because the implementation and enforcement of rules are essential for ensuring the credibility and confidence of markets, as well as for ensuring fair functioning and level playing in financial markets. In this regard, supervisory convergence, whereby supervisory practices are harmonized across jurisdictions, is vital to ensuring the fairness of regulatory burdens and limiting compliance costs (Ferran, 2012). In addition, full access to relevant information is essential for competent authorities to understand the dynamics within international groups during periods of stress (Acharya, 2009).

Studies (Levine & Zervos, 1998; Beck *et al.*, 2000; Cull & Xu, 2005; Cline, 2010; Demirgüç-Kunt, 2012; Mazzucato & Wray, 2015) show that an operational and efficient financial system increases entrepreneurs' investment funds, which can help the development of the economy. In this sense, studies on the development of the financial market, such as effective policies and the rule of law, are fundamental, as they enable the identification and understanding of influential factors. Thus, adopting mitigating measures should be promoted in addition to strategic planning and practices by institutions, aiming to encourage financial development.

Therefore, this work investigates how institutional characteristics affect financial development, comparing developed and developing economies. Information from 131 countries during the period 2000–2021 was gathered to conduct empirical analyses of the impact of institutional factors in the form of indices for government accountability, political stability and absence of violence/terrorism, government effectiveness, corruption control, quality of the legal system, and economic freedom. This study sets itself apart from others through the categorization of countries into developed and developing nations and the application of various econometric models, including Ordinary Least Squares (OLS), fixed effects, random effects, and dynamic methods such as the Generalized Method of Moments

(GMM). The aim is to provide a deeper and more comprehensive understanding of the relationships between institutional quality and financial development over the analyzed period. Including variables such as voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, corruption control, and the rule of law, and employing dynamic models to tackle endogeneity stands out as a significant differentiator from existing literature.

Additionally, incorporating the voice and accountability variable, which considers the overall perception of institutional responsibility in credit provision, adds a subjective dimension to traditional analyses. This approach goes beyond objective metrics like interest rates or regulations, recognizing the importance of stakeholders' subjective opinions, which impact overall trust in a country's economic environment, especially in the financial market. Thus, this research seeks to contribute theoretically and methodologically to understanding the factors driving financial development in specific economic contexts. It deepens the understanding of the interaction between institutional quality and financial development dynamics over time, bringing institutional variables into discussions that are often overlooked in economic growth and development analyses. The study hypothesizes that by comprehending the interdependence between institutions and finance, one can identify the crucial factors for improving economic and financial performance, particularly in developing countries, thereby creating an efficient and stable financial system based on the identified criteria.

This study is organized into five sections. The first section is the introduction, which aims to contextualize the topic. The second section presents a brief review of the literature on the subject. It presents previously conducted studies to explore the interrelationship between the development of the financial system and economic growth. The third section details the methods adopted to conduct this study. In the fourth section, the results are shown, discussed, and contextualized considering the literature. Finally, the fifth section addresses the conclusions drawn from the present research.

2. Connections between institutions, financial development, and economic growth

Financial development is a crucial topic for a country's economic growth. The theoretical literature suggests that financial development plays a crucial role in economic growth by increasing the availability of capital and promoting improvements in the efficient allocation of financial resources. It also suggests that financial services contribute to industry expansion and economic growth (Kose, Prasad, Rogoff, & Wei, 2010; Bodie & Merton, 1998). Other authors also suggest that political economy and trade openness influence a country's financial development (Andrianova, Demetriades, & Shortland, 2008; Baltagi, Egger, & Pfaffermayr, 2007; Beck, Demirgüç-Kunt, & Demirgüç-Kunt, 2001; Girma & Shortland, 2007; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000; Rajan & Zingales, 2003; Roe & Siegel, 2008). In other words, the development of the financial sector contributes to economic growth through both direct and indirect channels. In addition to financial services, the financial sector plays a highly crucial role as an indicator of profitable business opportunities and in improving corporate governance (Levine, 2005; Roubini & Sala-i-Martin, 1992).

Thus, the functions performed by the financial sector substantially influence the dynamics of economic growth rates (Gurley & Shaw, 1955; Patrick, 1966). An example is the study by Goldsmith (1969), which provides a relevant theoretical framework, suggesting that progress in financial development is associated with higher average economic growth rates. Demirgüç-Kunt and Levine (1996) also state that stock market development positively and robustly correlates with economic growth.

Given this, financial markets have contributed significantly to stimulating economic development through the influence of banks and stock exchanges, which encourage investment and the efficient allocation of resources. In this way, banks play a crucial role in granting credit and financing investment projects, allowing companies to expand their operations and drive economic growth. On the other hand, stock exchanges provide an environment for trading stocks and other financial assets, allowing companies to raise funds through initial public offerings (IPOs) and attracting investors to participate in capital markets. Thus, investment in companies and productive sectors has incentives, providing capital for expansion, innovation, and job creation (Bekaert, Harvey, & Lundblad, 2005; Taiwo & Falohun, 2016).

The role of financial development in economic growth is explained in theories that address financial structure. These theories are based on the behavior and interrelationship between banks, markets, and financial services and laws and finance, such as Financial Behavioral Theory (Kahneman & Tversky, 2013; Daniel, 2017; Richard *et al.*, 2022), Asymmetric Information Theory (Akerlof, 1978; Stiglitz, 1985), Agency Theory (Jensen, 1993; Jensen & Meckling, 2019), the Theory of Corporate Finance (Myers, 1977; Fabozzi, Modigliani, & Jones, 2014; Miller, 1977), the Theory of Rational Expectations (Muth, 1961; Lucas, 1980; Barro, 1984), and the Theory of Law and Finance (Coase, 1990; La Porta, Lopez-De-Silanes, Shleifer, & Vishny, 1997, 2000; Levine, 2005).

The Theory of Law and Finance suggests that a legal system is fundamental to the success of the company, industry, and the national economy (La Porta *et al.*, 1997; Levine, 1999). Thus, institutions, defined as legal and social rules and norms that govern economic systems and reward growth-promoting activities, play a crucial role in financial and economic development through diverse channels (Williamson, 1987; North, 1990; Acemoglu, Johnson, & Robinson, 2005). Financial markets and institutions effectively respond to technological and informational constraints within specific rules or institutions. Imperfections in financial markets, reflected in financial constraints, incomplete risk sharing, liquidity shortages, and inadequate market conditions, influence discipline in accumulating and allocating factors or capital (Acemoglu & Robinson, 2013). This dynamic has an intrinsic linkage with asymmetric information and transaction costs, in which well-developed institutions play a crucial role in improving the functioning of the economic and financial environment.

The fundamental mechanisms by which institutions can shape the relationship between financial development and economic growth include influencing property rights, contract enforcement, protection from the powerful elite, costs associated with contract enforcement, and economic policies, among other channels (Acemoglu & Robinson, 2013). Well-developed institutions are crucial in protecting the disadvantaged, ensuring property rights, and effectively enforcing contractual terms agreed upon between parties (Glaeser, Johnson, & Shleifer, 2001; Acemoglu & Johnson, 2005). In addition, by acting in defense of the interests of the less favored parties, such institutions guarantee protection to minority shareholders against privileged information held by more informed shareholders or managers through property rights and countermeasures against the powerful elite. This logic can also be extended to safeguarding the interests of creditors against the risks of expropriation and asymmetric information and protecting depositors and borrowers against monopoly power (Modigliani & Perotti, 1997; Ewert & Wagenhofer, 2011).

More vital institutions can prevent noncompliance with contractual obligations and the withdrawal of commitments established between parties by employing compromise mechanisms and independent arbitrators. The availability of these services can be costly due to the inherent complexity of financial contracts or the inefficiency of courts and regulators. Therefore, quality institutions play a crucial role in mitigating this challenge by contributing to the sustainability of financial development and lending (Acemoglu & Johnson, 2005).

Another crucial channel through which institutions affect the relationship between finance and economic growth is economic policy. Institutions play a crucial role in shaping macroeconomic and financial policy, primarily through the government budgeting process and central banks' and financial supervisors' degree of independence and accountability. This necessitates a combination of policies that includes macroeconomics, regulation, competition policy, and financial openness. These elements can be associated with macroeconomic instabilities and regulatory failures that, in turn, impact financial development and economic growth (Mishkin, 1999; Boyd & De Nicolo, 2005). Therefore, well-developed institutions ensure financial systems and more robust growth in the future by fostering sound economic policies.

La Porta *et al.* (1997), La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998, 2000) investigated the relationship between investor protection (in terms of legal rules and quality of law enforcement), capital markets (encompassing equity and debt markets), and the concentration of ownership in publicly traded companies. They concluded that the legal approach is crucial to understanding corporate governance and its potential reforms. Subsequently, Beck, Demirgüç-Kunt, and Levine (2003) advanced this work by showing a rigid/flexible link between legal origins and financial development. On the other hand, Acemoglu, Aghion, and Zilibotti (2006) and Anderlini, Felli, Immordino, and Riboni (2013) showed that a legal environment that is too rigid can obstruct economic development, exerting a negative impact on financial development.

For authors such as Douglas North (1990), institutions are significant in financial development and define the rules to be followed ("the rules of the game"), including constitutions and laws, codes of conduct, and standards of behavior in a country; this is crucial for the process of economic growth. In this way, solid institutions explain financial development, especially in the banking and finance sector; if there is no well-defined institutional environment, there is an obstacle to the growth of the economy (Demetriades & Law, 2006).

Thus, high institutional quality helps the development and maintenance of financial markets (Konadu-Agyemang, 2018) so that if the development of financial institutions and the market occurs, there is an increase in the quantity of monetary services and the stimulation of economic evolution (Patrick, 1966). Thus, the development of the financial sector instigates economic growth as the economy approaches economic-financial equilibrium. However, as financial development progresses, the first impact on supply diminishes, and demand begins to keep pace with the financial growth of a country's economy (Patrick, 1966). Thus, developing countries need reforms in their financial systems. On the other hand, underdeveloped countries need sudden changes in their financial systems to achieve a well-performing financial structure.

Finally, it is essential to note that a country's financial system influences savings and investment decisions, critical determinants of long-term economic growth. As far as the country is concerned, government policies and legislation can help mobilize savings. More transparent government policies and legislation promoting greater information disclosure can help individuals and companies make informed investment decisions (Anwar & Cooray, 2012). At the international level, financial globalization can contribute to a better allocation of financial resources. Chinn and Ito (2006) argue that countries with a higher degree of legal and institutional development are better positioned to receive financial liberalization help. Given this, the degree to which financial development affects economic growth also depends mainly on the quality of governance.

Thus, this paper examines how these institutional conditions influence the level of financial development in developed and developing economies, examining the relationships among financial development, institutions, and economic growth. This research is based on the variables provided by the World Bank's Worldwide Governance Indicators (WGI), which aim to measure and understand the impact of institutional quality and governance on countries' financial and economic development.

2.1 Literature review

The most recent empirical literature, primarily based on regressions of panel data, has shown that the financial system is significantly affected by institutional norms. According to [North \(1990\)](#), institutions are significant in financial development and define the rules to be followed, including constitutions and laws, codes of conduct, and the standard of behavior to be followed in a country; these criteria are recognized as crucial for the process of economic growth and development. [Knack and Keefer \(1995\)](#) corroborate the role of institutional quality in improving financial development. Other studies show that government-run banking, the political economy, and trade openness influence financial development ([Andrianova et al., 2008](#); [Baltagi et al., 2007](#); [Beck et al., 2001](#); [Girma & Shortland, 2007](#); [La Porta et al., 2000](#); [Rajan & Zingales, 2003](#); [Roe & Siegel, 2008](#)).

[Law and Demetriades \(2006\)](#) analyzed whether the interaction between institutional quality and financial development positively influences economic growth when considered separately. They used dynamic panel data techniques for 43 developing countries from 1980–2001 to do this. The results suggested that trade openness, including capital flows and institutions, is a determinant and essential factor for the financial development of middle-income countries but is weaker in low-income countries.

[Sghaier and Abida \(2013\)](#) examined the causal relationships between foreign direct investment (FDI), financial development, and economic growth in a panel of 4 North African countries (Tunisia, Morocco, Algeria, and Egypt), for the period 1980–2011. To do this, the authors used a panel data analysis with the generalized method of moments (GMM), finding robust evidence of a positive relationship between FDI and economic growth. They also found evidence that the development of the domestic financial system is an essential prerequisite for FDI to affect economic growth positively. Thus, it was possible to conclude that the development of a domestic financial system needs to be driven by local reforms to maximize the benefits of the presence of FDI.

[Anwar and Cooray \(2012\)](#) verified the impact of the interaction between (1) financial development and foreign direct investment and (2) financial development and the quality of governance on economic growth in South Asia. To do so, the authors used panel data from 1970 to 2009. The results suggest that quality institutions affect the level of financial development, implying that the extent of development benefits depends on the quality of governance. In addition, indicators for the rule of law, or more specifically, the guarantee of political rights and civil liberties, increase economic and financial development. Thus, financial development has contributed to increased FDI benefits in South Asia. In addition, improved political rights and civil liberties have increased the benefits of financial development in South Asia.

[Arcand, Berkes, and Panizza \(2015\)](#) and [Cecchetti and Kharroubi \(2015\)](#) demonstrated that better financial sector development can be an obstacle to real economic growth. The quality of institutions affects foreign direct investment (FDI) and trade openness in diverse ways. [Raza, Shah, and Ali \(2019\)](#) corroborates these findings by analyzing foreign direct investment (FDI) and economic growth in the presence of a sound governance system in the countries of the Organization for Economic Co-operation and Development (OECD). Using a dataset covering the years 1996 to 2013, fixed effects models and the GMM estimator were used. The study's results revealed that regulatory quality, control of corruption, political stability, voice and accountability, and government effectiveness had significant positive associations with economic growth. The authors concluded that the more countries maintain their institutional quality, the better their economic growth and FDI flows will be.

[Rani and Kumar \(2019\)](#) investigated the long-term association and direction of causality between economic growth, trade openness, and gross capital formation in Brazil, Russia, India, China, and South Africa (BRICS). To this end, the authors used the autoregressive distributed lag model (ARDL) and the vector error correction (VEC) model to examine the long-term

associations and the causal relationships between concurrent variables. The results of the ARDL limit tests indicated a long-term relationship between economic growth, trade openness, and gross capital formation. Granger's causal test revealed unidirectional causality between trade openness and economic growth in India and that Brazil supports the trade-led growth hypothesis. In contrast, two-way causality is found between China's trade openness and economic growth. In addition, empirical evidence of unidirectional causality between economic growth and trade openness is found in South Africa, confirming the growth-led trade hypothesis. Thus, trade openness significantly determines economic growth in BRICS countries.

Nguyen (2019) studied the effects of financial deepening on growth and productivity dynamics in an economy where heterogeneous entrepreneurs face endogenous debt constraints. From this, the author concluded that low-quality institutions hinder foreign investment and limit the positive impact of trade openness on economic growth. However, when the quality of institutions increases, the positive effect of FDI on the economy is amplified, generating additional benefits beyond the direct effects of trade openness.

Khan, Peng, and Li (2019) analyzed the relationship between institutional quality and financial development in developing and emerging countries. They used a panel dataset from 189 countries, employing OLS dynamics, fixed effects, random effects models, and GMM method estimators. The results indicated that better institutions are essential for financial development; particularly, stability, corruption control, and regulatory quality policies positively affect financial development worldwide. The rule of law negatively affects financial development, which reveals that in most global countries, the rule of law is fragile. Controlling the corruption ratio positively affects financial development in emerging countries, which indicates that most countries have reduced corruption to a low level. Thus, the study suggests that developing and emerging countries should improve institutional quality by re-examining the rules of law, government effectiveness, and government accountability. Nguyen (2019) studied the effects of financial deepening on growth and productivity dynamics in an economy where heterogeneous entrepreneurs face endogenous debt constraints. From this, the author concluded that low-quality institutions hinder foreign investment and limit the positive impact of trade openness on economic growth. However, when the quality of institutions increases, the positive effect of FDI on the economy is amplified, generating additional benefits beyond the direct effects of trade openness.

Abaidoo and Agyapong (2022) examine how institutional quality influences variability in financial development among sub-Saharan African (SSA) economies. They used the maximum likelihood of limited information (LIML) as an estimation technique to do so. The results suggested that institutional quality increases the pace of financial development among the economies of the subregion. In a further analysis at the micro level, where the components of the institutional quality index were examined separately, the results of the study suggested that effective governance, regulatory quality, the rule of law, and accountability tend to have a positive and significant impact on the development of the financial sector.

Asante, Takyi, and Mensah (2023) analyzed the effects of financial development on economic growth in sub-Saharan Africa (SSA) using a panel of 29 countries covering the period from 2000 to 2019. The System GMM model was used to estimate the model. The authors found that financial development positively and significantly affects economic growth. Moreover, when the rule of law, political stability, and regulatory quality are highly effective, there is a positive effect on financial development and economic growth.

3. Methodology

3.1 The empirical model

In this work, a panel data model is used to analyze the relationship between the quality of institutions and financial development for developed and developing countries and for the

complete set of countries in the sample. Based on empirical studies and theoretical aspects, variables and indicators were identified to define an empirical model aiming to explain the availability of domestic financing in the countries included in the analysis. The model is defined by Equation (1).

$$FD_{it} = \beta_0 + \beta_1 VR_{it} + \beta_2 EP_{it} + \beta_3 EG_{it} + \beta_4 QR_{it} + \beta_5 CCor_{it} + \beta_6 RLei_{it} + \beta_7 LEco_{it} + \beta_8 POP_{it} + \beta_9 Poup_{it} + \beta_{10} GDP_{it} + \beta_{11} FDI_{it} + \theta_i + year + \varepsilon_{it} \quad (1)$$

where FD_{it} is the value of the i country domestic financing over t time, used as a proxy to represent the country's financial development; α_0 is the constant of the model; VR_{it} is an indicator of the i country voice and accountability over t time; EP_{it} is an indicator of the i country political stability over t time; EG_{it} it is an indicator of the effectiveness of the government in the i country over time t ; QR_{it} is an indicator that expresses the regulatory quality of the i country over t time; $CCor_{it}$ is represents the i country control of corruption over t time; $RLei_{it}$ is an indicator of the i country regulations and laws over t time and refers to the rule of law; $LEco_{it}$ represents the degree of economic freedom of the i country over t time; POP_{it} is the population of the i country at the t time; $Poup_{it}$ is the i country saving of t time; GDP_{it} it is the i country GDP over t time; FDI_{it} is the foreign direct investment in the i country in t time; θ_i is the country-specific unobserved effect; $year$, is a dummy variable that captures time fixed effects; β represents the coefficients of the model to be estimated; and ε_{it} it is the error term.

The dependent variable was chosen to represent the availability of credit in the markets of each country according to the “supply-leading” hypothesis developed by Patrick (1966), according to which there is a causal relationship between financial development and economic growth. In this way, increasing financial markets and regulatory quality would result in a more excellent supply of financial services, leading to real economic growth. Therefore, it can be understood that the greater the availability of credit to the private sector is, the greater the levels of savings and investment, which promotes efficiency in the accumulation of capital, stimulating the expansion of the economic system and its contribution to the country's economy.

3.2 Econometric approach

This study uses a dynamic panel approach that includes 131 countries, including all countries in the sample, in the form of a panel composed only of developed countries and another with developing countries. The approach used was the Generalized Method of Moments (GMM) model developed by Arellano and Bond (1991), more specifically, the GMM model developed by Arellano and Bover (1995) and Blundell and Bond (1998), and the Dynamic Generalized Method of Moments (DGMM) recommended by Holtz-Eakin, Newey, and Rosen (1988). Other linear procedures, such as OLS, fixed effect, and random effect analyses, were adopted to estimate the model to compare and evaluate the results between models.

The DGMM model proposed by Arellano and Bond (1991) provides superior statistical accuracy to traditional linear estimation methods because it considers that the coefficients are variable in time, in addition to selecting the lags and periods ahead that are important for estimating specific coefficients. As a result, the data are used more effectively, resulting in more reliable and accurate estimates. Additionally, as the dynamic part of the system is considered, the estimates are not biased by problems of omitted variables or parameter instability, allowing the use of long-term information in the estimates. Thus, the main advantage of the DGMM model is that it allows efficient estimation of dynamic models, even when the underlying model is highly nonlinear and involves heteroscedastic disturbances. It also allows for consistent estimation of coefficients even in the presence of autocorrelation

and produces standard errors that consider estimation bias due to time dependence. However, the System GMM is superior to the DGMM.

According to [Arellano and Bover \(1995\)](#), the System GMM model has advantages over the DGMM model:

- (1) *Reduced bias.* The System GMM model is less biased than the DGMM model because it uses the first differences and the levels of the variables as instruments. This helps to solve the problem of weak instruments, which can lead to biased estimates in the DGMM model.
- (2) *Increased efficiency.* The System GMM model is also more efficient than the DGMM model because it uses more information in the estimation process. This is because the System GMM model can estimate short-term and long-term coefficients, while the DGMM model can estimate only short-term coefficients.
- (3) *Robustness to incorrect specification.* The System GMM model is more robust to specification errors than the DGMM model is. This is because the System GMM model uses the first differences and the level variables as instruments, which helps to mitigate the effects of poor specification.

The System GMM model is a more robust and efficient estimator than the DGMM model and is the preferred method for estimating dynamic panel data models.

To analyze and obtain the best results, we estimated the OLS, DGMM, and System GMM models; however, the focus was on the System GMM model, which provides a more efficient estimator than the others. Thus, the results are interpreted based on the System GMM estimates.

In these models, the two-step estimator is more efficient than the one-step estimator. However, Monte Carlo studies have proven that the efficiency gain is small, and the two-step estimator slowly converges to its asymptotic distribution. On the other hand, in finite samples, the asymptotic standard errors associated with the two-step GMM estimator can be tendentiously low ([Blundell & Bond, 1998](#)), while the results of OLS estimates, according to [Hoeffler \(2002\)](#), present a coefficient with an upward bias β .

The System GMM model controls for the endogeneity of the independent variables, considering that the institutional structure is influenced by the interaction between financial market development and institutional quality and other common factors that may have been omitted. Thus, the model is defined as follows:

$$FD_{it} = \beta_0 + \beta_1 FD_{it-1} + \beta_2 VR_{it} + \beta_3 EP_{it} + \beta_4 EG_{it} + \beta_5 QR_{it} + \beta_6 CCor_{it} + \beta_7 RLe_{it} + \beta_8 LEco_{it} + \beta_9 POP_{it} + \beta_{10} Pou_{it} + \beta_{11} GDP_{it} + \beta_{12} FDI_{it} + \theta_i + year + \varepsilon_{it} \quad (2)$$

For the estimation of the model, the logarithmic transformation was applied to the variables to facilitate the interpretation of the estimated coefficients as proportional effects associated with each of them.

3.3 Model data and variables

The data used for model estimation are from secondary sources. The data were obtained from the World Bank's Worldwide Governance Indicators (WGI) database and the [Fraser Institute \(2023\)](#). The variables that make up the model are as follows:

- (1) *Domestic credit:* This is the dependent variable and represents the proportion of credit granted by banks to the private sector about the size of the economy. Credit availability facilitates investments in expansion, innovation, and employability

(Demirgüç-Kunt & Levine, 2001; Beck, Demirgüç-Kunt, & Levine, 2004). Trust in this environment is strongly influenced by sound institutions, including clear regulations, an effective legal system, and robust corporate governance (North, 1990). These elements foster safe financial transactions, encouraging banks to increase their lending activities; therefore, this variable was used as a proxy for countries' financial development.

- (2) *Voice and accountability*: voice and accountability can affect overall confidence in a country's economic environment, influencing banks' willingness to extend credit (World Bank, 2023). Solid institutions play a role in trust and responsibility that permeates economic agents' perception, influencing their decision to lend and invest. When the view of accountability is positive, an environment conducive to financial development is created since trust is essential to mobilizing financial resources (Putnam, 1993).
- (3) *Political stability and the absence of violence/terrorism*: When a country establishes a stable political environment characterized by reduced uncertainty and the absence of violent conflicts, it creates a favorable scenario for credit. This political stability fosters investor confidence and encourages banks to increase their lending activities to the private sector (Yang, 2011; Asongu, 2014; Raza *et al.*, 2019). Thus, strong and well-developed institutions, facilitated by a stable policy environment, are critical for the efficient functioning of financial markets. They provide a reliable framework for conducting business, ensuring the protection of property rights and the effective enforcement of contracts (North, 1990).
- (4) *Government effectiveness*: An effective government could implement policies that promote economic stability and competent oversight, creating an environment conducive to financial development. When banks perceive effective governance, they may feel more confident in granting credit because government effectiveness suggests that implementing policy measures benefits economic growth (Minniti, 2008; Zhou, Bao, Zhao, He, Cui, & Liu, 2022; Khan *et al.*, 2019).
- (5) *Regulatory quality*: Clear and well-defined regulations create a predictable environment for financial institutions, fostering stability and economic order. The predictability provided by good regulatory quality is a crucial element for companies to plan strategically and confidently make investment decisions (Smit, 2010). Regulatory quality is a fundamental component, as it guides the behavior of economic agents, contributing to an efficient institutional environment (North, 1990). In addition, regulatory quality encourages banks to lend more, clarifying the operating environment (Laeven & Valencia, 2020; Khan *et al.*, 2019).
- (6) *Corruption control*: The presence of elevated levels of corruption can be detrimental to the domestic credit environment, introducing uncertainty and additional risks for banks. Authors such as Raza *et al.* (2019), Khan *et al.* (2019), and Song, Chang, and Gong (2021) state that low levels of corruption are associated with a more stable and credit-friendly environment. Corruption undermines the efficiency of financial markets and investor confidence and increases risk perception. In contrast, effective control of corruption contributes to a more transparent and predictable environment by encouraging banks to lend more to the private sector (Julius Otusanya, 2011; Admati, 2017).
- (7) *Rule of law*: A robust legal environment characterized by a strong rule of law lays the foundation for legal certainty, where contracts are respected, and legal disputes are resolved fairly. Such legal stability creates a scenario conducive to the efficient

functioning of financial markets. By perceiving a reliable legal system, banks can gain greater confidence in granting credit since they have the assurance that agreements will be fulfilled and that legal issues will be dealt with equitably (La Porta *et al.*, 1997; Beck *et al.*, 2003; Laeven & Valencia, 2020).

- (8) *Economic freedom*: Economic freedom contributes to a more dynamic business environment by stimulating economic growth, creating more accessible and more competitive environments favoring efficiency and innovation, and creating business opportunities that, in turn, can boost lending by banks (Acemoglu *et al.*, 2005; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999). According to Beck, Demirgüç-Kunt, Laeven, and Maksimovic (2006) and Levine (2005), greater economic freedom is often associated with more developed financial systems in which banks play a crucial role in financing business activities.
- (9) *Population*: A larger population can indicate a broader market for banks, creating opportunities to expand financial services. In this context, efficient institutions are crucial in facilitating access to credit on a larger population scale, boosting investment, and enabling a nation's economic growth (Levine, 1997; King & Levine, 1993).
- (10) *Gross savings*: Higher savings can indicate a greater volume of financial resources available to be directed at investments and loans, stimulating economic growth (Rajan & Zingales, 2003). On the other hand, it is essential to note that if people are saving more, they may, in return, invest less in immediate consumption, which may have implications for aggregate demand in the economy (Agénor, 2003; Su, Xu, & Tong, 2023).
- (11) *Gross domestic product*: A more robust economy, reflected by GDP, not only suggests a more remarkable ability to pay but also creates an environment conducive to investment opportunities. Banks sensing a growing economy tend to feel more confident in providing credit to the private sector, as economic expansion indicates a potential demand for financing. As an indicator of the size and overall health of the economy, GDP directly influences the scale and prospects of credit (Panizza & Presbitero, 2013; Valickova, Havranek, & Horvath, 2015; Khan *et al.*, 2019).
- (12) *Foreign direct investment*: The influx of capital from FDI can significantly impact the resources available for banks to borrow. The inflow of foreign investment not only provides an additional source of financing for financial institutions but can also indicate the confidence of foreign investors in the stability and economic growth potential of the recipient country, generating a positive influence of FDI on credit dynamics (Levine, 2005; De Haas & Van Lelyveld, 2006; Claessens & Van Horen, 2012).

Thus, Table 1 presents information regarding the variables that make up the model, highlighting the source of the data collection, period of analysis, expected signs, and underlying theoretical foundation. This approach provides clarity and facilitates the interpretation of the study results.

The analysis period spans from approximately 2000 to 2021, a time series of 21 years. The criteria for including the available data were as follows: the initial data from 2000 were published annually, and the data from 2021 were the most recent data available in the databases researched. The sample includes 131 countries for which data for the selected variables were presented.

Variable	Description	Source	Year	Expected signal	Theoretical basis
FD_{it}	Domestic lending to the private sector by banks (% of GDP)	World Bank	2000–2021	+	Stepanyan and Guo (2011), Korkmaz (2015), Khan <i>et al.</i> (2019)
VR_{it}	Voice and Accountability	WGI – World Bank	2000–2021	+	Yang (2011), Asongu (2014), Raza <i>et al.</i> (2019)
EP_{it}	Political Stability and Absence of Violence/ Terrorism	WGI – World Bank	2000–2021	+	Raza <i>et al.</i> (2019), Khan <i>et al.</i> (2019), Mensah, Kofi Osei-Fosu, and Nkansah Asante (2023)
EG_{it}	Effective Government	WGI – World Bank	2000–2021	+	Minniti (2008), Zhou <i>et al.</i> (2022), Khan <i>et al.</i> (2019)
QR_{it}	Regulatory Quality	WGI – World Bank	2000–2021	+	Laeven and Valencia (2020), Khan <i>et al.</i> (2019)
$CCor_{it}$	Control of Corruption	WGI – World Bank	2000–2021	+	Raza <i>et al.</i> (2019), Khan <i>et al.</i> (2019), Song <i>et al.</i> (2021)
$RLei_{it}$	Rule of Law	WGI – World Bank	2000–2021	+	Beck and Levine (2001), Khan <i>et al.</i> (2019), Mensah <i>et al.</i> (2023)
$LEco_{it}$	Economic Freedom	Fraser Institute	2000–2021	+	Acemoglu (2005), Roychowdhury, Shroff, and Verdi (2019)
POP_{it}	Population	World Bank	2000–2021	+	Stepanyan and Guo (2011), Khan <i>et al.</i> (2019), Asiamah, Steel, and Ackah (2021)
$Poup_{it}$	Gross Savings	World Bank	2000–2021	–	Agénor (2003), Su <i>et al.</i> (2023)
GDP_{it}	Gross domestic product	World Bank	2000–2021	+	Panizza and Presbitero (2013), Valickova <i>et al.</i> (2015), Khan <i>et al.</i> (2019)
FDI_{it}	Foreign Direct Investment	World Bank	2000–2021	+	Levine (2005), De Haas and Van Lelyveld (2006), Claessens and Van Horen (2012)

Table 1.
Description of the
model variables

Source(s): Prepared by the authors, 2023

4. Presentation and analysis of the results

In the context of GMM panel models, conducting unit root tests is of paramount importance for assessing the stationarity of the time series employed in the investigation. Stationarity represents a fundamental condition to ensure the validity and reliability of the estimates obtained. In situations where time series are non-stationary, meaning they exhibit a unit root, the results from GMM estimations may be biased or inconsistent, as evidenced by [Arellano and Bond \(1991\)](#) and [Baltagi \(2008\)](#). Based on this premise, the Levin, Lin, and Chu (LLC) (2002) and Harris-Tzavalis (HT) tests were conducted at levels, as well as after applying the logarithmic transformation. Conducting two unit root tests, such as the LLC and HT tests, aims to increase the robustness and reliability of the conclusions drawn. Each test has its own characteristics and underlying assumptions, and employing multiple tests allows verifying whether the results are consistent across different analysis methods. Therefore,

by conducting two distinct tests, it is possible to reduce reliance on a single test and obtain a more comprehensive assessment of the stationarity of the time series in question. This helps mitigate potential specification errors and increase confidence in the conclusions drawn from the unit root tests (Stock & Watson, 2020).

The results of the LLC test using the variables at levels indicated the presence of a unit root for the variables related to Political Stability and Absence of Violence/Terrorism (EP_{it}), Government Effectiveness (EG_{it}), Control of Corruption ($CCor_{it}$), Rule of Law ($RLei_{it}$) and Gross Savings ($Poup_{it}$), while the HT test pointed out the presence of a unit root in the variables Population (POP_{it}) and Gross Savings ($Poup_{it}$). However, after applying the logarithmic transformation, the tests showed the stationarity of the variables in question. The complete results of the unit root tests are presented in Appendix.

The serial correlation tests in Table 2 ruled out first-order serial correlation (AR1) and indicated the absence of second-order serial correlation (AR2). Importantly, when performing the first differentiation, the serial correlation AR (1) was used when the temporal component of the variable and the level error term were not serially correlated (Arellano & Bond, 1991). However, the GMM estimator is consistent only when the second-order correlation is not significant, even if the first-order correlation is not equal to zero (Abdullah, Habibullah, & Baharumshah, 2009). According to Arellano and Bond (1991), the autocorrelation of RA (1) is expected to be negatively significant; on the other hand, the second-order AR autocorrelation test (2) should not be significant; this is the crucial point about the validity of the instruments. Given this, the first- and second-order serial correlation tests were all satisfactory. The Sargan test demonstrated that the instruments used for the estimations of the System GMM model are valid, as it did not reject the null hypothesis and, therefore, presents a robust model and consistent and unbiased standard error. Thus, the analysis can be performed based on the results of GMM estimates (Khan *et al.*, 2019). Regarding Hausman's test, he noted that the fixed effects estimator is preferable to the random effects model, as it rejects the null hypothesis at the 5% level of statistical significance. In addition, the Wald tests performed on the models indicated the presence of heteroscedasticity, as they rejected the null hypothesis at the 5% level of statistical significance, and it was necessary to estimate these hypotheses in a robust format.

Table 2 shows the models' results in relation to the different panels. The variable domestic credit to the private sector by banks (% of GDP) in the first lag (FD_{it-1}) showed a positive sign and was statistically significant at the level of 1% in the System GMM (two-step) so that the increase of 1% in credit granted by banks to the private sector over $t - 1$ time causes an increase of 0.46% in credit granted by banks to the private sector over t time. In addition, in the System GMM (one-step) and DGMM models, the same variable was statistically significant at the 1% level and positively impacted. According to the System GMM (one-step) model, a 1% increase in credit granted by banks to the private sector over $t - 1$ time results in a 0.24% increase in credit granted by banks to the private sector over t time. According to the DGMM, this increase was 0.28%.

These results show the importance of domestic credit to the private sector by banks as a significant determinant of credit granted to the private sector. They also show that an increase in credit in the previous period has a positive and significant effect on subsequent credit, highlighting the influence of this factor on financial market dynamics and its impact on the private sector (Stepanyan & Guo, 2011; Korkmaz, 2015).

The variable political stability (EP_{it}) showed a negative sign and was statistically significant at the 10% level in the System GMM (two-step) model; thus, a 1% increase in political stability causes a decrease of 0.017% in the credit granted by banks to the private sector. In addition, in the DGMM model, the variable in question was also statistically significant at the 1% level and presented a negative impact, with a reduction of 0.012%. Finally, the coefficient did not show statistical significance in the System GMM (one-step), OLS, RE, and FE models.

Table 2.
Effects of institutional
quality factors on
financial development
– dependent
variable (FD_{it})

Variables	OLS	FE	RE	DGMM	GMM (one-step system)	GMM (two-step system)
FD _{it-1}	–	–	–	0.28080*** (0.07854)	0.24390*** (0.07189)	0.46109*** (0.15359)
VR _{it}	–0.00029 (0.00628)	–0.00303 (0.00600)	–0.00153 (0.00627)	–0.00045 (0.00368)	0.00910 (0.01458)	0.01600 (0.01064)
EP _{it}	–0.00749 (0.00581)	–0.00745 (0.00862)	–0.00831 (0.00650)	–0.01208*** (0.002555)	–0.01494 (0.01514)	–0.01691* (0.00875)
EG _{it}	0.00682 (0.01287)	0.01791* (0.01688)	0.01014 (0.01555)	0.02506 (0.01918)	0.01762 (0.02748)	0.05392** (0.02027)
QR _{it}	0.01891* (0.01140)	0.01797* (0.01113)	0.01629* (0.00981)	0.01889* (0.01411)	0.01457 (0.01722)	0.07012* (0.01941)
CCor _{it}	–0.01128* (0.00728)	–0.00365 (0.01239)	–0.01185 (0.01265)	–0.00501 (0.00767)	–0.02455 (0.02084)	0.00976 (0.01811)
RLei _{it}	–0.01981* (0.01343)	–0.0231763 (0.0230548)	–0.02188 (0.02033)	–0.02122 (0.02520)	0.01002 (0.03033)	–0.05191*** (0.02628)
LECo _{it}	–0.34871** (0.15888)	0.20623 (0.35223)	–0.29833* (0.21956)	–2.83418*** (0.89070)	–0.96091* (0.60937)	–0.64085 (0.62461)
POP _{it}	0.18681*** (0.06683)	–1.52172 (1.44957)	0.15645* (0.11468)	0.44686 (0.34937)	–0.03845 (0.23322)	0.21087* (0.18958)
Poup _{it}	–0.03716*** (0.01472)	–0.05338* (0.04366)	–0.04086* (0.02848)	–0.07181 (0.055181)	–0.03547 (0.04407)	–0.07964** (0.04148)
GDP _{it}	0.03483*** (0.01741)	0.04132* (0.03659)	–0.02451 (0.02665)	0.08649*** (0.02992)	0.03722 (0.06561)	0.03678* (0.07482)
FDI _{it}	–0.00088 (0.03666)	0.0064694 (0.0866287)	0.0040635 (0.0642394)	0.0256498 (0.0407629)	–0.08707 (0.11965)	0.026953 (0.16369)
Const.	22.49587*** (0.76316)	44.75713 (2.32335)	22.45786*** (1.35846)	– 370	–7.00853 (2.63368)	–16.25145 (1.62246)
N. Obs.	411	411	411	370	370	370
Tests	–	20.00 (0.0454)	–	–	–	–
Hausman	–	–	–	–	–	–

(continued)

Table 2.

Variables	OLS	FE	RE	DGMM	GMM (one-step system)	GMM (two-step system)
Breusch-Pagan (heteroscedasticity)	29.74 (0.0000)	31.45 (0.0009)	38.94 (0.0001)	–	–	–
AR1	–	–	–	–3.283 (0.0010)	–4.83 (0.0000)	–7.69 (0.0000)
AR2	–	–	–	–0.19299 (0.8470)	–0.89 (0.376)	0.10 (0.921)
Sargan	–	–	–	57.8097 (0.2694)	43.53 (0.182)	43.53 (0.182)

Note(s): The values in parentheses are the results of standard errors, and * is the significance level of the variable being 10; *, 5; **, 1%; ***, In the section referring to tests, the values in parentheses are the p values of the calculated statistics

Source(s): Prepared by the authors, 2023

The indicator of political stability used has undergone variations throughout the series analyzed, having gone through several periods, such as the 2008 crisis, the debt crisis in Europe in 2009, and COVID-19 in 2020. In this way, there are reasons why political stability hurts the provision of credit to the private sector. First, political instability creates uncertainty and risk for lenders, making them more cautious when extending credit. Investors and lenders may be reluctant to undertake long-term financing or make significant investments in an environment where political stability is absent. In addition, political instability can disrupt economic policies, create regulatory uncertainties, and harm the business environment, discouraging banks from providing credit to the private sector (Alesina, Özler, Roubini, & Swagel, 1996; Aisen & Veiga, 2013; Tuncay, 2018). It is essential to highlight here the importance of considering the particularities of each economic context and country and conducting complementary analyses for a more comprehensive understanding of this complex relationship between political stability and credit granting.

The variable Effective Government (EG_{it}) was statistically significant in the FE and System GMM (two-step) models at the levels of 10 and 5%, with positive impacts of 0.018 and 0.053%, respectively, indicating that an efficient government capable of implementing public policies effectively can create an environment conducive to economic growth and increased credit granting (Minniti, 2008; Zhou *et al.*, 2022). In the other models, the coefficient did not show statistical significance.

The regulatory quality variable (QR_{it}) had a positive sign and was statistically significant at the 10% level in the System GMM (two-step) model; thus, a 1% increase in political stability causes an increase of 0.070% in the credit granted by banks to the private sector. According to the OLS, FE, RE, and DGMM models, the impact of political stability was also significant at the 10% level and showed a positive effect. These models showed increases of 0.019, 0.018, 0.016, and 0.014%, respectively, in the credit provided by banks to the private sector. According to the System GMM (one-step) model, the coefficient of this variable was not statistically significant.

Therefore, regulatory quality is crucial in granting credit to the private sector. A favorable regulatory environment with clear and transparent policies can encourage banks to increase the credit supply. Effective and well-implemented regulations offer security and reliability to the financial system, decreasing the risks associated with lending. In addition, good regulatory quality can be related to policies that stimulate economic growth and private sector development, creating an environment conducive to investment and entrepreneurship (Love & Zicchino, 2006; Laeven & Valencia, 2020).

The rule of law variable was (RLe_{it}) statistically significant in the OLS and System GMM (two-step) models at the levels of 10 and 5%, resulting in negative impacts of 0.019 and 0.052%, respectively. The ROL index positively impacts financial credit provision to countries, as it creates a favorable environment for investment and business, increasing investor and bank confidence. However, in specific cases, excessive restrictions and strict enforcement of laws can create bureaucratic hurdles or severe penalties for banks in case of default, discouraging lending (Beck *et al.*, 2003; Faggian *et al.*, 2019). Thus, the negative outcome may show that the lack of a sound and practical legal system may increase uncertainty and risk for creditors, discouraging lending to the private sector (Glaeser, La Porta, Lopez-de-Silanes, & Shleifer, 2004; Kim, 2014).

The variable population (POP_{it}) is a positive variable and is statistically significant at the 10% level in the System GMM (two-step); thus, a 1% increase in the country's population causes an increase of 0.21% in the credit granted by banks to the private sector. In addition, in the OLS and RE models, this variable was also statistically significant at the 1 and 10% levels, respectively, and had a positive impact. According to the OLS model, a 1% increase in the country's population resulted in a 0.19% increase in credit granted by banks to the private

sector. In the FE model, this increase was 0.16%. Finally, the coefficient did not show statistical significance in the FE, System GMM (one-step), and DGMM models.

An increase in a country's population usually implies a higher demand for goods and services, economic growth, and business activity. Thus, banks respond to this demand by expanding their credit supply to meet the needs of the private sector. In addition, population growth is related to economic development and the expansion of the private sector, creating a favorable environment for granting credit (Demirgüç-Kunt & Huizinga, 2010; Stepanyan & Guo, 2011; Asiamah *et al.*, 2021).

The savings variable ($Poup_{it}$) showed a negative sign and was statistically significant at the 5% level in the System GMM (two-step) model; thus, the 1% increase in domestic savings causes a decrease of 0.079% in the credit granted by banks to the private sector. According to the OLS, FE, and RE models, the variable in question was also statistically significant at the levels of 1, 10, and 10%, respectively, and had a negative impact; a 1% increase in domestic savings caused a reduction of 0.037, 0.053, and 0.040%, respectively, in credit granted by banks to the private sector. Finally, the estimates for the System GMM (one-step) and DGMM models did not show statistical significance.

In this context, the increase in domestic savings implies the availability of resources for individuals and companies to save or invest, reducing the credit search. This leads to more cautious behavior about spending and investments, decreasing the demand for loans. Additionally, an increase in domestic savings may reflect greater risk aversion or economic uncertainty, causing individuals and businesses to prefer to keep their savings as a safety reserve, ceasing to invest or borrow. This conservative stance on credit reduces the demand for loans, decreasing credit to the private sector (Agénor, 2003; Su *et al.*, 2023).

The variable GDP (GDP_{it}) is a positive variable and is statistically significant at the 10% level in the System GMM (two-step) model; thus, a 1% increase in the country's GDP causes an increase of 0.037% in the credit granted by banks to the private sector. In addition, in the DGMM, this variable was also statistically significant at the 1% level; thus, a 1% increase in the country's GDP resulted in an increase of 0.086% in the credit granted by banks to the private sector. According to the OLS and FE models, the impacts were significant at 5 and 10%, respectively, with increases of 0.035 and 0.041%. On the other hand, the coefficient did not show statistical significance in the System GMM (one-step) and RE models.

This result can be justified by the economic growth that stimulates the demand for financing, better payment prospects caused by a healthy economy, and increased confidence in economic agents. An expanding GDP indicates a growing economy, increasing the need for credit for investment, consumption, and enterprises. In addition, a favorable economic environment improves borrowers' ability to repay and builds confidence in banks to extend credit (Panizza & Presbitero, 2013; Valickova *et al.*, 2015).

In addition, the variables Voice and Accountability (VR_{it}), Control of Corruption ($CCor_{it}$), Economic Freedom ($LEco_{it}$) and Foreign Direct Investment (FDI_{it}) did not show statistical significance in the System GMM (two-step) model. However, although the Voice and Accountability variable did not present statistical significance in the models, it had a negative impact, which can be attributed to the fact that greater involvement of citizens in governance and decision-making can generate more significant pressure for transparency and accountability, causing this negative impact on the granting of credit by banks (Przeworski & Vreeland, 2000; Ball, 2009). The control of corruption variable was statistically significant in the OLS model at the 10% level, indicating that a negative impact resulted in a reduction of 0.011%. The negative results found for this variable suggest that the presence of elevated levels of corruption can decrease the confidence of banks and investors in the business environment, reducing the availability of credit to the private sector (Cooray & Schneider, 2018; Alshubiri, Jamil, & Fekir, 2023).

Economic Freedom showed statistical significance in the OLS, RE, DGMM, and System GMM (one-step) models, with negative impacts of 0.35, 0.29, 2.84, and 0.96%, respectively. This finding indicates that excessive economic restrictions and government interventions may limit economic agents' ability to make investment decisions and seek credit (Acemoglu, 2005; Roychowdhury *et al.*, 2019). Finally, Foreign Direct Investment did not show statistical significance in any of the models; however, it is important to highlight that foreign direct investment (FDI) plays an essential role in a country's financial development and credit expansion. The capital injection associated with FDI strengthens local financial markets, allowing financial institutions to expand their credit supply. The entry of foreign financial institutions diversifies the financial system and introduces best practices and abilities, promoting efficiency and stability. This transfer of knowledge and experience enhances the ability to assess risks, resulting in more robust lending practices. In addition, FDI-generated competition encourages innovation and improves the quality of financial services, contributing to financial inclusion (Levine, 2005; De Haas & Van Lelyveld, 2006; Claessens & Van Horen, 2012).

4.1 Results of the system GMM for developed and developing countries of the world

Table 3 shows that the GMM estimator is appropriate for parameter estimation. The empirical results provide relevant statistical evidence and are subject to specific contingencies, i.e. depending on different conditions and contexts. Thus, it is observed that the variable domestic credit granted to the private sector by banks (% of GDP) in the first lag (FD_{it-1}) showed a positive sign and was statistically significant in the three models analyzed. According to the sample comprising the total set of countries, an increase of 1% in the credit granted by banks to the private sector over $t - 1$ time causes an increase of 0.46% in the credit granted by banks to the private sector over t time. This increase in the sample comprising developed countries represented 0.50%, while in developing countries, the increase was 2.79%.

The variable political stability (EP_{it}) was statistically significant and hurt all countries, indicating that a 1% increase in the political stability indicator generates a decrease of 0.017% in credit granted by banks to the private sector. The results were not statistically significant for the group of developing and developed countries; however, they had a negative impact.

The variable Government Effectiveness (EG_{it}) was statistically significant in the model estimated for all countries and the sample of developing countries. Thus, the 1% increase in the degree of government effectiveness causes a 0.054% increase in the granting of credit by banks to the private sector in the model for the entire set of countries. In contrast, in the model for developing countries, the impact is 0.31%. For the group of developed countries, the estimates were not significant. The positive impact is because the more solid and well-defined the institutions are, the lower the political risk, the better the quality of the data, and the greater the ability to pay in developed countries. These factors generate a stable, reliable environment with less uncertainty for banks and investors, increasing confidence in credit granting (Beck, 2012; Klapper, Laeven, & Rajan, 2006).

The variable regulatory quality (QR_{it}) showed a positive sign and was statistically significant for the total set of countries, so the 1% increase in regulatory quality causes an increase of 0.07% in the credit granted by banks to the private sector. For the model for developing countries, the coefficient of this variable also showed a positive sign. It was statistically significant, indicating that the 1% increase in regulatory quality causes a 0.66% increase in credit granted by banks to the private sector. This coefficient, although not statistically significant for developed countries, showed a positive impact.

The positive impact of regulatory quality on credit granting between developed and developing countries can be justified due to the robustness of regulatory institutions and the business environment. A higher regulatory quality strengthens bank confidence, promoting

Variables	GMM (two-step system) all countries	GMM (two-step system) developed countries	GMM (two-step system) developing countries
FD_{it-1}	0.46109*** (0.15359)	0.50496*** (0.05498)	2.79394* (1.49474)
VR_{it}	0.01600 (0.01064)	-0.00271 (0.00907)	-0.38491 (0.20547)
EP_{it}	-0.01691* (0.00875)	-0.00583 (0.00817)	-0.08204 (0.06369)
EG_{it}	0.05392** (0.02027)	0.02232 (0.03025)	0.31248* (0.17345)
QR_{it}	0.07012* (0.01941)	0.00654 (0.02679)	0.66306* (0.35522)
$CCor_{it}$	0.00976 (0.01811)	0.00912 (0.02138)	-0.662137* (0.40607)
$RLei_{it}$	0.05191** (0.02628)	0.00141 (0.02885)	0.06368 (0.06992)
$LEco_{it}$	-0.64085 (0.62461)	-1.64706 (1.75782)	9.90022 (6.64454)
POP_{it}	0.21087* (0.18958)	0.15352* (0.09604)	0.86467* (0.51111)
$Pou\phi_{it}$	-0.07964** (0.04148)	-0.02971* (0.01692)	-1.70526* (0.98348)
GDP_{it}	0.03678* (0.07482)	0.02116 (0.02666)	1.35241* (0.82092)
FDI_{it}	0.026953 (0.16569)	-0.02350 (0.06366)	3.13714 (1.66128)
Const.	-16.25145 (1.62246)	16.90367** (1.98745)	9.97017 (2.74611)
N. Obs.	370	175	195
AR1	-7.69 (0.000)	-4.39 (0.000)	-0.73 (0.000)
AR2	0.10 (0.921)	0.87 (0.384)	-0.65 (0.513)
Sargan	43.53 (0.182)	188.33 (0.161)	42.31 (0.217)

Note(s): The values in parentheses are the results of standard errors, and * is the significance level of the variable being 10: *, 5: **, 1%: ***. In the section referring to tests, the values in parentheses are the *p*-values of the calculated statistics

Source(s): Prepared by the authors, 2023

Table 3.
Results of the system
GMM for developed
and developing
countries around the
world – dependent
variable (FD_{it})

positive lending. However, when regulatory quality is poor, legal uncertainty and a lack of confidence result, leading to a negative impact on the granting of credit by banks. This highlights the importance of a stable and effective regulatory environment for the financial sector and economic development (Klapper *et al.*, 2006; Chen, Li, Liu, & Zhou, 2021).

The coefficient of the corruption control variable ($CCor_{it}$) showed a negative sign and was statistically significant for the model composed of the group of developing countries, such that the 1% increase in corruption control causes a decrease of 0.66% in the credit granted by banks to the private sector. This variable was not statistically significant for developed countries, but it was positive.

Notably, this corruption control indicator has values ranging from -2.5 to 2.5; thus, positive indicators show that anticorruption laws are more effective, while negative indicators indicate that anticorruption laws are less effective and, therefore, open the door to increased corruption. Most of the countries that make up the sample have a historical series with negative indicators, which may explain the negative sign of the corruption control

coefficient (Kaufmann, Kraay, & Mastruzzi, 2011). For Acemoglu, Johnson, and Robinson (2001), structural changes in the world and governments may not ensure the effectiveness of control; the greater the number of such changes is, the greater the degree to which corruption is, and the greater the extent to which the application of such measures ends up reducing the supply of financing.

Corruption breeds uncertainty and a lack of business confidence, discouraging banks from providing credit. This is because corruption increases credit risk by directing loans to less viable projects or companies, which results in a greater likelihood of default. In addition, corruption distorts the regulatory and legal environment and undermines the effective enforcement of laws and regulations. This leads to a lack of protection of property rights, making contracts less secure and increasing the risk for creditors. Systemic corruption makes it difficult for banks to enforce the terms of contracts or recover their investments. Finally, corruption undermines economic efficiency and resource allocation, diverting financial resources to lower-productivity projects to benefit companies or individuals with political connections. This limits and hinders access to credit for innovative companies, entrepreneurs, and productive sectors, slowing economic development (Pellegrini & Gerlagh, 2004; Fernández-Torres, Gutiérrez-Fernández, & Ramajo-Hernández, 2018).

The population variable (POP_{it}) had a positive correlation and was statistically significant for all the sets used. For the sample composed of all countries, a 1% increase in the country's population caused a 0.21% increase in credit granted by banks to the private sector; for developed countries, this increase represented 0.15%. Finally, for the group of developing countries, this variable represented an increase of 0.86%. As previously stated, a larger population indicates a broader consumer market, which increases business and investment opportunities. In addition, there is a more excellent supply of skilled labor and more significant economic diversity.

The coefficient of the saving variable ($Poup_{it}$) was negative and statistically significant for all the samples used. For the group of countries, a 1% increase in the country's savings caused a decrease of 0.079% in the credit granted by banks to the private sector; for developed countries, this reduction represented 0.029%. For the group of developing countries, this reduction was 1.70%. In countries with more mature and developed financial systems, savings can be directed to investments in government bonds or other low-risk investments, reducing the availability of resources for private loans (Carletti & Leonello, 2019; Arellano, Bai, & Zhang, 2012).

The variable GDP (GDP_{it}) showed a positive sign and was statistically significant for the samples composed of the total set of countries and for the sample composed of developing countries. For the first sample, the 1% increase in the country's GDP caused a 0.036% increase in credit granted by banks to the private sector. In the second sample, this increase represented 1.35%. For the group of developed countries, this variable was not significant. Notably, in countries with higher GDPs, there is greater payment capacity and more excellent economic stability, increasing banks' confidence in the ability of borrowers to meet their obligations (Didier, 2021).

Therefore, the model estimates showed that institutional-related variables have more influence in developing countries than in developed countries. According to Sahay *et al.* (2015), financial development increases resilience. It boosts economic growth, especially in emerging and developing economies, by mobilizing savings, promoting information sharing, efficient resource allocation, and easing diversification and risk management. Thus, developing countries with weaker and less effective institutions can generate uncertainty and need more confidence in business, directly affecting credit granting. Given this, the importance of strengthening institutions in these countries to improve access to credit and boost economic growth and development is highlighted, generating more robust and more developed institutions that enable security in credit negotiations. Finally, by analyzing how institutions

affect the efficiency and stability of financial systems, this study provides relevant information for improving public policies, identifying specific obstacles faced by different types of economies, and promoting a sounder and more efficient financial environment.

5. Conclusion

This study examined the role of institutional quality in financial development in both developed and developing economies. To do this, data from a dynamic panel analysis were used for a sample of 131 countries worldwide; these data were first applied to the combined sample and a set of developed and developing countries separately. The analysis showed that in developing economies, the variables of institutions used exert more significant influence on the granting of credit by banks to the private sector and the financial development of these countries. These results agree with the related academic literature.

However, in developed economies, the lack of significance of these variables can be explained by the fact that in advanced economies, where institutions are more robust, variations in institutional quality may have a less pronounced impact. In addition, in developed economies, institutions may be more resilient to change, and other factors, such as technological innovation and human capital, may have greater relevance in explaining growth disparities.

The findings of this research suggest that governments in developing countries, as well as credit regulators, adopt better-defined, concrete, and transparent governance structures since the impact of these variables in these countries is significant. In this way, good governance and the definition of quality institutions are fundamental for the financial development of these countries, leading to economic growth and development and improving the quality of life of local populations.

The limitations of this research include the availability of data for all countries in the world, which would make the research broader and more complete. Future studies could deepen the understanding of the causal link between economic growth and financial development, including variables of inequality and income, to better capture the effects of corruption or to conduct separate analyses of emerging and developing countries.

Note

1. An example of how institutional quality and financial development can work together to improve economic performance is the USA. The USA has become an economy of incredible institutional and financial strength. The extensive regulatory framework in this country has allowed for large and complex operations in the financial market, which provides the necessary security for the efficient functioning of the markets. In addition, the elevated levels of trust among participants and their trusted legal system have enabled the rapid development of the financial sector. The USA also keeps a resilient financial system, which puts it in a unique position to respond to severe global financial shocks (Acemoglu & Robinson, 2013; Piketty, 2014).

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Appendix

Unit root tests conducted

Variable	Levin, Lin, and Chu (LLC) test		Harris-Tzavalis test (HT)	
	Statistic	<i>p</i> -value	Statistic	<i>p</i> -value
FD_{it}	−17.7524	0.0000	0.3961	0.0000
VR_{it}	−6.8504	0.0000	0.3693	0.0000
EP_{it}	−1.9e+03	0.8856	0.4875	0.0000
EG_{it}	−24.4210	1.0000	0.2801	0.0000
QR_{it}	−6.2212	0.0000	0.3529	0.0000
$CCor_{it}$	−21.3704	1.0000	0.2875	0.0000
RLe_{it}	−20.4355	1.0000	0.3070	0.0000
$LEco_{it}$	−11.0158	0.0000	0.7620	0.0000
POP_{it}	−9.0604	0.0000	0.9853	1.0000
$Poup_{it}$	−1.6283	0.0517	0.8869	0.9892
GDP_{it}	−3.7221	0.0001	0.1928	0.0000
FDI_{it}	−6.5220	0.0000	0.3445	0.0000

Note(s): In both tests, the hypotheses are: H_0 = the time series has a unit root, H_0 = the time series does not have a unit root

Source(s): Prepared by the authors, 2023

Table A1.
Unit root test with
variables in level

Table A2.
Unit root test with
variables after
logarithmic
transformation

Variable	Levin, Lin and Chu (LLC) test		Harris-Tzavalis (HT) test	
	Statistic	p-value	Statistic	p-value
<i>FD_{it}</i>	−12.2223	0.0000	0.4165	0.0000
<i>VR_{it}</i>	−3.63268	0.0000	0.2651	0.0000
<i>EP_{it}</i>	−1.5e+07	0.0000	0.1965	0.0000
<i>EG_{it}</i>	−7.8e+02	0.0523	0.2997	0.0000
<i>QR_{it}</i>	−97.3078	0.0000	0.3386	0.0000
<i>CCor_{it}</i>	−15.9976	0.0015	0.1682	0.0000
<i>RLe_{it}</i>	−6.9e+06	0.0000	0.1840	0.0000
<i>LEco_{it}</i>	−50.3290	0.0000	0.3353	0.0000
<i>POP_{it}</i>	−22.2865	0.0000	0.9771	0.0000
<i>Poup_{it}</i>	−1.2e+02	0.0000	0.1739	0.0000
<i>GDP_{it}</i>	−91.5620	0.0000	0.0176	0.0000
<i>FDI_{it}</i>	−8.1089	0.0000	0.1763	0.0000

Note(s): In both tests, the hypotheses are: H_0 = the time series has a unit root, H_0 = the time series does not have a unit root

Source(s): Prepared by the authors, 2023

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