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Corporate governance, financial markets, and economic growth: Does corporate governance moderate the finance-growth nexus?

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Abstract

This paper examines whether corporate governance plays a moderating role in the impact of financial development on economic growth. The dataset consists of 39 advanced and developing countries for the 2006–2020 period. The empirical results show that the credit-to-GDP ratio is negatively associated with economic growth, and this finding is consistent with the literature, showing the relevance of "too much finance". The main findings indicate that the negative growth impact of credits is attenuated by corporate governance as measured by minority investor protection and disclosure extent. This moderating effect is economically significant and holds for different country groups and horizons. Hence, the paper argues that corporate governance measures the quality of financial markets, while the credit ratio measures its quantitative dimension. Therefore, it shows that both quality and quantity dimensions need to be taken into account to understand the finance-growth nexus properly.

Keywords

- corporate governance
- financial markets
- economic growth
- credits
- finance-growth nexus

JEL codes: E44, F43, G30

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Introduction

The relationship between finance and economic growth is examined extensively in the literature, with mixed evidence on the impact of financial markets on economic growth (Arcand et al., 2015; Jayaratne & Strahan, 1989; Law & Singh, 2014; Levine, 2005; Mian et al., 2017; Rousseau & Wachtel, 2011). Given the evolution of the literature on this finance-growth nexus, or more narrowly, the credit-growth nexus, it can be argued that the relationship between financial markets and economic growth can be conditional on relevant developments and factors. For example, the strong growth in credit markets over a short period can be difficult for an economy to absorb, thereby leading to a higher likelihood of asset price booms and credit market crunches (Jordà et al., 2013). Similarly, strong capital inflows to open economies can result in the over-appreciation of the domestic currency and a worsening of the current account balance, along with the risks of an economic crisis in subsequent periods (Calderon & Kubota, 2012). Hence, it is important to control for the underlying dynamics and possible moderating factors in the finance-growth nexus.

The growth-finance literature mostly focuses on the quantitative dimensions of financial development, such as banking sector assets, credits to the private sector, and stock market capitalisation. However, this perspective neglects the qualitative dimensions of financial development, such as efficiency, investor protection, disclosure standards, and corporate governance. These qualitative factors can prove significant in terms of limiting information problems and decreasing risk premia associated with external financing (Akhtar, 2022). Regarding the possible effects of qualitative factors, Rajan and Zingales (1998, p. 562) state the following: "Financial development, in the form of better accounting and disclosure rules, and better corporate governance through institutions, will reduce the wedge between the cost of internal and external funds and enhance growth". Hence, the authors emphasize the role of corporate governance and disclosure standards in strengthening the positive growth effects of financial development. More recent literature looks at the quality dimension of financial development, whereas studies on the moderating role of corporate governance are relatively scarce. For example, Demetriades and Rewilak (2020) adjust the quality of financial development by incorporating information on non-performing loans, liquidity conditions, and z-scores. Then, the quality-adjusted financial development is shown to support economic growth, in contrast to the negative effects of the quantitative measure of banking credits.

De Nicolo et al. (2008) look at corporate governance quality in terms of accounting standards, earnings smoothing, and stock price synchronicity, and document the positive growth effects of this indicator for 41 advanced and developing countries over the 1994–2003 period. It is also documented that

this positive growth effect becomes stronger with higher financial development levels. Similarly, Fulghieri and Suominen (2012) note that better corporate governance standards can support growth, especially in sectors with more dependence on external finance. The authors consider the protection of investor rights to be an important indicator of corporate governance quality. Claessens and Yurtoglu (2012) provide a review of the relationship between corporate governance and economic development and argue that corporate governance can improve access to finance and decrease the likelihood of financial crises, thereby supporting economic development. Overall, these papers discuss the relationships between growth, financial development, and corporate governance, but they do not sufficiently examine the possible moderating role of corporate governance on the finance-growth nexus.

The present study contributes to the relevant literature by conducting a detailed examination of this moderating role for a large sample of advanced and developing countries in the 2006–2020 period. Specifically, it shows that the "too-much finance" hypothesis holds for the collected sample. However, a higher quality of corporate governance standards (as measured by the protection of minority rights and disclosure quality) alleviates this negative effect to some extent. Hence, the paper documents that the quality of financial development in terms of corporate governance standards matters for the finance-growth nexus.

The rest of the paper proceeds as follows: Section 1 provides an overview of prior studies on the topic. Then, Section 2 introduces the dataset, while Section 3 introduces the empirical methodology. Section 4 presents the empirical results, and Section 5 offers various robustness analyses. The last Section concludes the paper.

1. Literature review and hypotheses development

The quantitative dimension of the finance-growth nexus is widely examined in the literature both in terms of theoretical mechanisms and empirical evidence (Greenwood & Scharfstein, 2013; Levine, 2005). In contrast, the qualitative dimension or moderating factors are examined less extensively (Demetriades & Rewilak, 2020). This section provides an overview of prior studies and identifies research gaps that the current paper aims to contribute to. It also discusses possible mechanisms and offers a conceptual framework for the research hypothesis concerning the moderating role of corporate governance in the finance-growth nexus.

The research topic builds on the existing literature on the nexus between financial development (specifically banking credits) and economic growth. This

relationship, which is also called the finance-growth nexus, is widely examined in the literature (Breitenlechner et al., 2015; Jayaratne & Strahan, 1996; Yilmazkuday, 2011). The majority of these studies focus on the quantitative measures of financial development (generally measured by the size of banking credits or stock markets), whereas the quality of finance is not sufficiently explored in the literature (Demetriades & Rewilak, 2020). In the finance-growth literature, early studies generally find positive growth effects of financial development, including banking credits and stock market capitalisation (Levine, 2005; Levine & Zervos, 1998). However, more recent studies, conducted after the global financial crisis, started to document weak or negative effects of credits on economic growth (Arcand et al., 2015; Law & Singh, 2014). These studies generally find a threshold value of banking credits to GDP. The growth effects are negative until this value and turn negative after this threshold. This relationship is called the "too-much finance" hypothesis. In a related study, Claessens and Yurtoglu (2012) estimate that the average growth rates of countries decline after a 100% bank credit-to-GDP ratio. The relevant literature presents various mechanisms for these negative effects of credit growth. For example, strong credit growth can benefit less productive sectors due to collateral difficulties in more innovative sectors (Cecchetti & Kharroubi, 2019) or can increase demand beyond supply, thereby creating asset price bubbles or external imbalances (Mian et al., 2017). In a detailed sector-level empirical study of developing countries in Asia and Latin America, Aizenman et al. (2015, p.16) document the presence of a financial "Dutch disease", i.e. "booming financial service flows reduce the supply of long-term funding to manufacturing and other sectors that rely on stable external finance". This paper argues that controlling the quality of financial development is crucial to identifying the specific effects of different financing dimensions. These authors mention various factors (such as spreads, the ease of access to credit, and creditor rights) that can measure the quality of financial development.

The literature examining the finance-growth nexus and testing the "too--much finance" hypothesis is actively expanding. In a recent study, Demetriades and Rewilak (2020) show that the standard empirical models using banking credits obtain a negative coefficient for their growth effects. However, when the authors control the quality of banking credits using *z*-scores, liquidity conditions, and non-performing loans, they recover the positive growth effects of credits. In contrast to this positive effect, Haini et al. (2023) and Boďa (2024) utilise more comprehensive datasets and show that finance can be a growth-decreasing event after controlling for quality and institutional factors. Iwasaki and Kočenda (2024) conducted a detailed meta-analysis of more than one hundred papers and found a positive but declining effect of financial development on economic growth. Hence, it can be argued that the existing evidence of the "too-much finance" hypothesis is still mixed, and that there is a need for further studies to examine different dimensions of the fi-

nance-growth nexus in more detail. Our paper contributes to this extant literature by investigating the possible moderating roles of corporate governance in the finance-growth relationship.

Regarding how the quality of finance affects economic growth, Jayaratne and Strahan (1996) examine the impact of financial development by focusing on the effect of bank branch deregulation in the US. It is found that it is the quality of finance in terms of banking efficiency, not necessarily the level of bank credits, that affects per capita income growth. Specifically, deregulation leads to the exit of less-efficient banks and facilitates economies of scale in information and operations. In this way, the quality of banking improves, along with positive effects on economic growth. In another study, Rajan and Zingales (1998) show that the positive impacts of financial development are more relevant for the sectors dependent on external finance. Hence, these studies document how the impact of financial development can be mediated by different factors, and it might be necessary to control for these factors in order to develop a more reliable and comprehensive understanding of the finance-growth nexus.

The role of corporate governance in the aggregate financial markets and the global financial crisis is also examined extensively in the literature (Conyon et al., 2011). Failures and weaknesses in corporate governance, such as excessive risk-taking by financial institutions, limited safeguards on the boards against risky strategies, ill-incentivised remuneration systems, and disclosure problems, all played crucial roles in the credit boom-bust cycles around the global financial crisis (Kirkpatrick, 2009; Wiggins et al., 2019). Given these important effects of corporate governance on financial institutions and markets, it can be argued that the quality of corporate governance would also matter for the impact of financial markets on economic growth. Higher-quality corporate governance standards and practices in an economy would increase the efficiency of financial markets and decrease the risks of financial volatilities and crises. In return, corporate governance would strengthen the positive growth effects of financial markets.

De Nicolo et al. (2008) examine the real effects of corporate governance quality for a large sample of 41 advanced and developing countries over the 1994–2003 period. Given the lack of comparable cross-country indicators of corporate governance, these authors develop a new measure based on accounting standards, earnings-smoothing practices, and stock price synchronicity. They note that countries with better corporate governance quality would follow international accounting standards in terms of disclosing crucial information in standard ways, would have lower incidences of earnings management, and would experience lower levels of stock market synchronicity. Thus, De Nicolo et al. (2008) combine these three indicators to obtain a quality measure and use it in empirical analyses. Their results indicate that corporate governance quality has a positive impact on growth and productivity, while most

of this effect comes from the synchronicity dimension. The authors also show that the quality indicator positively interacts with the financial development measures (estimated as the sum of banking credits and stock market capitalisation as a ratio to GDP). Fulghieri and Suominen (2012) study a theoretical model and show that better corporate governance can increase competition and decrease inside ownership. In addition, it can lead to lower risks of excessive leverage. The model also implies that financial development driven by equity market liberalisation can interact positively with corporate governance to support growth and productivity. Hence, these two papers provide empirical evidence and theoretical models for the positive interaction between financial development and corporate governance. However, these papers fail to go into the details of this interaction using comprehensive empirical analyses.

Claessens and Yurtoglu (2012) provide a very detailed review of the possible relationships between corporate governance, finance, and economic growth. The authors document a non-linear relationship between banking credits and economic growth. Specifically, the average growth rates increase for the ratio of private credits to GDP up to 100%, whereas they start to decline after this threshold. This non-linear finding is consistent with the "too--much finance" hypothesis examined in the literature (Arcand et al., 2015; Law & Singh, 2014). Then, the literature also examines the legal foundations of financial markets and investigates the role of corporate governance in this context. In seminal papers, La Porta et al. (1997, 1998) show that legal development and contract enforcement are crucial for financial and economic development. Similarly, Djankov et al. (2008) document the relevance of the protection of minority rights in financial development. Based on these studies and the relevant literature, Claessens and Yurtoglu (2012) argue that there can be different mechanisms through which corporate governance interacts with finance and growth. In particular, good corporate governance can increase access to credit and lower the cost of external finance. In this way, it allows for better allocation of resources, thereby supporting growth. In addition, good governance can decrease the risks of inefficient credit cycles and financial crises. Hence, these papers document how good corporate governance can bolster the positive effects of finance on economic growth.

From a theoretical perspective, good corporate governance can alleviate information problems between borrowers and lenders, thereby improving the efficiency of financial development (including risk-sharing capacity) and supporting economic growth (Castro et al., 2004). It particularly reduces the extent and intensity of agency problems and decreases the costs of both equity and debt financing. In addition, it reduces the transaction costs in screening and monitoring borrowers. Given the improvements in information asymmetries and agency problems, good corporate governance can also limit excessive risk-taking and ensure that borrowers follow more sound financial risk management practices. In return, these factors lead to a more efficient

allocation of financial resources in the economy, thereby fostering financial stability and avoiding inefficient financial cycles (Claessens & Yurtoglu, 2012).

The above theoretical and empirical discussions provide a useful conceptual framework to understand the possible moderating roles of corporate governance in the finance-growth nexus. It can be argued that the finance-growth link can be weak in economies with poor corporate governance. In these economies, there can be a misallocation of credit and excessive risk-taking, which can create financial volatility and crises. In addition, limited protection of minority rights can restrict financial development and limit its growth effects. In contrast, economies with good corporate governance display a better allocation of credit and prudent risk-taking. Hence, corporate governance can support economic growth. Therefore, it can be argued that corporate governance can moderate the finance-growth relationship in significant ways. The review of the relevant literature reveals how the leading mechanisms in this moderation are the lower levels of information asymmetries and monitoring/transaction costs, prudent risk management, and financial stability.

Overall, the above discussions show that the moderating role of corporate governance in the finance-growth nexus has not received sufficient attention in the literature, and the present paper aims to investigate the relevant channel empirically using a large dataset of advanced and developing countries. Based on the above examination of the relevant literature, the paper postulates the following research hypothesis:

Hypothesis: The quality of corporate governance positively moderates the effects of bank credits on economic growth.

2. Data

The data are collected from two datasets from the World Bank (2022). The first source is the Doing Business dataset, which provides information on various business-enabling factors in different countries. The dataset also includes corporate governance indicators such as the protection of minority investors and the extent of disclosure. These indicators are available annually, starting from the mid–2000s. Two particular corporate governance variables are selected for the empirical analysis. The first is a broad indicator called “Protecting minority investors” (PMI), which is a composite measure. It includes information on the ease of shareholder suits, conflict of interest regulation, corporate transparency, the extent of director liability, the scope of ownership and control, and the extent of shareholder governance. The Doing Business database scores countries relative to the best regulatory prac-

tice in these dimensions. The protection of investor rights is considered to be an important quality dimension of financial institutions and development in the literature (Aizenman et al., 2015; Djankov et al., 2008). These studies note that investor rights are crucial for addressing information asymmetries and agency problems. Hence, they can affect both access to financing and the costs of external funds, thereby becoming an important quality measure of financial development.

The second corporate governance measure is a more specific indicator called the "Extent of disclosure", which provides information on the approval and disclosure requirements of related-party transactions. Disclosure and report readability are also expected to alleviate information asymmetry and incomplete information issues in financial markets, thereby improving economic efficiency (Jiao, 2011; Leuz & Wysocki, 2016). Key studies, such as Djankov et al. (2008), also develop their measures of disclosure and show their importance in explaining financial market depth and access. The seminal paper by Rajan and Zingales (1998) also considers better disclosure standards to be one of the defining features of financial institution quality. Hence, these two corporate governance indicators (i.e. the protection of investor rights and disclosure standards) are expected to provide information about the quality of financial markets in different countries. Therefore, these two variables are utilized as the moderating factor for the relationship between credits and economic growth. Then, these dependent and independent variables, along with some control variables, are collected from the World Development Indicators database of the World Bank (2022). The sample is restricted to the period from 2006 to 2020, as the World Bank produces these variables only for this sample period. The dataset is not updated after 2020.

The qualitative dimension of financial development is more difficult to capture than the quantitative dimension. The size of different financial markets, such as the banking sector and stock markets, can be used as widely available and comparable indicators of financial development on the quantity dimension. However, developing comparable indicators concerning the quality of corporate governance across countries, such as disclosures and investor rights, can be more challenging due to different legal systems, distinct institutions, and differences between de jure standards and de facto implementations. Rogge and Archer (2021) criticize the World Bank's Ease of Doing Business (EDB) index for its equal weighting approach across different countries and for not sufficiently considering the heterogeneities across economies. The World Bank (2022) also acknowledged various issues in its collection and generation of this dataset and published a corrected version covering the 2006–2020 period. We use the final corrected dataset in our analysis. The literature also develops its own indicators, such as the corporate governance quality indicator of De Nicolo et al. (2008) and the investor protection indicator of Djankov et al. (2008), although these indicators are not updated regularly to provide

panel information on more recent years. It is therefore important to consider these limitations in appropriately measuring the quality of corporate governance when interpreting the empirical results.

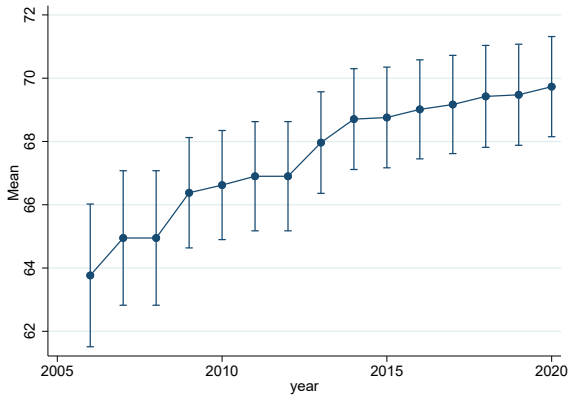

Figure 1. Protecting minority investor scores

Note: Bars show one standard deviation band around the mean values.

Source: World Bank (2022) and own elaboration.

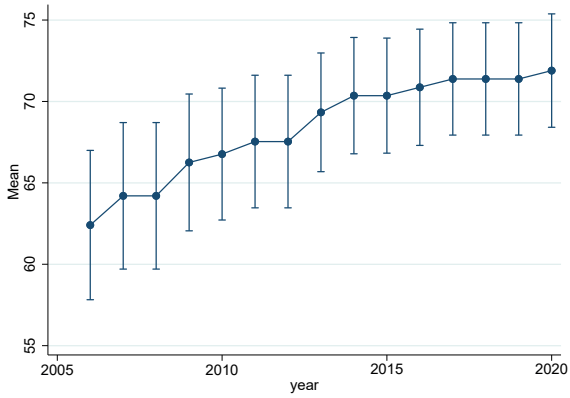

Figure 2. Extent of disclosure scores

Note: Bars show one standard deviation band around the mean values.

Source: World Bank (2022) and own elaboration.

The main independent variables "protecting minority investors (PMI)" and "extent of closure" are presented in Figure 1 and Figure 2, respectively. The graphs show the mean values and standard deviation bands over the sample period. It is visible that both indicators displayed upward trends between 2006 and 2020. The mean value of PMI increased from 64 in 2006 to close to 70 in 2020, while the mean value of EoD increased from around 63 in 2006 to 72 in 2020. In addition, the standard deviation bands around the mean values

also show that there are important cross-country variations in the relevant corporate governance scores.

The dependent variable is the GDP growth rate, while the independent variable is the bank credits to the non-financial private sector as a ratio to GDP. The selection of these variables is in line with relevant studies in the literature, such as Arcand et al. (2015) and Mian et al. (2017). The control variables are investments, savings, trade (the sum of export and import flows), and foreign direct investments (FDI), with all variables measured as ratios to GDP. Finally, based on the data availability issues from these two datasets, the sample of 39 advanced and developing countries is as follows: Albania, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Croatia, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Thailand, Türkiye, the United Kingdom, and the United States. Table 1 presents the summary statistics of the dataset.

Table 1. Summary statistics (39 countries, 2006–2020 period)

Variable	Observations	Mean	Standard deviation	Min	Max
ΔGDP (%)	520	2.217	3.115	–10.149	25.176
Δ3GDP (%)	444	4.933	6.647	–23.683	33.166
Credit/GDP (%)	520	96.719	44.725	19.196	206.671
Δ3(Credit/GDP (%))	403	–0.24	13.376	–58.491	38.235
PMI	520	67.125	10.031	36.023	88
Extent of disclosure	520	67.646	24	10	100
Investments/GDP (%)	520	23.231	4.253	11.902	46.018
Savings/GDP (%)	520	23.834	7.152	4.66	50.592
Trade (Exports + Imports)/GDP (%)	520	96.973	62.057	22.106	437.327
FDI/GDP (%)	520	4.967	10.091	–40.33	86.589

Source: (World Bank, 2022).

The two corporate governance indicators of PMI and the extent of the disclosure are constructed as scores ranging from 0 to 100, with higher values showing better standards and practices. Table 1 shows that the PMI ranged between 36 and 88, with an average of 67 and a standard deviation of 10. For the disclosure variable, the mean is 68, with a standard deviation of 24. The variable had a larger range, with a minimum value of 10 and a maximum value of 100. Overall, these variables display variations that would be useful for documenting the role of corporate governance in the credit-growth nexus.

Figure 3 presents a histogram of PMI, while Figure 4 presents its scatter plot with the credit variable for the full sample. Figure 2 shows that the majority of observations for PMI are distributed between 50 and 80, while the distribution is heavily tailed on both sides. Then, it is seen from Figure 4 that corporate governance and financial development are closely related, as higher PMI levels are associated with higher credit ratios. As shown in Figures 3 and 4, the PMI observations below the value of 50 are relatively scarce. If this low segment of the variable is omitted, the positive association between PMI and credits becomes stronger.

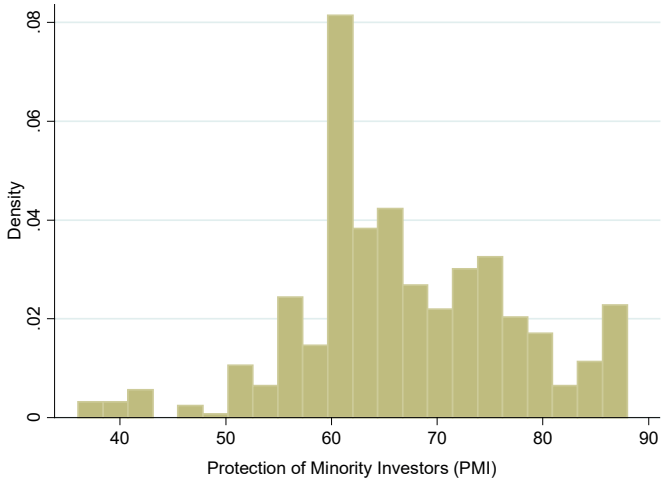

Figure 3. Histogram of PMI

Source: World Bank (2022) and own elaboration.

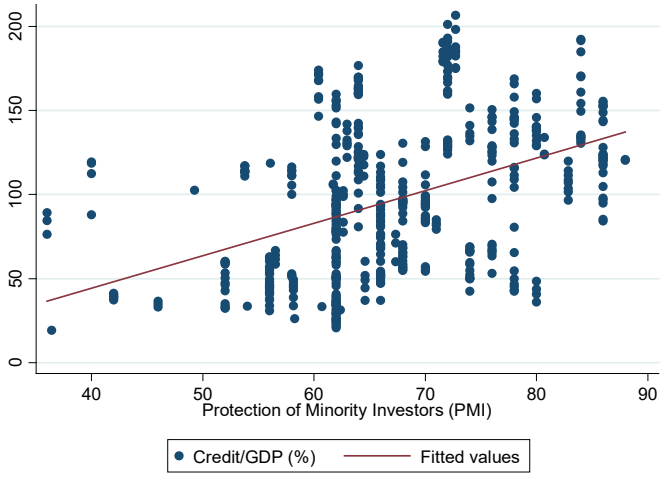

Figure 4. PMI and bank credits scatterplot

Source: World Bank (2022) and own elaboration.

3. Methodology

The longitudinal data nature of the dataset is utilised in the empirical analysis. The benchmark specification is as follows:

$$GDP\ Growth_{it} = \alpha_i + \beta_1 Credit/GDP_{it} + \beta_2\ Corporate\ Governance_{it} + \\ + \beta_3\ Credit/GDP_{it} \cdot Corporate\ Governance_{it} + \gamma\ Control\ Variables_{it} + \\ + \lambda_i + \mu_t + u_{it} \quad (1)$$

The dependent variable is the annual real GDP growth rate, while the main independent variable is the credit-to-GDP ratio. In order to measure the moderating role of corporate governance, an interaction term between the credit variable and the corporate governance indicators is also added. In line with Brambor et al. (2006), the regression model also includes the corporate governance indicator as a control variable. Studies such as Law and Singh (2014) and Mian et al. (2017) find the impact of credit to be negative, i.e. $\beta_1 < 0$. Then, the present paper argues that this negative effect would be attenuated by the quality of corporate governance. Thus, it is hypothesised that $\beta_3 > 0$. Equation (1) is estimated using the fixed-effects panel estimation in order to control for the invariant country characteristics in the sample. The equation includes country-fixed effects λ_i to control for time-invariant factors at the country level. The regression model also includes time-fixed effects μ_t in some specifications to control for global factors (such as the global financial crisis) that can affect all countries over time. Finally, u_{it} refers to the error term at the country-year level in the regression model. While this equation is expected to produce initial insights into the moderating role of corporate governance, the contemporaneous nature of the equation restricts the analysis. Given that the credit-growth nexus can be more dynamic and as a strategy to address endogeneity issues, to some extent, the present paper also follows the empirical specification of Mian et al. (2017):

$$\Delta_3 Y_{it+k} = \alpha_i + \beta_1 \Delta_3 (Credit/GDP_{it-1}) + \beta_2\ Corporate\ Governance_{it} + \\ + \beta_3 \Delta_3 (Credit/GDP_{it}) \cdot Corporate\ Governance_{it} + \gamma\ Control\ Variables_{it} + \\ + \lambda_i + \mu_t + u_{it+k} \quad (2)$$

Equation (2) presents a dynamic relationship between credits and economic growth. The dependent variable $\Delta_3 Y_{it+k}$ is the three-year logarithmic change in the real GDP level in period $t + k$, where k ranges from –1 to 5. Varying parameter k allows both short-run and medium-run relationships to be studied, as in Mian et al. (2017). The independent variables $\Delta_3\ Credit/GDP_{it}$ and $\Delta_3\ Credit/GDP_{it} \cdot PMI_{it}$ are the three-year changes in the private credit to GDP ratio in period t and its interaction with the corporate governance indicators, respectively. Consistent with Mian et al. (2017), this equation esti-

mates the short-run and medium-run relationship between credits and economic growth. When $k = 3$, the equation shows the impact of the credit ratio change in the last three years on the output change in the next three years. Hence, this equation looks at the credit-growth nexus over the short-term and medium-term business cycles. Both equations are also estimated using random-effects methods, and the results are compared using the Hausman test, which favours fixed-effect estimations.

4. Results

The fixed-effects regression results for equation (1) and the corporate governance indicator of PMI are presented in Table 2. The first column includes credit as the only independent variable of interest, while the second column adds PMI and its interaction with credits to see how the corporate governance variable affects the benchmark credit-growth regression. It is seen that the four control variables: investments, savings, trade, and FDI are positively associated with economic growth. The impact of credit on GDP growth is estimated to be negative. This finding is consistent with the literature on too much finance (Law and Singh, 2014; Arcand et al., 2015) or the negative effects of credits (Mian et al., 2017).

The main result is presented in column 2 of Table 2, which includes both credit variables for the full sample. It is seen that the control variables retain their positive and statistically significant effects on growth. In addition, the credit variable has a negative and statistically significant coefficient. This column shows that the interaction term between credits and the corporate governance indicator of PMI is positive and statistically significant at the 1% level. Hence, it implies that the negative effect of credits is attenuated, to some extent, by corporate governance. The last two columns show that the moderating effects hold for both advanced and developing countries. The comparison of these columns indicates that the negative growth impact of credits is stronger in developing countries. The attenuating impact of corporate governance is also enhanced in these countries.

The results presented in Table 2 can be interpreted as supporting the claim that corporate governance improves the efficiency and benefits of financial markets or limits their risks and volatilities. As another interpretation, it can be argued that the credit-to-GDP ratio measures the quantitative dimension or the size of financial development, while corporate governance provides information on the qualitative dimension or the quality of financial development. It therefore appears to be necessary to capture both dimensions in the empirical analysis.

Table 2. Fixed-effects regression results on the modifying effect of PMI

Dependent variable	Full sample	Full sample	Advanced countries	Developing countries
Investment	0.239***	0.274***	0.158***	0.470***
	(0.0392)	(0.0399)	(0.0527)	(0.0744)
Savings	0.243***	0.211***	0.365***	0.0287
	(0.0530)	(0.0523)	(0.0721)	(0.0900)
Trade	0.0238**	0.0368***	0.0343***	0.0689***
	(0.0111)	(0.0115)	(0.0129)	(0.0246)
FDI	0.0641***	0.0675***	0.0930***	–0.00925
	(0.0133)	(0.0131)	(0.0156)	(0.0236)
Credit	–0.0415***	–0.216***	–0.167***	–0.362***
	(0.00939)	(0.0430)	(0.0528)	(0.0822)
PMI		–0.140**	–0.130	–0.186*
		(0.0631)	(0.0851)	(0.0996)
Credit*PMI		0.00247***	0.00196***	0.00402***
		(0.000600)	(0.000735)	(0.00111)
Constant	–7.745***	0.798	–2.387	3.174
	(2.171)	(4.510)	(6.128)	(6.691)
Observations	520	520	345	175
R-squared	0.315	0.347	0.425	0.317
Number of id	39	39	26	13

Note: Fixed effects for countries. Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: own elaboration.

In order to verify the credit-growth nexus and the moderating role of corporate governance, Figure 5 estimates the predictive margins of credit on economic growth for three PMI values. The mean values of the independent variables are used to predict the output growth level within the range of credit ratios between 20% and 206%. Since the growth impact of credit depends on the level of corporate governance, this analysis is repeated for three different values of PMI, for the mean and for the mean ± two standard deviations.

It can be seen from Figure 5 that for PMI values at and below the mean, there is a negative association between credits and economic growth, whereas this negative association disappears in the case of higher PMI values (i.e. mean + two standard deviations). In the case of the mean PMI value, when

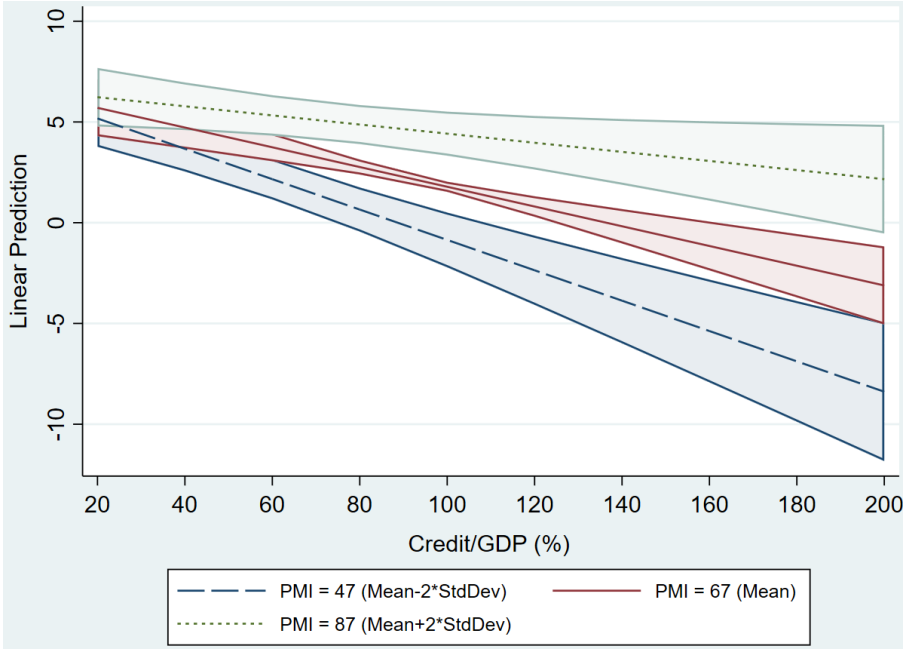

Figure 5. Predictive margins on the credit-growth nexus for different PMI values

Note: Shaded areas represent 95% confidence intervals.

Source: own elaboration.

the credit ratio moves from 20% to 200%, the average predicted growth declines from around +5% to around –5%. This negative association is stronger for a lower level of PMI. In this case, higher credit ratios are reflected in much lower predicted growth rates for the relevant countries. Specifically, when the credit ratio moves from 20% to 200%, the average predicted growth declines from above +5% to around –10%. However, when the corporate governance quality improves (i.e. PMI increases to 87, namely, mean + two standard deviations), the negative association between credits and economic growth disappears, as shown by the solid line in Figure 5. Hence, it is found that for countries with a higher quality of corporate governance, the "too-much finance" mechanism is not relevant. In general, the predictive margins document that the moderating impact of corporate governance is economically significant.

The analogous analysis is repeated for the second corporate governance indicator of the extent of disclosure in Table 3. The results are very similar in the sense that the credit variable has a negative influence on growth, whereas the modifying effect of corporate governance reduces this negative impact. Both advanced and developing countries have the same results, as shown in the last two columns of Table 3, while the relevant effects are again stronger in the case of developing countries. Overall, both Tables 2 and 3 provide sta-

Table 3. Fixed-effects regression results for the extent of disclosure

Dependent variable	Full sample	Advanced countries	Developing countries
Investment	0.287***	0.189***	0.433***
	(0.0404)	(0.0515)	(0.0782)
Savings	0.214***	0.347***	0.0455
	(0.0523)	(0.0706)	(0.0950)
Trade	0.0293**	0.0321**	0.0489**
	(0.0114)	(0.0126)	(0.0245)
FDI	0.0680***	0.0960***	–0.00432
	(0.0130)	(0.0155)	(0.0241)
Credit	–0.110***	–0.0953***	–0.223***
	(0.0250)	(0.0267)	(0.0709)
Disclosure	–0.0256	–0.0410	–0.0220
	(0.0360)	(0.0401)	(0.0753)
Credit*Disclosure	0.000895***	0.000883***	0.00196**
	(0.000310)	(0.000338)	(0.000842)
Constant	–6.470**	–8.343**	–6.122
	(3.256)	(3.558)	(6.965)
Observations	520	345	175
R-squared	0.350	0.437	0.283
Number of id	39	26	13

Note: Fixed effects for countries. Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: own elaboration.

tistically significant evidence of the moderating impact of corporate governance on the credit-growth nexus.

In order to control for dynamic effects, Table 4 presents the results of Equation (2). The results indicate that the credit ratio change in the last three years has negative growth effects in the same period and the following two years. Hence, the negative association between credits and economic growth spans both the short and medium term. As the main result, the moderating impact of the corporate governance indicator PMI is statistically significant and positive in the same periods. Very similar results are obtained when the other corporate governance indicator of disclosure is used in the estimations.

Table 4. Dynamic impact of credits on economic growth

Dependent variable	$\Delta_3 Y_{t-1}$	$\Delta_3 Y_t$	$\Delta_3 Y_{t+1}$	$\Delta_3 Y_{t+2}$	$\Delta_3 Y_{t+3}$	$\Delta_3 Y_{t+4}$	$\Delta_3 Y_{t+5}$
Investment	0.864***	0.957***	0.471***	–0.305**	–0.658***	–0.579***	–0.553***
	(0.135)	(0.105)	(0.118)	(0.141)	(0.148)	(0.145)	(0.171)
Savings	0.475***	0.428***	0.482***	0.732***	0.280*	–0.155	–0.625***
	(0.140)	(0.116)	(0.130)	(0.144)	(0.164)	(0.170)	(0.183)
Trade	0.0753**	0.0788***	0.102***	0.0580*	0.0802**	0.177***	0.204***
	(0.0349)	(0.0256)	(0.0287)	(0.0312)	(0.0336)	(0.0338)	(0.0390)
FDI	0.0229	0.0730***	0.0666**	0.102***	0.0565	–0.0337	–0.0191
	(0.0285)	(0.0254)	(0.0284)	(0.0335)	(0.0443)	(0.0436)	(0.0503)
$\Delta_3 Credit/GDP_t$	0.249	–0.231*	–0.469***	–0.490***	–0.199	–0.132	–0.131
	(0.180)	(0.139)	(0.156)	(0.169)	(0.182)	(0.175)	(0.176)
PMI	0.438***	0.239***	0.0814	–0.00826	0.0513	–0.0636	–0.175
	(0.109)	(0.0861)	(0.0966)	(0.106)	(0.116)	(0.113)	(0.119)
$\Delta_3 Credit/GDP_t \cdot PMI$	–0.00325	0.00178	0.00456**	0.00528**	0.00161	0.000674	0.00138
	(0.00245)	(0.00187)	(0.00210)	(0.00228)	(0.00245)	(0.00235)	(0.00236)
Constant	–63.02***	–50.53***	–32.64***	–10.42	2.535	9.663	24.91**
	(8.049)	(6.338)	(7.111)	(7.964)	(8.759)	(8.876)	(10.28)
Observations	369	403	402	365	327	289	252
R-squared	0.389	0.498	0.409	0.333	0.220	0.259	0.226
Number of id	38	38	38	38	38	37	37

Note: Fixed effects for countries. Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: own elaboration.

5. Robustness analyses

This part conducts various robustness checks. The first involves examining non-linear credit-growth dynamics as postulated by the "too-much finance" effects. A standard approach to check for non-linear effects is to include the

Table 5. Non-linear effects of credits

Dependent variable	Full sample	Full sample	Advanced countries	Developing countries
Investment	0.232***	0.274***	0.128**	0.471***
	(0.0395)	(0.0401)	(0.0548)	(0.0737)
Savings	0.233***	0.209***	0.404***	0.0318
	(0.0535)	(0.0525)	(0.0725)	(0.0893)
Trade	0.0241**	0.0385***	0.0446***	0.0696***
	(0.0111)	(0.0115)	(0.0131)	(0.0244)
FDI	0.0641***	0.0675***	0.0914***	–0.00923
	(0.0133)	(0.0130)	(0.0154)	(0.0234)
Credit	–0.0760***	–0.529***	–0.857***	–0.375
	(0.0282)	(0.132)	(0.240)	(0.290)
Credit2	0.000152	0.00167**	0.00308***	0.00102
	(0.000117)	(0.000665)	(0.00104)	(0.00208)
PMI		–0.304***	–0.647***	–0.0712
		(0.0954)	(0.188)	(0.144)
Credit*PMI		0.00672***	0.0118***	0.00245
		(0.00189)	(0.00323)	(0.00418)
Credit2*PMI		–2.26e–05**	–4.34e–05***	–3.36e–06
		(9.33e–06)	(1.39e–05)	(2.79e–05)
Constant	–5.778**	12.57*	32.27**	–0.808
	(2.645)	(6.497)	(13.69)	(9.383)
Observations	520	520	345	175
R-squared	0.317	0.356	0.444	0.337
Number of id	39	39	26	13

Note: Fixed effects for countries. Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: own elaboration.

squared term of banking credits as an additional control variable. Table 5 presents the relevant results, which include both the level and square of banking credits, as well as their interactions with PMI.

The first column of Table 5 shows the results for the credit variables only, without corporate governance indicators. Then, the second column of Table 5 shows that the credits have a negative coefficient, whereas their squared term has a positive coefficient. Both coefficients are statistically significant at the 5% level. These coefficients imply a non-linear association between credits and economic growth in the full sample of countries. More importantly, the interaction variables of both the level and square terms of credits with the corporate governance indicators also have statistically significant regression coefficients. When country differences are examined in the last two columns of Table 5, it is found that the non-linear effects and interactions hold for the advanced countries, whereas they are statistically insignificant for the developing countries.

The robustness analysis in Table 5 shows that the credit-growth nexus and the moderating role of corporate governance in this nexus can be non-linear. In order to quantify this non-linear moderating effect, Figure 6 produces the predictive margins using the non-linear regression results in the second column of Table 5. Compared to Figure 5, which uses linear regression estimations, Figure 6 produces more nuanced results. In particular, the graph

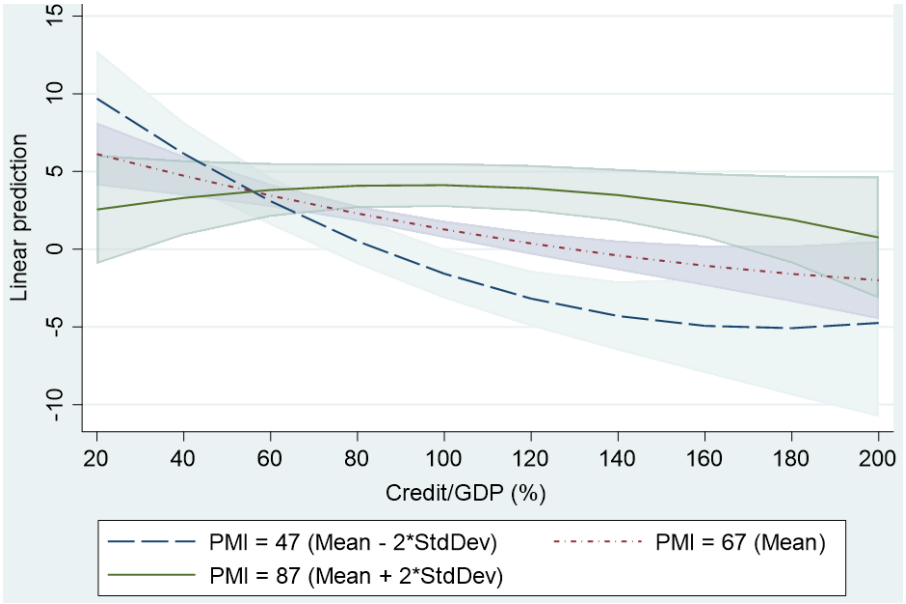

Figure 6. Predictive margins with non-linear effects of credits

Note: Shaded areas represent 95% confidence intervals.

Source: own elaboration.

shows that for countries with good corporate governance (i.e. a PMI level of 87, which corresponds to the mean plus two standard deviations), the credit-growth nexus has a hump shape. Specifically, banking credits produce positive growth effects up to a credit ratio of 100%, whereas the growth effects turn negative above this threshold. This finding is consistent with the result of Claessens and Yurtoglu (2012), who also find a threshold effect at around 100%. In the case of moderate or poor corporate governance, the positive growth effects of credits are no longer observed. Figure 6 shows that these countries (i.e. PMI = 67 or PMI = 47) experience negative growth effects of credit market development.

Another robustness check relates to the financial development indicator. The previous analysis focuses on banking credits to the private sector

Table 6. Regressions employing a broader financial development indicator

GDP Growth	Credits + Stocks	Credits + Stocks
Investment	0.329***	0.343***
	(0.0494)	(0.0495)
Savings	0.298***	0.291***
	(0.0563)	(0.0561)
Trade	0.0426***	0.0484***
	(0.0121)	(0.0122)
FDI	0.0688***	0.0708***
	(0.0158)	(0.0157)
PMI	0.0839**	–0.0488
	(0.0367)	(0.0687)
(Credits + Stocks)	0.00197	–0.0660**
	(0.00535)	(0.0303)
(Credits + Stocks)*PMI		0.000950**
		(0.000417)
Constant	–22.96***	–14.51***
	(3.305)	(4.955)
Observations	520	520
R-squared	0.317	0.356
Number of id	39	39

Note: Fixed effects for countries. Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: own elaboration.

as a ratio of GDP. However, financial development also includes equity markets, which are generally very important in developed countries, especially in Anglo-Saxon economies. The literature also considers these dimensions of financial development. For example, De Nicolo et al. (2008, p. 220) consider a broader financial development indicator as "the sum of private credit and stock market capitalisation to GDP". We follow this approach for the sake of a robustness exercise. The relevant results are presented in Table 6. This shows that the sum of banking credits and stock markets also has a negative growth effect. However, this negative impact is attenuated to some extent by

Table 7. GMM estimation

GDP Growth	Pooled OLS	Fixed effects	Difference GMM
Lag. GDP Growth	0.332***	0.0618	0.177**
	(0.102)	(0.0796)	(0.0845)
Investment	0.102***	0.196***	0.204***
	(0.0298)	(0.0661)	(0.0716)
Savings	0.0320	0.123*	0.110
	(0.0207)	(0.0661)	(0.117)
Trade	–0.00275	0.0206*	0.0216
	(0.00264)	(0.0102)	(0.0189)
FDI	0.0404	0.0489	0.0475
	(0.0304)	(0.0430)	(0.0387)
Credit	–0.0325	–0.163**	–0.145***
	(0.0210)	(0.0663)	(0.0440)
PMI	0.0277	–0.0801	0.00345
	(0.0322)	(0.0852)	(0.0858)
Credit*PMI	0.000306	0.00171*	0.00153**
	(0.000303)	(0.000873)	(0.000668)
Constant	–1.215	3.581	
	(2.506)	(7.081)	
Observations	485	485	485
R-squared	0.598	0.606	
Number of id		39	39

Note: Fixed effects for countries. Standard errors in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: own elaboration.

good corporate governance. Hence, the results are robust to different measures of financial development.

The third robustness check employs another method for estimation. Endogeneity between the main variables of interest (growth, credits, and corporate governance in our case) can be an important issue to address in regression models. In addition, the dependent variable (the GDP growth rate) can display some persistence and ignoring the lagged term can lead to biased estimations of regression coefficients. In this case, Arellano and Bond (1991) propose a difference GMM (general method of moments) approach, where the lagged levels of the endogenous variables are used as instruments. Table 7 shows the regression results for this estimation approach. The table also includes the pooled OLS and the fixed-effects estimations as two benchmark cases.

Regarding the difference GMM method, Blundell and Bond (1998) show that if the lagged dependent variable is persistent (i.e. the autocorrelation coefficient is close to one) and the time dimension is short, this approach also suffers from some limitations. Then, these authors recommend a system GMM method to address these shortcomings. In order to verify the relevance of this method, we can check the coefficient of the lagged dependent variable in Table 6. It is seen that this coefficient varies between 0.06 and 0.33 and is not very persistent. In addition, the time dimension includes 15 years, which is not very short. Moreover, if the difference GMM produced biased results, the regression coefficient for the lagged dependent variable would be closer to the fixed-effects estimate than the pooled OLS estimate. This case is also not relevant in Table 6. Therefore, the difference GMM stands out as the appropriate estimation method. As another robustness check in the same context, the regression model estimates reported in Table 7 also include time-fixed effects. The table shows that the main results are robust to the use of a lagged dependent variable and employing GMM estimation.

Conclusions

The paper has investigated whether corporate governance (as measured by the two indicators of disclosure extent and PMI) mediates the relationship between credits and economic growth. Panel-data regression analyses on a sample of 39 advanced and developing countries show that the credit variable has a negative impact on economic growth, although this negative effect is attenuated by corporate governance. This moderating impact is economically sizeable, relevant for both advanced and developing country groups, and holds in both the short and medium term of the business cycle. We also

conduct detailed robustness analyses in terms of non-linear credit-growth patterns, broader financial development indicators encompassing stock markets, and GMM estimation. The non-linear analysis shows that for countries with high corporate governance standards, credits are associated with higher GDP growth rates up to the threshold level of 100% for the credit-to-GDP ratio, while the effect becomes negative after this threshold. However, in the case of countries with poor corporate governance standards, credits are associated with lower economic growth rates.

The findings have important policy implications for both credit policies and corporate governance measures. The paper implies that taking a one-dimensional approach to financial development can be misleading, as both quantity and quality dimensions of financial markets matter for the effects of financial development. The paper shows that financial development produces positive growth effects for countries with good corporate governance, whereas this effect turns negative for countries with poor corporate governance. Hence, improving the quality of corporate governance becomes a crucial policy area. Instead of merely focusing on credit developments (such as credit subsidies or liquidity measures to support credit growth rates), aiming to improve corporate governance practices (such as accounting standards, disclosure requirements, and the protection of investor rights) can become a more effective area of policymaking. In addition, these measures would improve the efficiency of the financial markets and the allocation of resources without needing to find additional credit or external funding. They can also support access to debt in financial markets. Future research can examine other measures of financial development, such as spreads and access to credit.

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