

INSTITUTIONAL ENVIRONMENT AND MARKET STRUCTURE AS DRIVERS OF BANKING INDUSTRY PERFORMANCE

Jorge A. Muñoz Mendoza

Departamento de Gestión Empresarial, Universidad de Concepción (Chile)

Corresponding author: jormunozm@udec.cl

Carmen L. Veloso Ramos

Departamento de Gestión Empresarial, Universidad de Concepción (Chile)

Carlos L. Delgado Fuentealba

Department of Economics, Texas A&M University (United States)

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ABSTRACT

We analyze the effects of market concentration, income diversification, and institutional environment on banking industry performance. We used a sample of 168 countries for the 1994-2019 period and the GMM estimators for dynamic panel data regressions. Our results show that market concentration and diversification have a positive effect on bank performance. The institutional environment, both public-political and private-regulatory, has a negative effect on bank profitability, showing that these financial institutions obtain higher returns in countries with institutional weaknesses. When countries have a high institutional quality, the positive impact of market concentration and income diversification is reversed. Strengthening countries' institutional quality makes it possible to combine competition between banks and specialization in traditional activities with higher performance. These results are relevant for bank stability and financial policy design, given that the institutional framework includes both direct and indirect channels that affect the general behavior and strategies of banks in the industry. **Keywords:** Banking performance, market concentration, diversification, institutional environment.

JEL Classification: E01, G18, G21, G23.

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ENTORNO INSTITUCIONAL Y ESTRUCTURA DEL MERCADO
COMO IMPULSORES DEL DESEMPEÑO DE LA INDUSTRIA BANCARIA

RESUMEN

Analizamos los efectos de la concentración del mercado, la diversificación de ingresos y el entorno institucional en el desempeño de la industria bancaria. Usamos una muestra de 168 países para el periodo 1994-2019 y estimadores GMM para regresiones de datos de panel dinámicos. Nuestros resultados muestran que la concentración y diversificación del mercado tienen un efecto positivo en el desempeño bancario. El entorno institucional, tanto público-político como privado-regulatorio, tiene un efecto negativo sobre la rentabilidad que muestra que el sistema bancario obtiene mayores retornos en naciones con debilidades institucionales. Cuando las economías tienen una alta calidad institucional, se revierte el efecto positivo de la concentración del mercado y la diversificación de ingresos. El fortalecimiento de la calidad institucional de los países permite combinar la competencia entre bancos y la especialización en actividades tradicionales con mayor desempeño. Estos resultados son relevantes para la estabilidad bancaria y para el diseño de políticas financieras, dado que el marco institucional incluye canales directos e indirectos que afectan el comportamiento general y las estrategias de los bancos en la industria.

Palabras claves: desempeño bancario, concentración de mercado, diversificación, entorno institucional.

Clasificación JEL: E01, G18, G21, G23.

1. INTRODUCTION

Previous empirical studies have shown a wide consensus for the positive relationship between concentrated industries and higher performance in the banking market (Garza-García, 2012). Under non-competitive market structures, banking industries have begun to diversify their income over non-traditional activities such as securities trading, investments and insurance, among others. The common production technology used in diverse financial products implies that economies of scope generate greater benefits than economies of scale

(Gregoire and Mendoza, 1990). Clearly, these facts have generated important incentives in the banking industry to achieve higher performance (Sanya and Wolfe, 2011).

The institutional environment has also played a relevant role, particularly in the expansion of banks from developed countries to emerging markets. Several studies have highlighted the advantages of a healthy institutional environment to promote foreign direct investment and the financial development of countries (Law and Azman-Saini, 2012; Fernández and Tamayo, 2017). However, its effects on banking performance seem to go in a different direction. The subprime crisis that occurred in the United States showed that when banks take advantage of a lack of regulation and other institutional weaknesses to obtain higher performance, they tend to carry out riskier and more diversified activities. Furthermore, the scarce evidence in this field of study supports that banks obtain higher returns in countries with weak institutional environments because they intensify uncertainty and adverse selection around their activities (Dike, 2005; Shen and Chang, 2006). The debate for financial policy design could be enriched if we knew not only the direct channels through which the institutional environment, market concentration, and income diversification affect bank performance, but also the indirect channels by which institutional environment conditions the effects of these factors on banking profitability. In other words, if banks operate in countries with a high institutional quality, what effects do market concentration and income diversification have on banking performance?

Therefore, our objective is to analyze the direct and indirect effects of market concentration, income diversification and institutional environment on banking performance. Although we analyze the direct effects of these factors on banking performance, our main empirical contribution to the current discussion is focused on the indirect impact of the market concentration and income diversification under a context of high institutional development. We believe that, in this scenario, it is possible to find that higher banking performance and a more specialized and competitive market structure could be compatible.

For this purpose, we used a sample of 168 countries extracted from the World Bank databases for the 1994-2019 period. We contribute to the empirical literature in three points. First, our results support that banking

market concentration and income diversification have positive direct effects on the performance of banking industry. Second, a higher quality institutional environment reduces bank profitability. These results suggest that banks obtain higher profitability in countries with institutional fragilities. Third, when countries have a high institutional standard, the positive effect of market concentration, and income diversification is reversed. This point reveals that both factors are a source of systemically risky profitability for banks. Even for policymakers, it is a relevant factor for financial policy design, since competition and specialization in the banking industry are only compatible with higher performance if such policies are implemented in a developed institutional environment.

This article is structured as follows. Section 2 presents the theoretical background on the effects of the institutional environment, market concentration and income diversification on banking performance. Section 3 indicates the research hypotheses. Section 4 presents the data and methodology, while section 5 describes the results. Finally, section 6 presents the conclusions and implications.

2. THEORETICAL FRAMEWORK

2.1. Effect of the institutional environment on banking performance

Institutional environment is relevant to the development of countries because it establishes the conditions for society; its scope is not only social, but also economic. An extensive literature has analyzed the role of the institutional environment on the macroeconomic system of countries, mainly through its impact on financial development. Fernández and Tamayo (2017) point out that institutional environment improvements facilitate financial development and attract direct foreign investment. This attractiveness is sustained by reductions in information asymmetries and optimal risk allocation for investors (Law and Azman-Saini, 2012). In any case, the effects of the institutional environment on banking performance have been poorly analyzed.

The public-political environment is an important aspect of the institutional framework of countries. Several authors have concluded that a better public and political institutional environment promotes financial development, mostly in the banking sector (Gropper, Jahera and Park,

2015; Yahya, Akhtar and Tabash, 2017). Political stability and democratic development of the economic system would facilitate banking activities and generate investor confidence, both in public and banking institutions (Huang, 2010). In any case, few studies have investigated the effects of public-political institutions on bank performance. Ben (2013), in a study conducted on banks in France, Germany, the United Kingdom and Greece for the period 2005-2011, concluded that a stable and democratic government reduces bank performance. The author argues that this scenario strengthens the State's supervising role over banking activities and mitigates the adverse selection problem. Yahya, Akhtar and Tabash (2017) agree with previous studies and add that bad political practices increase the risk of banking activities, allowing banks to achieve higher performance. Even, Gropper, Jahera and Park (2015) argue that bank performance benefits from political connections. Corruption is another key factor in the public-political environment that impoverishes countries' institutional quality. This fact promotes inefficiencies and bad practices in public institutions and reduces firm's investment (Dike, 2005). These bad practices increase the uncertainty surrounding banking activities (Méon and Sekkat, 2005). For these arguments, some studies have found that increased corruption increases bank performance (Anaere, 2014). This can be seen in the fact that banking performance has a systematic component associated with institutional deficiencies in the public-political sphere that turns risk into a greater return.

The private-regulatory environment is another relevant factor of countries' institutional quality. This aspect is closely related to the State's responsibility for the design and implementation of effective regulations for private activities. Herger, Hodler and Lobsiger (2008) state that regulations should promote investor confidence in State's activities and guarantee investors' rights protection. When the regulatory system meets these conditions, it facilitates foreign direct investment and the development of a country's banking sector (Marcelin and Mathur, 2014). However, a higher development of private-regulatory institutional environment would have negative effects on banking performance. Shen and Chang (2006), in an empirical study for 8,113 banks in 46 countries, showed that more rigorous regulation reduces bank performance. This finding was also supported by Ben (2013). Eisenbach *et al.* (2017) argue that the objective of regulation is to anticipate any event that weakens the health

of the banking system. From this perspective, lower bank performance would be a consequence of more conservative risk management by banks (Eisenbach *et al.*, 2017), or lower credit growth (Barth *et al.*, 2013). Even regulation may force banks to adopt more conservative accounting criteria that mitigate the practice of manipulating financial statements (Kanagaretnam, Lim and Lobo, 2014). However, Arias, Maquieira and Jara (2020) in an analysis at the bank level for 52 countries, open a space for empirical debate by finding evidence of a positive relationship between regulatory development and bank performance.

2.2. Effect of market structure and income diversification on banking performance

The banking industry structure and income diversification strategies are factors that many researchers have catalogued as relevant on bank performance. Diverse studies have discussed the effects of market concentration on bank performance. Seminal works established the theoretical bases that associate higher bank performance with more concentrated market structures (Klein, 1971). But the empirical evidence has analyzed this positive relationship in different ways. Some studies have argued that, in concentrated market structures, banks achieve higher performance because they would have greater control over industry prices. This vision is known as the structure-conduct-performance hypothesis (SCP) and several researchers have corroborated it for developed and emerging markets (Garza-García, 2012). Other studies have indicated that banks can reduce their production costs through greater activity volume and generate higher profitability (Shepherd, 1983). These facts are common in the more concentrated banking industry, where large banks take advantage of the scale factor associated to size (Berger, 1995). This perspective is known as the relative-market-power hypothesis (RMP). Chortareas, Garza-García and Girardone (2011) corroborate this hypothesis for Latin American and Organization of the Petroleum Exporting Countries (OPEC) banks, respectively. They argue that market concentration is associated with a broader financial product portfolio that allows banks to reduce the cost of operational activities.

Although both hypotheses analyze the effect of market concentration on banking performance through different views, their results have shown

that banks achieve greater benefits from monopolistic behaviors (Jara, Arias and Rodriguez, 2014). This would generate a smaller number of banks in the industry, where large banks absorb the largest profits in the sector due to a broader portfolio of financial products (Maudos and Solís, 2009). It is important to note that other studies support that an excessive market concentration could have side effects on bank profitability. A higher market concentration could lead to greater banking income instability, incidence of riskier borrowers and lower efforts to maximize profits. These facts could reduce bank performance (Mirzaei, Moore and Liu, 2013).

Financial deregulation also has favored the development of non-traditional activities by banks. Distributing banking costs into various financial products with similar production technologies allows banks to achieve greater benefits in economies of scope than economies of scale (Gregoire and Mendoza, 1990). For this reason, income diversification would increase bank profitability. Lee, Hsieh and Yang (2014), in a study for 2,372 banks of 29 Asia-Pacific countries, corroborate that income diversification increases banking performance. Elsas, Hackethal and Holzhäuser (2010) add that income diversification increases banks' market value through a study for 380 banks from 9 developed countries. Adem (2022) demonstrates the positive impact of diversification on the banking performance and stability of African countries. Even more, all these findings are consistent with the RMP hypothesis. In a more concentrated banking industry, larger banks would have higher profitability because they would develop a higher production volume of diversified financial services (Deng and Elyasiani, 2008). Many researches have corroborated these findings for both developed and emerging countries (Sanya and Wolfe, 2011; Jara, Arias and Rodriguez, 2014; Ali *et al.*, 2022).

In spite of the above, there is a lack of consensus regarding the effects of income diversification on banking performance. Chiorazzo, Milani and Salvini (2008) analyzed Italian banks and showed that income diversification strategies reduced bank profitability. They add that income diversification generates a trade-off between risk and return on bank performance. Berger, Hasan and Zhou (2010) corroborate these findings for Chinese banks and add that income diversification reduces bank performance because it increases their costs. Other researchers support that income diversification should increase bank risk and performance

instability because it deepens the adverse selection problem on financial service portfolio (Stiroh and Rumble, 2006). Even more recent studies support that the negative impact of the COVID-19 pandemic on banking performance could have been accelerated by the high degree of diversification as well as capital requirements (Susanti, Putra and Bahtiar, 2023).

3. RESEARCH HYPOTHESIS

According to empirical evidence, we expect that a higher quality institutional environment, public-political as well as private-regulatory, will reduce bank performance (Gropper, Jahera and Park, 2015; Eisenbach *et al.*, 2017; Yahya, Akhtar and Tabash, 2017). Bad government practices, State institutional fragility, regulation deficiencies and imperfect information are all examples of institutional variables that the existing literature associates with higher banking performance.

At the industry level, several studies argue that a more concentrated market with diversified income sources would generate higher bank performance. Regarding market concentration, bank performance increases because, in more concentrated markets, banks either consolidate market power over assets pricing or efficiently manage their costs through a higher production volume (Berger, 1995; Chortareas, Garza-García and Girardone, 2011). In regard to income diversification, higher performance has been associated with increases in the income generated by non-traditional activities (Stiroh and Rumble, 2006; Elsas, Hackethal and Holzhäuser, 2010; Sanya and Wolfe, 2011; Lee, Hsieh and Yang, 2014). Thus, we expect that both market concentration and income diversification will be positively related to banking performance.

However, the explicit relationship between market concentration, income diversification, and institutional quality, as well as its potential effect on bank performance *a priori*, is not clear. Shen and Chang (2006) point out that a country's institutional quality can affect how "other variables" impact bank performance. This idea was corroborated by Ben (2013), whose analysis on European banks showed that the impact of financial regulations on bank performance depends on the institutional environment. Initially, we were inclined to think that a more developed and regulated institutional environment leads banks to develop a lower degree of market concentration, which would then

affect their profitability. In addition, institutional development could increase the costs of income diversification, forcing banks to resort to more traditional banking activities. These arguments lead us to believe that the effects of market concentration and income diversification on banking performance depend on institutional environment. Therefore, we test the following research hypotheses:

- H1a: In countries with high institutional development, market concentration has a negative effect on banking performance.
- H1b: In countries with high institutional development, market concentration has a positive effect on banking performance.
- H2a: In countries with high institutional development, income diversification has a negative effect on banking performance.
- H2b: In countries with high institutional development, income diversification has a positive effect on banking performance.

4. DATA AND METHODS

4.1. Data

The data were extracted from Global Financial Development (GFD), World Developing Indicators (WDI) and Worldwide Governance Indicators (WGI), all of them from World Bank databases. The data cover annual periods between 1994 and 2019 and were organized into a panel data for 168 countries.

Table 1 shows the geographical composition of the sample. Countries' distribution according to their income level reveals that 38.69% correspond to high-income countries. Of those countries, more than 50% are located in Europe and Central Asia, and to a lesser degree, in Asia-Pacific and Latin America. Also, 26.79% of countries are of upper-middle income, located mainly in Latin America, Europe and Central Asia, and 23.81% of countries have the lower-middle income classification, represented mostly by countries of Asia-Pacific, Europe and Central Asia, and Middle East and North Africa. Finally, 10.71% are low-income countries, which are almost entirely Sub-Saharan African nations.

Table 2 presents the variables used in this research. The dependent variable was banking performance (*BPER*) measured by return on the

asset (*ROA*). According to several empirical studies, this ratio compares the net banking income to total assets. This measure is a global performance indicator for banks (Mercieca, Schaeck and Wolfe, 2007; Yahya, Akhtar and Tabash, 2017). We also used net interest margin (*NIM*) as an alternative bank performance measure.

Table 1. Sample composition, percentage (countries)

Geographic zone	Countries classification by income level				
	High	Upper-Middle	Lower-Middle	Low	Full sample
East Asia and the Pacific	4.76%	4.17%	5.95%	0.60%	15.48%
	8	7	10	1	26
Europe and Central Asia	20.24%	5.95%	4.17%	0.00%	30.36%
	34	10	7	0	51
Latin America and the Caribbean	6.55%	8.33%	2.98%	0.60%	18.45%
	11	14	5	1	31
Middle East and North Africa	4.76%	3.57%	4.17%	0.00%	12.50%
	8	6	7	0	21
North America	1.79%	0.00%	0.00%	0.00%	1.79%
	3	0	0	0	3
South Asia	0.00%	0.60%	2.98%	1.19%	4.76%
	0	1	5	2	8
Sub-Saharan Africa	0.60%	4.17%	3.57%	8.33%	16.67%
	1	7	6	14	28
Full Sample	38.69%	26.79%	23.81%	10.71%	100.00%
	65	45	40	18	168

Notes: This table shows the geographical distribution of the sample of countries, indicating the countries' classification according to their income level.

Source: Authors' elaboration.

Table 2. Variables

Variable		Description
Dependent variable		
<i>BPER</i>	Bank performance- <i>ROA</i>	Return on assets. Net income to total assets ratio
<i>BPER</i>	Bank performance- <i>NIM</i>	Net interest margin
Institutional environment variables		
<i>CORR</i>	Control corruption Index	Index that measures the perception of the control of corruption in public power. Index fluctuates between -2.5 (low control) and 2.5 (high control)
<i>GOVEF</i>	Government effectiveness	Index that measures the perception about the credibility of the government, the quality of public services and its independence from political pressure. Index ranging from -2.5 (low efficacy) to 2.5 (high efficacy)
<i>PST</i>	Political stability	Index of political stability fluctuating between -2.5 (high stability) and 2.5 (low stability)
<i>REQL</i>	Regulation quality	Index that measures the perception of the government's ability to formulate policies that promote private development. Index ranging from -2.5 (low quality) to 2.5 (high quality)
<i>RLAW</i>	Rule of law	Index that measures the perception of agents about normative quality for the execution of contracts and property rights. Index ranging from -2.5 (civil law) to 2.5 (common law)
<i>ACCOUNT</i>	Accountability	Index that measures the perception of agents about citizen participation and freedom of expression. Index ranging from -2.5 (low transparency) to 2.5 (high transparency)
Market structure and bank diversification		
<i>LER</i>	Lerner Index	Market structure index. It varies between 0 (competitive market) and 1 (concentrated market)
<i>BCON</i>	Bank assets concentration	Assets accumulated by the five largest banks in a country
<i>DIV</i>	Bank diversification	Bank non-interest income to total income ratio

Table 2. Variables (concluded)

Variable		Description
Banking industry-level variables		
<i>CAPASS</i>	Bank capital	Bank capital and reserves to total assets ratio
<i>DEP</i>	Bank deposit	Bank deposits to GDP
<i>NPL</i>	Non-performing loans	Non-performing loans on gross bank loans
<i>FD</i>	Financial development	Domestic credit provided by banking sector to GDP
<i>EFIC</i>	Operating efficiency	Gross margin ratio
<i>FST</i>	Z-Score	Financial Stability Indicator
Macroeconomic-level variables		
<i>GROWTH</i>	Economic growth	Annual GDP growth
<i>INF</i>	Inflation	Annual inflation rate
<i>CRISIS</i>	Economic crisis	Dummy equal 1 for years that countries face economic or financial crises and 0 otherwise (Asian, Sub-prime and other crises)

Notes: The definition of these variables explains the measurement method set on the World Bank databases.

Source: Authors' elaboration.

The institutional environment (*IE*) was measured through six proxy variables. Corruption control (*CORR*), government effectiveness (*GOVEF*), and political stability (*PST*) variables measure the country's public-political institutional quality; regulatory quality (*REQL*), rule of law (*RLAW*) and accountability (*ACCOUNT*) variables represent private-regulatory institutional quality. Each indicator normally fluctuates between -2.5 and $+2.5$, where positive (negative) values indicate a high (low) institutional quality. Some empirical studies have used this type of measurement to evaluate institutional environment quality, although not necessarily in relation to bank performance (Ben, 2013; Anaere, 2014).

The effects of market concentration and income diversification on banking performance are variables of interest for our research. The Lerner

Index (*LER*) measures market concentration¹. This indicator oscillates between 0 and 1, values that indicate a competitive and a monopolistic market structure, respectively. Any value within this range represents a noncompetitive market structure for a country's banking industry (Klein, 1971). We also measured banking concentration through the asset concentration of the five largest banks (*BCON*). On the other hand, bank income diversification (*DIV*) was measured by the non-operating income to total income ratio, as has been suggested by different studies (Stiroh and Rumble, 2006; Chiorazzo, Milani and Salvini, 2008; Lee, Hsieh and Yang, 2014).

We also incorporate other control variables. At the industry-level, we use the bank capital ratio (*CAPASS*), bank deposits to GDP ratio (*DEP*), non-performing loans to total bank loans ratio (*NPL*), bank credits to GDP ratio (*FD*), gross margin ratio (*EFIC*), and the Z-Score indicator as a proxy of banking stability (*FST*) as previous studies indicate (Maudos and Solís, 2009). At the macroeconomic level, we use the economic growth (*GROWTH*), annual inflation (*INF*) and the *CRISIS* dummy variable (Yahya, Akhtar and Tabash, 2017; Saleh and Abu Afifa, 2020; Alam *et al.*, 2021).

4.2. Econometric methodology

To quantify the effects of market concentration and income diversification on banking performance, conditioned to institutional environment quality, we use the Generalized Method of Moments (GMM) estimator for dynamic panel regression proposed by Arellano and Bond (1991):

$$\begin{aligned}
 BPER_{it} = & \beta_0 + \beta_1 BPER_{it-1} + \beta_2 IE_{it} + \beta_3 LER_{it} + \beta_4 (LER_{it} \times HIQ_{it}) \\
 & + \beta_5 DIV_{it} + \beta_6 (DIV_{it} \times HIQ_{it}) + \sum_k^K \beta_k X_{kit} + \eta_i + \eta_t + \varepsilon_{it} \quad [1]
 \end{aligned}$$

¹ The Lerner index is used as a market power measure associated with less-competitive banking markets and a potentially greater degree of industry concentration. This measure positively correlates with the assets concentration ratio (Berger, Klapper and Turk-Ariss, 2009). Chen and Liao (2011) suggest that the concentration ratio indicates the possible barrier to entry for other financial intermediaries. Therefore, a higher concentration ratio is related to a less-competitive banking industry and a higher Lerner index.

Where $BPER_{it}$ is the dependent variable that measures bank performance for country i in period t . The $BPER_{it-1}$ is the lag in $t-1$ period for bank performance. Banking performance is controlled over institutional environment quality (IE_{it}), where β_2 measures the direct channel of institutional environment on banking performance. LER_{it} is the Lerner index that measures banking market concentration and DIV_{it} measures income diversification. The variables ($LER_{it} \times HIQ_{it}$) and ($DIV_{it} \times HIQ_{it}$) measure the indirect channel of institutional environment quality, through market concentration and income diversification, on banking performance. The indirect channel describes the way in which institutional quality conditions the effect of these variables on banking performance. We define HIQ_{it} as a dummy variable that adopts the value 1 when a country has a high level of institutional quality and 0 otherwise. To distinguish countries' institutional quality, the value 1 was assigned when the value of each institutional quality indicator was greater than 0. We use this dummy variable to attenuate the multicollinearity problem associated to low variance of institutional development variables.

The model incorporates other k control variables, both at banking industry and macroeconomic levels, grouped in the X_{kit} matrix (see Table 2). The model also includes temporal effects (η_t) related to year t and individual effects (η_i) related to country i . It also includes dummy variables associated to crises periods, geographic zones and income levels in order to control the sample heterogeneity. The crisis dummy variable adopts the value 1 in the periods of Asian (1997-1998), Subprime (2008-2009) and European (2011-2012) crises. Finally, ε_{it} is the remaining random disturbance. Specifically, we use the GMM estimator proposed by Arellano and Bond (1991) because contemporaneous banking performance can be affected by the persistence of shocks that have occurred in past banking performance (Arias, Maquieira and Jara, 2020). This fact justifies the inclusion of the lagged dependent variable at $t-1$, which is treated as an endogenous regressor variable. To control the endogeneity problem, we implement the one-step GMM estimator, and we use the lags at $t-2$ and $t-3$ of the dependent variable as instruments since they are autocorrelated with the same dependent variable, but not with the error term. However, for the model to be correctly specified, Arellano and Bond (1991) also pointed out that these estimators must be consistent, and the model must be instrumentally overidentified. To

guarantee GMM estimator consistency, the presence of first-order autocorrelation is necessary, but not a higher-order of autocorrelation. The instrumental overidentification of the model was verified through the Sargan Test. All these models were estimated through robust variance.

5. EMPIRICAL RESULTS

5.1. Descriptive analysis

Table 3 shows the statistical description, correlations and unit root tests. Banking industry performance at the international level shows an average return on assets of 1.46%. Within this figure, it is worth noting that there is lower bank performance in high-income countries (0.88%) and a higher return for banks in low-income countries (2.04%). In fact, the banking sector of high-income countries is the only one that shows a performance below the world average. Net interest margin (*NIM*) follows a similar pattern.

Institutional environment quality shows different results according to countries' income level. Although the public-political and private-regulatory institutional indicators have a value close to 0, the high institutional quality of high-income countries contrasts with the poor institutional environment of low-income countries. Even these indicators correlate negatively and significantly with bank performance measures such as *ROA*, and *NIM*. This fact suggests that higher banks returns are also a consequence of countries' institutional weaknesses.

Preliminarily, market concentration and income diversification are positively correlated with banking performance. According to the Lerner Index (*LER*) and the five largest banks assets concentration (*BCON*), the banking market structure is clearly not competitive. Although this quality is very similar among countries, banks in high-income countries exhibit a less concentrated structure than the world average, which could explain the lower industry performance. On the other hand, income diversification indicates that 37.97% of bank income comes from non-operational activities (non-traditional), a figure that rises to 43.25% in low-income countries.

The banking industry-level variables also show interesting results. The capital requirements, which on average oscillate around 10.21%, is

positively correlated with bank profitability. This positive correlation is also observed with bank liquidity, operational efficiency and financial stability. These results preliminarily suggest that banks achieve higher returns in banking industries with greater financing independence, liquidity, cost control efficiency, and financial stability. Other banking system characteristics, such as its non-performing loans and banking development are negatively correlated with bank performance. It should be noted that the banks of high-income countries show the lowest capital requirements and non-performing loans, as well as higher levels of liquidity and banking penetration when compared to banks of lower-income countries.

Regarding the macroeconomic characteristics, we observed an annual growth of 4.12%. At this point, there is dissociation between the low growth of high-income countries, with a figure of around 2.98%, and the higher economic activity of low-income countries, whose growth is above the average global growth. Finally, unit root test results indicate that all variables are stationary processes.

5.2. Effect of institutional environment, income diversification and market concentration

Table 4 shows the results of model (1). This model satisfies the necessary specification conditions indicated by Arellano and Bond (1991). The GMM estimators are consistent because z-test AR1 reveals the presence of first-order autocorrelation, while the AR2 test discards second order autocorrelation. The Sargan test indicates that the model is instrumentally overidentified. Moreover, the unit root test indicates that *ROA* is a stationary process. This result guarantees that its lags are not weak instruments. Finally, the Wald test is a chi-square test that, for all cases, supports the model's global significance.

The institutional environment has significant effects on banks performance. Public-political institutional environment variables, such as corruption control (*CORR*), government effectiveness (*GOVEF*), and political stability (*PST*) have a negative and significant effect on bank's *ROA*. Public-political institutional inefficiencies raise the perception of bad practices in this sector, raising the uncertainty surrounding banking activities (Méon and Sekkat, 2005; Anaere, 2014). These fragile insti-

Table 3. Descriptive statistics

Variables	High		Upper-Middle		
	S.D.	Mean	S.D.	Mean	
Dependent variable					
Bank performance-ROA (%)	0.88	1.16	1.46	1.42	
Bank performance-NIM (%)	2.41	1.39	4.97	2.40	
Institutional environment variables					
Control corruption index	1.26	0.81	-0.05	0.69	
Government effectiveness	1.29	0.67	0.03	0.63	
Political stability	0.84	0.57	0.12	0.79	
Regulation quality	1.21	0.58	0.04	0.78	
Rule of law	1.20	0.63	-0.01	0.70	
Accountability	0.89	0.83	0.12	0.88	
Market structure and bank diversification					
Lerner index	0.18	1.73	0.25	0.17	
Five largest banks assets (%)	82.54	16.85	79.54	16.33	
Bank diversification (%)	36.96	16.13	35.02	15.63	
Banking industry-level variables					
Bank capital (%)	7.99	3.29	10.89	3.31	
Bank deposit (%)	90.52	64.44	53.08	36.44	
Nonperforming loans (%)	4.39	5.37	6.97	6.17	
Financial Development (%)	96.53	49.96	50.53	32.92	
Operating efficiency (%)	42.55	23.05	43.58	18.09	
Bank Z-score	13.99	7.59	13.00	9.21	
Macroeconomic-level variables					
Economic growth (%)	2.98	4.11	3.71	4.92	
Inflation (%)	2.60	3.16	9.90	77.65	

Notes: This table shows the statistical summary and correlation between ROA and the other variables. The correlations are supported by their p-values. Unit root correspond to the z-test proposed by Karavias and Tzavalis (2014).

	Lower-Middle		Low		Full sample		Correlation	Unit root
	S.D.	Mean	S.D.	Mean	S.D.	Mean		
	1.62	1.81	2.04	2.10	1.46	1.69	1.00***	-16.49***
	5.80	2.73	7.41	3.88	4.95	3.24	0.39***	-25.40***
	-0.52	0.52	-0.86	0.49	-0.03	1.04	-0.21***	-16.57***
	-0.50	0.51	-0.97	0.54	-0.03	1.04	-0.20***	-22.84***
	-0.36	0.94	-0.86	0.89	-0.05	1.03	-0.14***	-18.42***
	-0.48	0.59	-0.93	0.62	-0.03	1.04	-0.26***	-19.04***
	-0.47	0.60	-0.97	0.56	-0.04	1.03	-0.21***	-13.48***
	-0.34	0.81	-0.86	0.69	-0.03	1.04	-0.23***	-13.25***
	0.26	0.16	0.29	0.19	0.24	1.00	0.03***	-14.77***
	80.98	15.92	88.70	17.05	83.84	16.91	0.05***	-19.45***
	36.90	17.73	43.25	16.94	37.97	16.90	0.08***	-15.42***
	11.48	4.16	12.52	5.60	10.21	4.20	0.29***	-16.36***
	38.64	22.44	18.23	11.94	48.59	46.02	0.27***	-9.04***
	9.08	7.68	14.39	11.52	7.44	7.75	-0.16***	-10.98***
	34.27	24.70	14.94	12.49	47.51	44.05	-0.30***	-8.73***
	41.92	19.35	41.30	22.28	42.32	20.91	0.38***	-9.41***
	14.05	10.07	10.16	6.70	12.90	8.64	0.12***	-17.28***
	4.62	6.96	5.01	8.11	4.12	6.35	0.14***	-27.63***
	20.92	115.93	82.14	1,156.86	30.11	597.70	0.07***	-23.90***

Table 4. Arellano and Bond (1991) GMM estimator for ROA

Variables	Dependent variable: Bank performance measured by bank ROA					
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Constant	-0.0264*** (-4.91)	-0.0377*** (-4.89)	-0.0294*** (-4.56)	-0.0339*** (-5.10)	-0.0308*** (-5.27)	-0.0374*** (-5.02)
ROA_{t-1}	0.1673*** (4.65)	0.1371*** (4.09)	0.1568*** (5.21)	0.1470*** (4.37)	0.1525*** (4.80)	0.1668*** (5.16)
Institutional environment						
<i>CORR</i>	-0.0096*** (-3.12)					
<i>GOVEF</i>		-0.0079*** (-3.02)				
<i>PST</i>			-0.0097*** (-3.49)			
<i>REQL</i>				-0.0087*** (-2.85)		
<i>RLAW</i>					-0.0119*** (-3.77)	
<i>ACCOUNT</i>						-0.0116*** (-3.29)
Bank diversification and market structure						
<i>LER</i>	0.0339*** (5.10)	0.0353*** (4.91)	0.0306*** (4.32)	0.0317*** (5.46)	0.0394*** (4.98)	0.0377*** (5.69)
$LER \times HIQ_{it}$	-0.0251*** (-3.01)	-0.0208** (-2.10)	-0.0247*** (-3.45)	-0.0236** (-2.32)	-0.0240** (-2.45)	-0.0262*** (-3.11)
<i>DIV</i>	0.0202*** (3.60)	0.0177*** (3.27)	0.0186*** (3.91)	0.0190*** (4.04)	0.0212*** (4.21)	0.0169*** (3.42)
$DIV \times HIQ_{it}$	-0.0158*** (-2.89)	-0.0139** (-2.33)	-0.0176*** (-3.10)	-0.0154*** (-3.39)	-0.0143** (-2.08)	-0.0181*** (-3.80)

Table 4. Arellano and Bond (1991) GMM estimator for ROA (concluded)

Variables	Dependent variable: Bank performance measured by bank ROA					
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Sample	1,074	1,074	1,074	1,074	1,074	1,074
Wald test	603.56***	637.31***	650.14***	703.58***	684.33***	665.73***
AR1	-3.14***	-3.28***	-3.01***	-2.95***	-3.70***	-3.03***
AR2	-0.52	-0.46	-0.88	-1.07	-0.67	-0.83
Sargan test (statistic)	45.80	41.74	40.63	37.04	38.91	40.87
Sargan test (p-value)	0.44	0.57	0.64	0.42	0.53	0.50
Dummy year	Yes	Yes	Yes	Yes	Yes	Yes
Dummy crisis	Yes	Yes	Yes	Yes	Yes	Yes
Dummy zone	Yes	Yes	Yes	Yes	Yes	Yes
Dummy income level	Yes	Yes	Yes	Yes	Yes	Yes
Robust variance	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The AR1 and AR2 z-tests indicate under the null hypothesis the first and second order autocorrelation absence, respectively. The Sargan test indicates under the null hypothesis that the model is instrumentally overidentified. All estimates include industry control variables such as Bank Capital (*CAPASS*), Bank deposit (*DEP*), Non-performing loans (*NPL*), Financial Development (*FD*), Operating efficiency (*EFIC*), Financial Stability (*FST*); and macroeconomic variables such as Economic Growth (*GROWTH*) and Inflation (*INF*). z-statistics in bracket. Superscripts ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively. Source: Authors' elaboration.

tutional conditions favor banking performance, but would accentuate adverse selection problem (Dike, 2005; Ben, 2013). Private-regulatory environment variables, such as regulatory quality (*REQL*), rule of law (*RLAW*) and accountability (*ACCOUNT*), also have a negative and

significant impact on *ROA*. The regulation on private activities, such as banking, inhibits the adverse selection and risky policies of these institutions (Ben, 2013). These conditions reduce the credit expansion rate or avoid accounting manipulation in bank financial statements (Barth *et al.*, 2013). Thus, bank performance would be reduced. The direct channel of the countries' institutional quality on banking performance reveals that their profitability is supported by institutional, political and regulatory weaknesses.

Market concentration is also another key factor affecting bank performance. Our results indicate that the Lerner index (*LER*) has a positive and significant effect on bank's *ROA*. This result is not a novelty because several past studies have supported this relationship (Jara, Arias and Rodríguez, 2014). However, country institutional quality works as an indirect channel that affects banks performance through market concentration. The interactive variable ($LER \times HIQ_{it}$) has a negative and significant effect on *ROA*. Banking market concentration reduces banking profitability in high institutional quality countries, a result that corroborates hypothesis H1a. This result is important for financial policy design because it shows that banking competition (concentration) is compatible with higher (lower) performance, an idea that had been largely discarded by international evidence. Thus, better institutional quality, public-political and private-regulatory, is essential for banking regulation to promote sector competition and higher performance. This result also reveals that the positive effect of market concentration on bank performance is attributable to institutional fragilities.

Income diversification strategy is another relevant factor affecting bank performance. Table 4 shows that the *DIV* variable has a positive and significant effect on *ROA*. Income diversification generates a greater banking return given that economies of scope result in a greater benefit for banks compared to economies of scale. Although there is still no clear consensus on this matter, this result is in line with several international studies (Stiroh and Rumble, 2006; Elsas, Hackethal and Holzhäuser, 2010; Sanya and Wolfe, 2011; Lee, Hsieh and Yang, 2014). However, the quality of the institutional environment also affects how income diversification impacts bank performance. The variable ($DIV \times HIQ_{it}$) has a negative and significant effect on *ROA*, which validates hypothesis H2a. Income diversification in countries with high institu-

tional quality reduces banking profitability. So, this fact induces them to reduce their non-traditional operations or develop more specialized services to support their performance. This result suggests that income diversification is a risky source of banking profitability, and it is related to institutional fragilities.

5.3. Robustness analysis

We sensitized model (1) through the use of net interest margin (*NIM*) as alternative measure of bank performance. The *NIM* is measured by interest-minus-expense to total assets ratio. Model (1) was estimated through the one-step *GMM-SYS* estimator proposed by Arellano and Bover (1995). Obviously, the *GMM-SYS* estimator of Arellano and Bover (1995) is a more general case than the traditional *GMM* estimator of Arellano and Bond (1991) because it allows controlling the endogeneity associated with the lag of the dependent variable as well as a regressor variable, in this case, the operational risk (*NPL*). According to Stiglitz and Weiss (1981) and Saleh and Abu Afifa (2020), a higher bank return is endogenously related to operational risk. The authors argue that banks have incentives to take on higher risks when they seek higher returns by granting funds to riskier borrowers. However, this decision would diminish the quality of banks' credit portfolio because it accentuates the adverse selection problem. From an econometric point of view, we also use the lags at $t-2$ and $t-3$ of the dependent variable (*BPER*) and the regressor variable (*NPL*) as instruments. Table 5 shows the results of the robustness tests using *NIM* as dependent variables, and the five largest banks' assets concentration (*BCON*) as a measure of market concentration. These robustness tests support all previous estimates.

6. CONCLUSIONS AND IMPLICATIONS

Our research investigates the effects of institutional environment, market structure and income diversification on banking performance. Our main contributions to the empirical evidence can be summarized in three points. First, a higher institutional quality, public-political and private-regulatory environment reduces banking performance. This direct channel suggests that a fraction of banks' returns is systematic in

Table 5. Arellano and Bover (1995) estimator for *NIM*

Variables	Dependent variable: Bank performance measured by bank <i>NIM</i>					
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Constant	-0.0422*** (-4.05)	-0.0363*** (-3.26)	-0.0346*** (-3.19)	-0.0350*** (-3.58)	-0.0428*** (-4.12)	-0.0405*** (-3.93)
NIM_{t-1}	0.3405*** (10.74)	0.3592*** (12.09)	0.3301*** (13.66)	0.3275*** (9.04)	0.3519*** (10.45)	0.3465*** (13.84)
Institutional environment						
<i>CORR</i>	-0.0095*** (-4.72)					
<i>GOVEF</i>		-0.0111*** (-5.08)				
<i>PST</i>			-0.0082*** (-4.49)			
<i>REQL</i>				-0.0067*** (-3.65)		
<i>RLAW</i>					-0.0119*** (-4.89)	
<i>ACCOUNT</i>						-0.0057*** (-2.91)
Bank diversification and market structure						
<i>BCON</i>	0.0125*** (4.11)	0.0102** (2.16)	0.0118*** (3.89)	0.0154*** (5.41)	0.0114*** (3.90)	0.0147*** (3.99)
$BCON \times HIQ_{it}$	-0.0064*** (-3.13)	-0.0076*** (-3.24)	-0.0114*** (-3.77)	-0.0117*** (-3.94)	-0.0103*** (-4.19)	-0.0129*** (-3.86)
<i>DIV</i>	-0.0383*** (-7.09)	-0.0369*** (-6.37)	-0.0327*** (-5.94)	-0.0309*** (-5.75)	-0.0350*** (-6.14)	-0.0336*** (-5.97)
$DIV \times HIQ_{it}$	0.0161*** (3.25)	0.0173*** (3.64)	0.0179*** (3.39)	0.0182*** (3.60)	0.0148*** (3.14)	0.0136** (2.34)

Table 5. Arellano and Bover (1995) estimator for *NIM* (concluded)

Variables	Dependent variable: Bank performance measured by bank <i>NIM</i>					
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Sample	1,074	1,074	1,074	1,074	1,074	1,074
Wald test	716.65***	729.04***	698.59***	712.05***	719.46***	732.95***
AR1	-3.02***	-3.29***	-3.16***	-3.42***	-3.28***	-3.20***
AR2	-0.43	-0.61	-0.53	-0.89	-1.01	-0.84
Sargan test (statistic)	45.09	50.04	47.84	41.38	40.97	50.36
Sargan test (p-value)	0.56	0.62	0.61	0.35	0.39	0.55
Dummy year	Yes	Yes	Yes	Yes	Yes	Yes
Dummy crisis	Yes	Yes	Yes	Yes	Yes	Yes
Dummy zone	Yes	Yes	Yes	Yes	Yes	Yes
Dummy income level	Yes	Yes	Yes	Yes	Yes	Yes
Robust variance	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The AR1 and AR2 z-tests indicate under the null hypothesis the first and second order autocorrelation absence, respectively. The Sargan test indicates under the null hypothesis that the model is instrumentally overidentified. All estimates include industry control variables such as Bank Capital (*CAPASS*), Bank deposit (*DEP*), Non-performing loans (*NPL*), Financial Development (*FD*), Operating efficiency (*EFIC*), Financial Stability (*FST*), and macroeconomic variables such as Economic Growth (*GROWTH*) and Inflation (*INF*). z-statistics in bracket. Superscripts ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively. Source: Authors' elaboration.

nature and is associated with institutional fragilities. Such fragilities are associated with higher banking returns, bad practices from the political-banking relationship, greater market uncertainty, lack of regulation, breaches of investor rights and the possibility that banks manipulate their

financial statements to improve their valuation in the market. This weak institutional scenario allows banks to increase their profitability but leads them to face an adverse selection problem regarding their activities. This first result is relevant for political and regulatory authorities and their role in mitigating the issues of bank adverse selection. This aspect could even contribute to increasing banking financial stability.

Second, market structure is a relevant factor in banking performance. Our results suggest that a more concentrated market structure promotes higher bank performance. However, this result is reversed in countries with a higher institutional quality. Thus, as an indirect channel, countries' institutional environment affects the impact of market structure on bank performance. This result is empirically relevant for financial policy design because it shows that banking competition is compatible with higher returns only if a country's institutional environment quality is high. This result corroborates the view that market concentration is a systematic source of risk-return for banks in countries with poor institutional quality.

Third, income diversification improves banks' performance. This result indicates that the benefit of economies of scope is generally higher than economies of scale. Thus, banks obtain higher returns in a multi-product industry. Institutional environment quality also affects the impact of income diversification on banking performance. Our results suggest that banks achieve higher (lower) performance from diversification only if the institutional environment is of low (high) quality. So, banks take advantage of poor institutional development of the countries to achieve higher performance. Like market concentration, income diversification is a systematic source of bank profitability that is also related to institutional weaknesses. Another way, in countries with higher institutional development, banks could achieve higher performance from more specialized activities. This fact is also relevant for policymakers because it suggests them to design policies that promote higher institutional development. Then, at the banking industry level, the banks would adapt their strategies according to this environment.

Our research results have important implications for regulators and bankers alike. At the regulatory level, our research maintains that it is possible to develop regulations that promote competition and specialization in the banking industry that are compatible with higher performance.

At the bank level, our results argue that these institutions must adapt their structures and strategies according to the institutional context in which they operate. ◀

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