

**[RETRACTED ARTICLE] Intra-and Extra-bank
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INTRA- AND EXTRA-BANK DETERMINANTS OF LATIN AMERICAN BANKS' PERFORMANCE

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Abstract

This paper seeks to examine the determinants of the performance of Latin American banks during the period 1995-2010. The sample of banks is representative of the Latin American region because it includes small and large economies with different levels of development in their financial markets. The empirical analysis combines intra-bank determinants of its performance (bank-based variables) and extra-bank variables (institutional-based exogenous variables) through the GMM system estimator. The major findings are: i) that there is a non-monotonic, inverse U-shaped relationship between the capital ratio and profitability, ii) asset diversification impacts positively the banks' performance, iii) the high concentration of the banking sector in Latin America, as well as the international investment (mainly from the US and EU), allows banks to take advantage of immature financial markets and generate monopolistic profits, iv) the measures taken in order to improve market competition such as enforcement of the regulation and transparency have resulted in lower profits for the banking industry.

Resumen

Este documento tiene por objeto examinar aquellas variables de desempeño en los bancos de América Latina durante el período 1995-2010. La muestra de los bancos representa la región de América Latina, que incluye las economías pequeñas y grandes con diferentes niveles de desarrollo en sus mercados financieros. El análisis empírico combina determinantes intra-bancarios sobre su rendimiento (variables basados en la banca) y variables extra-bancarias (variables exógenas con base institucional) a través del sistema estimador GMM. Los principales resultados son: i) que existe una relación no monótona, en forma de U inversa entre la razón de capital y la de rentabilidad, ii) los impactos de diversificación de activos impactan positivamente el desempeño de los bancos, iii) la alta concentración del sector bancario en América Latina, así como la inversión internacional (principalmente de los EE.UU. y la UE), permite que bancos se aprovechan de los mercados financieros inmaduros y generan ganancias monopolísticas, iv) las medidas adoptadas con el fin de mejorar la competencia en el mercado, tales como el cumplimiento de la regulación y la transparencia se han traducido en menores ganancias para la industria bancaria.

JEL Classification: C23, G21, L2.

Keywords: Bank performance, Capital Ratio, Diversification, Institutional Environment.

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1. Introduction

Over the last thirty years the Latin American banking systems have experienced a quick and deep structural transformation. This evolution is characterized by the desire of the governments to improving the efficiency through the deregulation of the banking system, several periods of privatization of financial institutions, and the active participation of foreign banks. Additionally, in this process of consolidation, the economies in Latin America have experienced a regional integration and financial innovation led by the markets. As a result of this evolution, the market forces are placed in a more relevant position in their role in the credit allocation, financing institutions, investors, and families.

Although all these transformations have improved the allocation of financial resources, the economic impact is not necessarily positive. More complex risks, such as the foreign exchange rate risk, interest rates risk, market risk, among others, as well as the inherent risk of new financial products, the lower diversification, and the introduction of new market regulations might have made the economies more vulnerable. All this in conjunction with the consolidation of the banking sector in the region driven by the mergers, acquisitions and takeovers of local banks by foreign institutions has impacted the way banks make their profits (Chortareas, Garza-García, & Girardone, 2011).

The profitability of banks is not just determined by the factors mentioned above, but also and substantially by the different crisis observed during the last decades. According to Singh et al. (2005), despite of the relatively high spreads, the profitability of credit entities is still poor due to the high operating costs and the relatively high loan risks in the banking systems in the region.

The initial research on bank performance was focused on the determinants of bank interest margins. The seminal paper of Ho and Saunders (1981) has been the theoretical framework for most of the further research on the drivers of bank net interest margins. The dealership model of Ho and Saunders indicates that the optimal net interest margin is a function of risk aversion, the size of bank concentration, the interest rate risk on deposits and loans, and the degree of market competition. This model has been widely used and extended/improved in the literature.¹

In the same way as Naceur and Omran (2011), in this paper we follow an alternative approach focused on performance analysis using both net interest margin and return on assets with a more eclectic one-step estimation process based on a behavioral model of the banking firm. Previous literature focused on the study of bank profitability considers also this pragmatic approach of analysis where the determinants of profitability are classified as internal and external

¹For instance Lerner (1981) discusses critically that certain assumptions behind the model might lead to errors. Afterwards, Allen (1988) extends the Ho and Saunders model to consider the case of loan heterogeneity. In the context of European banks, Carbó Valverde and Rodríguez Fernández (2007) use a multi-output framework to show that the relationship between bank margins and market power varies significantly across bank specializations. Focused on the European Union banks, Maudos and Fernández de Guevara (2004) widen the Ho and Saunders model to take banks' operating costs explicitly into account. Additionally, Saunders and Schumacher (2000) use a multicountry setting and decompose bank margins into a regulatory component, a market structure component and a risk premium component.

factors (Bourke, 1989; Demirgüç-Kunt & Huizinga, 1999; Goddard, Molyneux, & Wilson, 2004; P. Molyneux & Thornton, 1992; Saona, 2011; Short, 1979). Literature usually considers that the internal drivers of bank profitability are those management controllable factors which account for the intra-firm differences in commercial bank profitability, given the external environment.² While the external factors are the set of those taken for granted, away from bank's control, and are expected to affect positively and/or negatively the banks' business (Athanasoglou, Brissimis, & Delis, 2008; Ramlall, 2006; Sufian & Habibullah, 2009). These variables are basically determined by the legal and institutional framework, the financial system, and the peculiarities of the economic (macroeconomic) setting where the bank performs its operations (Demirgüç-Kunt, Laeven, & Levine, 2004). Athanasoglou *et al.* (2008) investigate the determinants of bank profitability in a single equation framework decomposed in: bank-specific (which involves operating efficiency, financial risk, and banks' size), industry-specific (which includes variables which are not the direct result of managerial decisions) and macroeconomic-specific (cyclical output and expected inflation, for instance) determinants of profitability.

In this paper we consider the second and third group of determinants together as part of our extra-bank drivers of banks' profitability (Athanasoglou, *et al.*, 2008).

The general goal of this paper is to determine the effect of intra- and extra-bank drivers of performance of Latin American banks. Recently, Lin *et al.* (2012) addressed the issue that diversification activity in the banking industry has become an important trend, however the existing literature on the determinants of bank interest margins does not address the effect of such diversification. Therefore, the specific goal of this paper is, besides considering the intra- and extra-bank determinants, to analyze how diversification of banks' business determine such performance. The Latin American market seems to be a very interesting context to be studied basically due to the large process of liberalization of its economies, on the one hand, and due to the internationalization of its banking systems, on the other hand. An example of this is the consolidation of the Latin American banking system driven basically by the acquisition of local banks by foreign institutions (Yeyati & Micco, 2007). Additionally, most of the past research has been focused basically on the US and Europe. These two contexts are representative of developed countries but almost nothing has been done for emerging markets (Demirgüç-Kunt, *et al.*, 2004), and much less for the Latin American region (Kristjanpoller & Saavedra, 2014).

Concerning the internal determinants of banks' performance, the main findings support a non-linear relation between the capitalization of banks and their performance. This relationship is positive for low levels of capitalization but after a certain critical point, when the capitalization keeps on growing, the performance of banks worsens. In terms of the functional diversification, the results show that the asset diversification of banks has contributed to improve the performance in the banking sector in Latin America, contrary to the findings on revenue diversification. The results also prove that market power driven

² They also break down this classification into both financial and non-financial (off-balance sheet) statement variables.

by a highly concentrated industry impacts positively the net interest margin of banks. Finally, the external variables such as the evolution of the macroeconomic conditions, the development of the financial markets and the regulation of the financial intermediation also impact the performance of banks in the region.

The remaining of the paper is structured as follows. Section 1 provides a description of the related literature and the research hypotheses. Section 2 develops the methodology applied in the empirical analysis and describes the variables used. The main results are shown in Section 3 and after this, in the final section, the paper draws the conclusions and policy implications.

2. Related Literature and Research Hypotheses

2.1 Measures of Performance

Following Demirgüç-Kunt and Huizinga (1999) we will use two measures of banks' performance. The first one is the bank interest spread or net interest margin. We will use the ex-post spreads which are measured as the difference between the banks' actual interest revenues and their actual interest expenses. This ex-post spread differs from the ex-ante spread by the amount of loan defaults. The ex-post spread is a more useful measure because it controls for the fact that banks with high-yield, risky credits are likely to face more defaults.

The second measure of bank profitability is approached by the return on assets as opposed to the return on equity. Return on assets is a financial ratio used to measure the relationship of earnings to total assets. Jahan (2012) recently reported that the return on assets is the best and most widely used indicator of earnings and profitability supplemented by return on equity (ROE) and return on deposits (ROD). In fact, the return on assets assesses how efficiently a bank is managing its revenues and expenses, and also reflects the ability of the bank's management to generate the net income accruing to the bank from non-interest activities. Additionally, Demirgüç-Kunt and Huizinga (1999) argue that the problem in some developing countries is that banks operate with extremely low equity capital, often supported by implicit state guarantees, which inflates their return on equity. For comparison reasons, the return on equity (ROE) and the return on average equity (ROEA) are reported in Tables 2 and 3. It can be observed that the alternative measures for the return on equity are substantially higher than those for the return on assets as argued by Demirgüç-Kunt and Huizinga (1999). Therefore, since this work is focused on Latin American economies, we will use the return on assets as a proxy for performance in order to minimize the measurement bias in such an important variable.

2.2 Drivers of Banks' Performance and their Associated Hypotheses

2.2.1 Intra-Bank Determinants

Capital ratio: One of the major drivers of banks' performance is their capitalization. Even though there are not clear findings regarding the relationship between bank's capital ratio and its performance, Berger (1995b) argues that there is a positive relationship between the capital ratio and the bank's profitability. Such relationship is supported by two complementary arguments. The first one is addressed by the expected bankruptcy costs hypothesis; according to which banks will increase their capital ratio whenever the exogenous factors increasing the expected bankruptcy costs are greater. Therefore, the capital

ratio of banks increases in order to reduce the likelihood of default and thereby lowering the expected value of bankruptcy costs. The second argument is based on the signaling hypothesis. According to this hypothesis a positive relationship between banks' performance and their capital ratios is expected. In this case, management might be willing to convey information to the market concerning its future prospects and capacity to generate profits. As a result, a signaling equilibrium might exist where banks expecting to have improved future performance will exhibit higher capital ratios.

Additionally, a higher capital ratio involves a higher flexibility to take advantage of new business opportunities, mostly when banks have financial constraints derived from unexpected losses in its business operations (Goddard, *et al.*, 2004). For a sample of Middle East and North Africa countries, Maudos and Fernández de Guevara (2004) find that bank capitalization has a positive and significant impact on banks' net interest margin, cost efficiency, and profitability.

Besides these arguments, the literature also provides results for a negative relationship between capital and banks' performance. The traditional view of bank profitability suggests that a higher capital-asset ratio is linked with a lower return on equity because a higher equity capital ratio decreases the risk on equity and the tax subsidy provided by interest deductibility (Berger, 1995a). An excessively high capital ratio might denote that a bank is operating cautiously or over conservatively and ignoring potential profitable growth opportunities (Saona, 2011). This argument involves higher opportunity costs of capital when the capital ratio increases.

Berger and Bonaccorsi di Patti (2006) provide an argument for the negative relation between performance and capital. They use the efficiency-risk hypothesis where more efficient firms/banks tend to choose relatively low capital ratios, as higher expected returns from the greater profit efficiency substitute equity capital to some degree, in terms of protecting the firm against financial distress, bankruptcy, or liquidation. An additional argument supporting the negative relationship between capital ratio and performance in the banking industry comes from the agency costs hypothesis (Jensen, 1986; Jensen & Meckling, 1976). According to this, high leverage -or, in other words, a low capital ratio- reduces the agency costs of outside equity and increases firm value by constraining or encouraging the managers to act more in the interest of shareholders. Higher leverage can mitigate conflicts between shareholders and managers concerning the choice of investment (Myers, 1977), the amount of the undertaken risk (Jensen & Meckling, 1976), among others. Therefore, this higher control on managers would lead toward a better performance of banks. Empirically, Berger and Bonaccorsi di Patti (2006) find evidence consistent with the agency costs hypothesis that relatively low equity capital ratios in banking are associated with higher profit efficiency.

Most of the previous empirical literature that studies the relationship between banks' performance and equity capital ratio uses a monotonic linear relationship between these variables (Chaudhry, Chatrath, & Kamath, 1995; Goddard, *et al.*, 2004; Philip Molyneux, Remolona, & Seth, 1998; P. Molyneux & Thornton, 1992; Naceur & Omran, 2011). Saona (2011) however, for a sample of US banks, considers a non-monotonic relationship which seems to fit better

the theoretical arguments. In the same vein, Baele et al. (2007) find that there is a quadratic relationship between equity capital ratio and the banks' franchise value. Additionally, the findings of Memmel and Raupach (2010), using monthly regulatory data of large German banks, suggest that there exists a target level of capital structure for a substantial percentage of banks. Therefore, it might be hypothesized that there is a quadratic relationship between the equity capital ratio and the bank's performance which leads to observe an optimal capital structure which maximizes the profitability of banks.

Functional diversification: Turning to the diversification variable, we might say that fee-based and financial advising banking services constitute nowadays an additional source of revenues. This means that banking industry has been pursued to functional diversification through activities such as electronic pursue, delivery channels, clearing systems, investment banking, security trading, hedge funds, foreign exchange, assurance, and other financial services able to generate revenue in a variety of different ways, including interest, fees, transaction fees, and commissions (Valdez, 2007). Studies on functional diversification provide mixed results (Trujillo-Ponce, 2013). Mercieca *et al.* (2007) consider banks' diversification activities that occur either through shifts between non-interest income and interest income securities, through diversification within these two types of income generating activities, or through both simultaneously. For a sample of small EU banks their findings indicate that banks neither benefit from diversification within nor across business lines. Cybo-Ottone and Murgia (2000) find a significant positive abnormal returns associated with the announcement of domestic bank deals and by product diversification of banks into insurance for a sample of European banks involved in mergers and acquisitions. Wall and Eisenbeis (1984) find a negative correlation between bank earnings and securities broker/dealer earnings for a sample of US banks. Applying the seminal Ho-Saunders' (1981) model to a multi-output framework, Carbó and Rodríguez (2007) show that the relationship between bank margins and market power varies significantly across bank specializations. DeYoung and Roland (2001) find that fee-based activities, which represent a growing share of banking services, raise the overall level of volatility of earnings. Berger et al. (2010) conclude that all dimensions of diversification considered in their analysis (loan deposits, assets, and geography) were associated with higher costs and reduced profits. Additionally, Demirgüç-Kunt *et al.* (2004) argue that well-developed fee income sources will produce lower interest margins due to cross-subsidization of bank activities. Therefore, the fee income activities must be entered into the analysis in order to assess the impact of bank regulations and national institutions on bank margins. In the same line, for a sample of European banks Lepetit *et al.* (2008) find that banks expanding into non-interest income activities (or banks with more diversified businesses) present higher risk and higher insolvency risk than banks which mainly supply loans (or less diversified banks). Finally, as it can be seen, the effect of diversification on banks' performance is an empirical dilemma. Therefore, the hypothesis on banks' diversification establishes that its relationship with the performance of the bank might be positive or negative.

Bank size: An additional intra-bank driver of its performance comes from the relative size of the bank. The effect of banks' size on their performance underlies in an optimal size which maximizes the profitability. Athanasoglou

et al. (2008) suggest that in general the effect of a growing size on profitability has been proved to be positive to certain extent. They also say that for banks that became extremely large, the effect of size could be negative due to bureaucratic reasons. On this respect, Goddard *et al.* (2004) introduced the economies of scale and showed that, at small size of assets, banks can take advantage of the economies of scale, but they become exhausted as the size of assets increases. These findings, therefore, suggest that economies as well as diseconomies of scale drive the performance of banks. The model of Maudos and Fernández de Guevara (2004), following Ho and Saunders (1981) predicts that the unit margins are an increasing function of the average size of operations. The justification is that, for a given value of credit risk and of market risk, an intermediation operation of greater size would mean a greater potential loss, so the bank will require a greater margin. Likewise, the potential loss will be greater for those banks in which the volume of credit granted is greater. The empirical literature finds, for instance, that banks with larger operations bear a high risk, and, thus, charge higher margins, improving their performance (Maudos & Solís, 2009). In the opposite way, Hawtrey and Liang (2008) find that the size of bank transactions is inversely related to bank spread. They say that their finding is not surprising because transaction size is likely to be a proxy for scale economies. In contrast to Maudos and Fernández de Guevara (2004), Hawtrey and Liang (2008) predict margins to decline as bank scale increases, on account of the standard cost economies of scale effect. For a sample of different types of Chinese banks, Heffernan and Xiaoqing (2010) have recently found that bank size does not influence performance. However, the type of bank does -rural commercials had a positive average economic value added, and they significantly outperform the big four, the joint stocks, and city commercial banks, possibly because they operate as near local monopolies. Therefore, the banks' size-performance relationship might be positive or negative depending on the existence of economies or diseconomies of scale (Athanasoglou, *et al.*, 2008).

Credit risk: the credit risk might also drive the banks' performance. Theoretically, it is suggested that increased exposure to credit risk is usually associated with decreased firm profitability (Athanasoglou, *et al.*, 2008). Therefore, the way banks can improve their performance is by means of screening and monitoring the credit risk. Additionally, central banks set some specific standards for the level of loan-loss provisions to be adopted by the country's banking system; which means, in other words, that credit risk is a predetermined variable. Empirically, using both cross-section and pooled time-series regressions for a sample of US banks, Miller and Noulas (1997) suggest that the more financial institutions are exposed to high-risk loans, the higher the accumulation of unpaid loans and the lower the profitability. Nevertheless, in their recent work for Asian countries, Lin *et al.* (2012) find that risky loans are positively associated with net interest margins, supported in the idea that banks with more risky loans will require a higher net interest margin to compensate for the greater risk of default. Therefore, we might hypothesize that the relationship between credit risk and banks' performance might be positive or negative depending on which effect is stronger, either the demand for larger margins in order to offset the additional credit risk or the accumulation of unpaid loans which reduces the performance.

Bank concentration: according to both the market power and efficient-

structure hypotheses, there is a positive relationship between the bank concentration and performance (Saona, 2011). Bourke (1989) and Molodtsov and Thornton (1992) state that this positive correlation is due to increased market power yields monopolistic profits due to deviations from competitive markets. The collusion hypothesis also supports a positive relationship between banks' concentration and their performance. Demsetz (1973) finds that the assumption behind the collusion hypothesis is that the degree of market concentration exerts a direct influence on the degree of competition amongst the firms competing in a certain market. Then, highly concentrated markets will lower the cost of collusion and foster tacit and/or explicit collusion between firms. However, if the number of banks operating is large, the cost of collusion increases because it is more difficult to carry it out (Goddard, *et al.*, 2004). Nevertheless, if collusion is feasible, banks in the market will be able to earn monopoly rents. Then, we should expect a positive relationship between bank concentration and banks profitability.

In the same vein, market share has been considered a variable closely related to bank concentration in driving the bank performance. A larger market share means higher potential for profits because it gives more power to banks in controlling the prices and services they offer to customers (Rasiah, 2010). Nevertheless, Smirlock (1985) takes the discussion a little further suggesting that there is no relationship between concentration and profitability, but rather between bank market share and bank profitability. His arguments are based on the fact that market concentration is not a random event but, rather, the result of firms with superior efficiency obtaining a large market share. Then, according to his arguments, in this case market share and profits will be correlated but there will be no causal relation between market concentration and profits. Chortareas *et al.* (2011) is one of the first, if not the only one, to analyze the relationship between market structure, efficiency, and bank performance in Latin America. Their evidence shows that the performance of the banking industry is more consistent with the efficient structure hypotheses than with the market-power theories.

Despite of the previous arguments, in terms of the scope of this work focused on Latin American economies where banking concentration is substantially high (Chortareas, *et al.*, 2011),¹ we will not differentiate between bank concentration and market share but treat them as synonymous. Therefore, we should expect a positive correlation between bank concentration and performance.

Bank loans: bank loans are expected to be the main source of income and to have a positive impact on bank performance (Naceur & Goaid, 2008). Assuming no change in other factors, if more deposits are converted into loans, then it is expected to observe higher interest margins and profits. Empirical studies find that higher loan ratios are associated with higher interest margins, suggesting that risk-averse shareholders seek for larger earnings to compensate higher credit risk (Maudos & Fernández de Guevara, 2004; Naceur & Goaid, 2008).

¹ In fact, Baer and Mote (1985) present evidence that concentration is higher internationally than in the United States, and additionally, within the United States, concentration is higher in branching than in non-branching states.

Nevertheless, Demirgüç-Kunt & Huizinga (1999) find that there is a negative correlation between bank loans and earnings before taxes, but when the bank loans are interacted with the GDP it becomes positive. This fact indicates that higher income level bank's lending activities tend to be more profitable. In a recent paper, Naceur & Omran (2011) find that when market conditions enable the bank to provide additional loans with a profitable return/risk profile, this will, everything else remaining constant, improve the interest margin. Then, the expected empirical relationship between bank loans and performance should be positive.

Bank deposits: The demand for deposits represents the market profit opportunities (Berger, 1995a, 1995b; Berger & Bonaccorsi & Patti, 2006; Goddard, *et al.*, 2004). The demand for deposits is a primary source of agency problems due to the insurance protections given by the government (Berger, 1995a). In this case, one can expect a negative relationship between this variable and the bank's profitability. Nevertheless, the lack of competitive credit conditions in Latin America and the limited access to international capital markets lead banks to finance their growth with lower proportions of wholesale markets and higher proportions of customer deposits. Following the arguments of Trujillo-Ponce (2013), under this scenario, the deposits constitute a cheap and stable financial resource vis-à-vis with other financing alternatives, which supports a positive relationship between the banks performance and customer deposits for the Latin American context.

2.2.2 Extra-Bank Determinants

The empirical literature has been quite prolific also in providing drivers of the performance of banks which are exogenously determined. This set of variables are named here as extra bank determinants since they correspond to all those variables that are not defined internally by managerial decisions but by the current economic, institutional systems, and regulatory conditions. Demirgüç-Kunt *et al.* (2004), for instance, classify these kind of variables in regulatory variables, macroeconomic and financial system control variables, and institutional variables while Naceur and Omran (2011) classify them as regulatory impediments, macroeconomic variables, and financial and institutional development variables. For straightforwardness, in this paper, all these kinds of variables are called just extra-bank determinants. Demirgüç-Kunt *et al.* (2004) is one of the first papers focused on the examination of the impact of these external determinants on bank interest margins, controlling for bank-specific factors and cross-country differences. Their findings are based on a sample of banks from more than 70 countries where bank-specific variables seem to explain a substantial part of the within-country variation in intermediary costs (bank performance), as well as the bank regulations. Moreover, the authors stress the fact that bank regulations cannot be viewed in isolation from the overall institutional framework. Therefore, we believe that including the extra-bank variables into the empirical analysis is a must, more than a suggestion. Thus, among our extra-bank variables we accounted for:

Inflation rate: Perry (1992) studies the impact of inflation on bank profitability. The author suggests that the impact of inflation depends on whether inflation is fully anticipated. This implies that if inflation is totally anticipated, then, revenues increase faster than costs, improving, in this way, profitability.

Empirically, for a sample of banks from Middle East and North Africa countries, Naceur and Omran (2011) find that banks do not adjust their lending rates according to inflation and consequently they bear the entire negative cost of inflation. This means that banks respond to the upward adjustment in the discount rate by reducing margins, hence supporting the cost of refinancing their liquidity needs. Despite of this finding, most of the previous literature shows a positive impact of inflation on banks' performance (Bouhassira, 1989; P. Molyneux & Thornton, 1992).

GDP growth: the real GDP per capita growth is expected to have a positive impact on banks profitability according to the well documented literature on the association between economic growth and financial sector development (Naceur & Goaid, 2008). For a large sample of developed and developing countries Bikker & Hu (2002) document that the real GDP and other cyclical variables all turn out to have significant on banks profit and profit margins.

Financial development: the level of financial development across countries is also a widely mentioned driver of the banks' performance. Demirgüç-Kunt and Huizinga (1999) suggest a negative relationship between the size of the banking sector and profitability that reflect the higher level of competition in developed banking sectors. Later on, Demirgüç-Kunt and Levine (2004) find that financial development has a significant impact on bank profitability, pointing out that countries with developed stock markets might create a competitive environment that puts downward pressure on bank interest margins. Naceur and Omran (2011) suggest that a developed banking system reduces profitability through higher competitiveness, whereas stock market development improves bank performance especially in a lower stage of financial development. Then, less mature financial systems, such as the particular case where South American banks operate, allow the banking sector to take advantage of weaker competition in order to both, set higher margins up and increase profitability.

Reserve requirements: it corresponds to the reserve or liquidity requirements imposed by the government. To the extent that reserve holdings are not remunerated or remunerated at less-than-market rates, this sort of regulation impose a tax on the bank (Demirgüç-Kunt, *et al.*, 2004). In the same way, such reserves cannot be used efficiently in profitable business and, therefore, they are viewed as the opportunity cost of unused capital. For a sample of Latin-American banks during the mid-1990s Brock and Rojas-Suarez (2000) shows that reserve requirements act as a tax on banks that gets translated into a higher spread. Consequently, a statistically significant negative relation should exist between capital reserve requirements and the performance of banks.

Legal enforcement and regulatory system: Demirgüç-Kunt & Huizinga (1999) and later on Demirgüç-Kunt *et al.* (2004) find that better legal enforcement, and efficient regulatory systems are associated with lower levels of corruption which make the financial system to perform with much less frictions. Therefore, they suggest that there is a negative association between legal enforcement and the efficiency of the regulatory system and profitability of banks. Naceur and Omran (2011), however, find that an improvement in the law and order decreases the cost of efficiency without affecting performance. Gelos (2009) argues that a high recovery rate and shorter times to repossess collateral in countries with better legal environments are expected to reduce

bank spreads. Therefore, due to the particular characteristics of lower enforcement in legal system in Latin American economies we should expect that this variable impacts negatively the performance of banks.

3. Methodology and Variables' Measurement

3.1 Methodology

The statistical analysis is developed with a sample of 156 banks from Argentina, Brazil, Chile, Mexico, Paraguay, Peru, and Venezuela. The composition of the panel data is described in Table 1. Paraguay, Brazil, and Mexico have a significant relative weight in terms of the number of observations in the sample. In order to compound an efficient data panel, we included a minimum of 5 and an average of 6.18 continuous year observations per bank. The panel data includes 964 observations over the years 1995 to 2010. The information microeconomic data at bank-level (financial statements) was gathered from the Economica Dataset.

Table 1. Panel Structure

Country	Obs		Firms		Obs per Firm
	Number	%	Number	%	
Argentina	76	7.88%	13	8.33%	5.85
Brazil	228	23.65%	38	24.36%	6.00
Chile	71	7.37%	13	8.33%	5.46
Mexico	184	19.09%	31	19.87%	5.94
Paraguay	252	26.14%	35	22.44%	7.20
Peru	63	6.54%	10	6.41%	6.30
Venezuela	90	9.34%	16	10.26%	5.63
Total	964	100.00%	156	100.00%	6.18

Fuente: Elaboración propia con datos de Secretaria de Economía y Banxico

Due to the panel structure of our data, which is a combination of cross sectional and time series information, we have estimated the model using the generalized method of moments (GMM). The panel data methodology allows us to control for two basic problems in this kind of studies: the unobservable heterogeneity and the endogeneity problems (Arellano, 2002). The relationships between the banks' characteristics and their impact on performance must be interpreted carefully because of the possibility of observing spurious relations which foster endogeneity problems. An exogenous variable is that whose values are given and are not affected by the variable to be explained, which is said to be endogenous. As a result, there is an endogeneity problem when some of the explanatory variables are not strictly exogenous.

These models might also suffer from the unobserved heterogeneity problem, where the identified relationships are symptoms of some unobservable factor that drives both the dependent and independent variables.

Because in both of these problems the independent variables are endogenous and correlated with the residuals of the regressions, the OLS estimation is both biased and inconsistent (Brown, Beekes, & Verhoeven, 2011). As a result, we address the endogeneity and unobservable heterogeneity problems in the estimations by using the GMM estimator proposed by Blundell and Bond (1998)

and Bond (2002) which might provide further efficiency gains. Due to the possible weakness of the instruments stated by Alonso-Borrego and Arellano (1999), the GMM system estimator returns the most efficient and consistent estimations. In this context, the election of instruments is a key decision in handling the endogeneity problem. According to Athanasoglou et al. (2008) and Saona (2011) capital ratio is better modeled as an endogenous determinant of bank profitability in econometric models. The Hansen/Sargan tests assess the model specification validity (Hansen, 1996). This test examines the lack of correlation between the instruments and the error term. The AR1 and AR2 statistics measure the first and second serial correlation, respectively. The Sasabuchi (1980) contrast is applied in order to test the existence of a non-linear relationship between bank capitalization and performance. The Wald test of joint significance is also used to assess the significance of all the independent variables in the sample.

According to Berger and Bonaccorsi di Patti (2006) bank profits show a tendency to persist over time. This persistence may be the result of the market competition barriers, banks' regulatory capital-ratios enforcement, informational opacity and/or sensitivity to external shocks, to the extent that there is a serial correlation between them (Buse, Chen, & Kane, 1981; Memmel & Raupach, 2010). Then, these arguments suggest the application of a dynamic model about banking profitability.

3.2 Variables Definition

Performance as the dependent variable is measured by the net interest margin (NIM1) calculated as net interest revenue over average earnings assets. The other direct measure of the dependent variable is the return on assets (ROA).⁴

Concerning the independent variables, we measured banks' capital ratio (CAP) as the quotient between book value of equity capital and total assets, according to the extensive previous literature (Angbazo, 1997; Naceur & Goaid, 2008; Saona, 2011). Following Demirgüç-Kunt and Huizinga (1999) we used as an alternative variable of banks' capital ratio the book value of equity capital divided by total assets lagged one period. The reason to use one period lag for this variable is to correct for the fact that profits, if not paid out as dividends, have a contemporaneous impact on bank equity (Demirgüç-Kunt & Huizinga, 1999).⁵

In order to measure bank business diversification (*DIVERSIF*) we follow a pragmatic definition of the degree of both functional diversification of asset and revenue diversification (Baele, *et al.*, 2007; Laeven & Levine, 2007; Lin, *et al.*, 2012). Asset diversity is based on stock variables, while revenue diversity is based on flow variables. Then, diversity is measured as $DIVERSIF = 1 - 2x - 1$, where x is either the loans-to-assets ratio or the ratio of non-interest income

⁴ Alternatively, the net interest margin was calculated as the net interest revenue over average total assets (NIM2); net interest revenue over total assets (NIM3); and net interest revenue over total earning assets (NIM4). Similarly, as an alternative measure of the ROA we used the return on average total assets (ROAA).

⁵ Although the regression outputs with this variable are not reported for saving space reasons, all the results were consistent with those shown in this work.

to total operating income -the higher this ratio is, the more a bank relies on non-traditional bank activities. Diversity measured in this way takes values between 0 and 1 which means that the firm diversification increases with higher values for *DIVERSIF*.⁶

Bank size (*Size*) is measured as the natural logarithm of total assets (Demirgüç-Kunt, *et al.*, 2004; Naceur & Omran, 2011). The credit risk (*CredRisk1*) is measured by the loan loss provision over total loans (Lin, *et al.*, 2012). As additional measures for risk we included i) the ratio of net loans to total loans (*CredRisk2*) (Naceur & Omran, 2011), and ii) the Banks Z Score for the whole banking system per year (*BankZScore*).

Following Naceur and Goaid (2008) we measure bank concentration (*Conc*) as the fraction of bank assets held by the three largest commercial banks in each country. As an alternative measure for concentration we used the Lerner index, which has been widely used in the specific case of banks (Maudos & Fernández de Guevara, 2004). This index corresponds to the negative inverse demand elasticity. The values of the index range from 0 (perfect competition) to 1 (monopoly), which indicate that, in a highly competitive market, the banking sector has less capacity to set high margins resulting in a low Lerner index, and vice versa (Hawtrey & Liang, 2008). Algebraically, the Lerner index corresponds to $LernerIndex = ((TR - TC))/TR$, where *TR* is the total revenue and *TC* is the total cost.^{7 8}

The loan-to-assets ratio (*Loans*) measures banks loans (Lin, *et al.*, 2012). This records the business capacity of a bank and corresponds to total gross loans and leases divided by total assets (Saona, 2011). The demand for deposits (*Depsta*) is measured by the ratio of total deposits over total assets (Berger & Bonaccorsi di Patti, 2006; Maudos & Solís, 2009).

Concerning the extra-bank drivers of bank performance, the inflation rate (*Infl*) corresponds to the annual inflation rate (Demirgüç-Kunt & Huizinga, 1999), and the *GDP* per capita growth (*GDPgrowth*) is also measured in an annual basis. We use the stock market capitalization over *GDP* as a proxy for financial development (*FinDev*) (Naceur & Goaid, 2008). As alternative variables of financial development we used the quotient between the private credit by deposit money banks over *GDP*, and the total value traded in the economy as a percentage of the *GDP* (*PrivCred*) (Demirgüç-Kunt, *et al.*, 2004). Following Naceur and Omran (2011) we proxy the reserve requirements (*Reserve*) as the ratio of non-interest earnings assets divided by total assets, and, additionally,

⁶ This measure for diversification relies on the assumption that an equal division between lending and non-lending activities constitutes the optimal diversification mix (Baele, *et al.*, 2001).

⁷ In the same way as Hawtrey and Liang (2008) we choose the Lerner index instead of the Herfindahl index since the more static measure of market power may not capture the degree of competition. The Lerner index however captures more information about the actual price-setting behavior of banks in relationship to their cost structures than the size of banks whether measured in terms of deposits, relative size of balance sheets or income generated.

⁸ Since the Lerner Index was significant only in a handful of regressions, we decided not to report the results concerning this variable.

we include a dummy variable which takes on the value one if there are mandatory reserve or liquidity requirements and zero otherwise (Demirgüç-Kunt *et al.*, 2004).⁹ The legal enforcement variable (*Law*) was taken from La Porta *et al.* (2006) and is a measure of the effective rights of minority shareholders. Its scale is from 1 to 10. As an alternative variable of creditor rights and legal framework, we used the Legal System and Property Rights index (*Eco. Freedom*) from the Economic Freedom Index of the World Annual Reports (Selos, 2009). This index is comprised in a 0-10 scale and is a composite index of economic freedom (the higher the index the higher the economic freedom). Dummy variables by country were also introduced in the model.

In addition to the extra-bank determinants already described here, we used an alternative set of variables similar to those used in Ugalde and Saona (2011), such as: growth rate of *GDP* (*GDP*); total economy bank deposits (*BankDep*) (defined as the demand, time and saving deposits in deposit money banks as a share of *GDP*); foreign banks (*ForeignBank*); cost income ratio (*BankCostIncomeRatio*) (which is the total costs as a share of total income of all commercial banks); and the stock market turnover ratio (*StockMktTO*) (which is the value of total shares traded to average real market capitalization). The source of this information was the updated dataset gathered by Beck (2000). In addition to this, we included the corruption index (*Corrupt*) obtained from Perception Index of Transparency and Corruption gathered by Transparency International. This index ranges between 0 (highly corrupt) and 10 (very clean). We used the principal component analysis to summarize in just a few factors all the information we account with per country and year. The factor analysis has the advantage that the estimated factors are uncorrelated among them, making the regression analysis easier.

4. Results

4.1. Descriptive Statistics

Table 2 provides an initial outline of the variables used in the regression analysis for the whole sample. The four different measures of the net interest margin (*NIM1*, *NIM2*, *NIM3* and *NIM4*) are consistent with the average values recorded in previous literature (Angbazo, 1997; Fungáčová & Poghosyan, 2011; Lin, *et al.*, 2012). The average of the net interest margin among these four variables is about 7.13%. When the alternative measures of the return on assets (*ROA* and *ROAA*) are compared with those of the return on equity (*ROE* and *ROEA*), a large difference between these groups of variables is observed. The average return on asset is about 1.50% whilst the average return on equity is about 13.70% for a typical Latin American bank. Such difference is explained by the relatively low capitalization of banks which is about 11.70% of total assets (*CA1*). This finding is also very similar to previous literature for the banking industry in emerging markets (Naceur & Omran, 2011). The asset (revenue) diversification measured by *DIVERSIF1* (*DIVERSIF2*) has an average coefficient of 0.704 (0.494) which is virtually the same as the 0.690 (0.403) recently reported by Lin *et al.* (2012) for a sample of banks in emerging markets. The diversification coefficient ranges from 0 to 1 and such value increases with the

⁹ This dummy variable becomes relevant since Demirgüç-Kunt *et al.* (2004) find that about a quarter out of the 72 countries in their sample have no reserve requirements.

degree of diversification. What we can conclude out of these comparisons is that the asset as well as the revenue diversification of Latin American banks is not different from that observed in other developing markets. The net loans over total assets as a measure of risk (*CredRisk1*) indicate that about 45-50% of total assets correspond to net loans. Table 3 shows the same description by country. We can see that Venezuela, Paraguay, Costa Rica and Brazil are the countries with the highest average net interest margins; whilst in the other extreme are Argentina and Panama. The rest of the countries have average margins. Costa Rica, Venezuela and Panama have that highest capitalization ratio relative to the other countries included in the sample. The bank concentration (*Conc*) climbs up to an average of 50% of the assets in hand of the three largest banks by country for the sample during the period of analysis.

Table 2. Descriptive Statistics by Year

Variable/Years	Mean	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<i>Intra-Bank Determinants</i>																			
Nim1	0.083	0.087	0.090	0.104	0.096	0.098	0.109	0.108	0.09	0.099	0.096	0.088	0.074	0.074	0.075	0.075	0.067	0.067	0.073
Nim2	0.065	0.065	0.068	0.078	0.073	0.077	0.085	0.080	0.06	0.067	0.065	0.054	0.059	0.059	0.060	0.059	0.052	0.056	0.056
Nim3	0.060	0.057	0.063	0.069	0.064	0.068	0.077	0.075	0.06	0.074	0.069	0.049	0.053	0.055	0.054	0.053	0.049	0.053	0.053
Nim4	0.077	0.078	0.082	0.093	0.083	0.083	0.101	0.107	0.080	0.097	0.095	0.077	0.061	0.067	0.069	0.069	0.069	0.063	0.067
Roa	0.015	0.015	0.017	0.012	0.014	0.020	0.019	0.017	0.011	0.01	0.005	0.010	0.013	0.016	0.019	0.021	0.017	0.017	0.017
RoaA	0.018	0.018	0.018	0.014	0.018	0.024	0.022	0.018	0.014	0.01	0.010	0.011	0.015	0.018	0.020	0.023	0.019	0.018	0.019
Roe	0.137	0.124	0.158	0.057	0.094	0.167	0.122	0.124	0.071	0.1	0.058	0.071	0.129	0.154	0.184	0.201	0.167	0.152	0.158
RoaA	0.158	0.269	0.177	0.065	0.119	0.207	0.143	0.136	0.101	0.140	0.079	0.103	0.143	0.173	0.208	0.227	0.183	0.167	0.175
Cap	0.117	0.080	0.107	0.1	0.105	0.106	0.118	0.137	0.155	0.142	0.114	0.112	0.111	0.110	0.105	0.103	0.117	0.113	0.113
Cap	0.021	0.009	0.015	0.016	0.014	0.014	0.018	0.025	0.024	0.050	0.040	0.017	0.015	0.016	0.016	0.013	0.014	0.019	0.015
Diversif1 (assets)	0.704	0.763	0.767	0.804	0.764	0.662	0.7	0.747	0.6	0.720	0.709	0.707	0.698	0.693	0.672	0.664	0.671	0.687	0.694
Diversif2 (revenue)	0.494	0.373	0.475	0.506	0.463	0.459	0.401	0.366	0.24	0.501	0.406	0.476	0.522	0.474	0.532	0.527	0.540	0.570	0.585
Size	11.431	11.189	11.272	11.384	11.406	11.593	11.500	11.500	11.29	11.443	11.296	11.376	11.424	11.533	11.460	11.456	11.510	11.397	11.484
CredRisk1	0.026	0.015	0.019	0.033	0.031	0.021	0.02	0.031	0.02	0.028	0.074	0.020	0.013	0.012	0.021	0.024	0.030	0.029	0.019
CredRisk2	0.454	0.500	0.509	0.493	0.491	0.50	0.523	0.485	0.4	0.435	0.418	0.383	0.388	0.419	0.427	0.465	0.453	0.449	0.491
Cons	50.003	53.431	46.933	45.441	49.697	45.7	45.366	44.785	43.4	43.504	46.095	48.490	46.992	47.144	49.873	54.517	56.044	59.030	52.380
LernerIndex	0.256	0.226	0.236	0.237	0.212	0.21	0.208	0.181	0.211	0.204	0.237	0.243	0.269	0.339	0.317	0.284	0.248	0.269	0.294
Loan	0.479	0.508	0.547	0.523	0.519	0.533	0.523	0.502	0.467	0.456	0.416	0.411	0.439	0.446	0.444	0.484	0.471	0.469	0.510
Depta	0.607	0.550	0.681	0.671	0.68	0.695	0.576	0.6	0.596	0.575	0.562	0.608	0.595	0.608	0.612	0.609	0.574	0.581	0.569

Table 2. Descriptive Statistics by Year

Variable/Years	Mean	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<i>Extra-Bank Determinants</i>																			
Inf1	0.104	0.220	0.078	0.314	0.29	0.148	0.139	0.097	0.087	0.069	0.089	0.121	0.057	0.062	0.063	0.062	0.091	0.061	0.058
GDPgrowth	0.014	-0.001	0.001	0.009	-0.007	0.023	-0.004	-0.021	-0.003	-0.011	-0.015	0.009	0.042	0.029	0.042	0.049	0.034	-0.034	0.065
FinDev	26.681	18.100	11.004	15.136	13	16.338	15.595	15.443	18.428	18.657	20.102	22.934	27.193	33.042	35.864	44.790	34.06	31.121	41.518
PrivCred	25.738	21.787	25.850	27.991	27.441	25.519	23.687	22.819	23.462	23.013	21.686	20.406	22.323	24.030	27.149	28.742	32.747	33.278	33.285
Reserve	0.189	0.189	0.191	0.207	0.194	0.160	0.180	0.224	0.165	0.195	0.182	0.195	0.204	0.177	0.188	0.198	0.198	0.173	0.180
Law	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482	3.482
EconFreedom	6.326	5.761	6.326	5.977	5.960	6.012	6.206	6.357	6.238	6.240	6.223	6.215	6.549	6.590	6.510	6.512	6.465	6.491	6.491
BankZScore	13.674	11.408	11.231	11.890	11.747	12.331	12.011	11.879	13.157	13.765	15.091	15.699	14.984	15.900	14.938	13.575	14.660	13.047	13.047
<i>Alternative Extra-Bank Determinants</i>																			
GDP	0.020	0.029	0.030	0.018	0.043	0.015	-0.004	0.014	0.012	0.001	0.024	0.056	0.042	0.055	0.062	0.047	-0.021	0.078	0.078
BankDep	39.183	22.096	22.0	22.953	22.463	24.174	25.333	25.722	25.857	27.622	28.062	28.811	28.626	30.180	30.515	31.540	31.215	34.984	36.970
Foreignbank	0.445	0.320	0.320	0.372	0.374	0.390	0.437	0.465	0.442	0.462	0.479	0.471	0.464	0.451	0.453	0.449	0.448	0.461	0.453
BankConfidenceRatio	67.944	67.944	67.944	70.751	65.470	65.529	73.225	68.827	81.462	68.400	70.328	79.977	70.916	65.500	81.751	60.153	62.384	56.310	57.115
StockMktQ	20.574	4.683	9.732	11.707	14.799	19.092	15.546	12.985	12.727	12.983	13.431	15.628	18.599	20.663	21.489	28.777	35.143	31.015	33.157
Corrupt	2.085	2.367	2.168	2.293	2.374	2.635	2.658	2.898	2.716	2.913	3.032	3.194	3.261	3.354	3.224	3.469	3.351	3.341	3.343
LnGDPgrowth	0.121	0.126	0.928	0.911	1.037	1.004	1.095	1.047	1.120	1.065	1.072	1.143	1.210	1.343	1.502	1.528	1.618	1.583	1.559

Table 3. Descriptive Statistics by Country

Variable/Countries	Obs.	Mean	Std. Dev.	Min	Max	Argentina	Brazil	Chile	Mexico	Paraguay	Peru	Venezuela
<i>Intra-Bank Determinants</i>												
Nim1	964	0.083	0.054	-0.180	0.430	0.036	0.085	0.069	0.062	0.104	0.067	0.132
Nim2	964	0.065	0.040	-0.120	0.327	0.029	0.071	0.059	0.051	0.072	0.058	0.096
Nim3	964	0.060	0.037	-0.080	0.311	0.028	0.066	0.051	0.047	0.067	0.055	0.083
Nim4	964	0.077	0.051	-0.159	0.431	0.035	0.079	0.058	0.058	0.097	0.064	0.112
Roa	964	0.015	0.025	-0.469	0.116	0.008	0.015	0.014	0.010	0.019	0.016	0.025
RoaA	964	0.018	0.023	-0.262	0.126	0.007	0.017	0.017	0.012	0.021	0.018	0.028
Roe	964	0.137	0.200	-1.691	0.782	0.054	0.142	0.159	0.094	0.136	0.178	0.202
RoaA	964	0.158	0.211	-1.775	1.053	0.062	0.169	0.178	0.121	0.158	0.198	0.251
Cap	964	0.117	0.083	0.022	0.974	0.097	0.097	0.107	0.098	0.147	0.094	0.162
Cap	964	0.021	0.060	0.000	0.949	0.010	0.012	0.015	0.014	0.030	0.009	0.067
Diversif1 (assets)	964	0.704	0.228	0.000	1.000	0.833	0.663	0.545	0.594	0.746	0.820	0.746
Diversif2 (revenue)	964	0.494	0.261	0.000	0.999	0.568	0.437	0.565	0.500	0.484	0.633	0.442
Size	964	11.431	1.615	9.215	17.172	9.838	10.603	10.218	10.968	12.998	10.176	11.091
CredRisk1	964	0.026	0.048	-0.131	0.749	0.016	0.033	0.021	0.026	0.022	0.017	0.034
CredRisk2	964	0.454	0.179	0.005	0.920	0.452	0.333	0.656	0.488	0.483	0.553	0.423
Cons	964	50.003	14.313	27.512	100.000	37.058	39.452	53.345	66.496	45.463	71.743	48.041
LernerIndex	964	0.256	0.164	0.002	1.054	0.309	0.274	0.293	0.234	0.219	0.303	0.261
Loan	964	0.479	0.187	0.005	1.203	0.474	0.355	0.677	0.518	0.506	0.590	0.447
Depta	964	0.607	0.211	0.000	0.952	0.581	0.374	0.687	0.613	0.682	0.796	0.749

Table 3. Descriptive Statistics by Country

Variables/Countries	Obs.	Mean	Std. Dev.	Min	Max	Argentina	Brazil	Chile	Mexico	Paraguay	Peru	Venezuela
<i>Extra-Bank Determinants</i>												
Infl	964	0.104	0.117	-0.012	0.999	0.076	0.087	0.036	0.092	0.107	0.03	0.32
GDPgrowth	964	0.014	0.041	-0.117	0.162	0.035	0.021	0.027	0.008	0.00	0.08	0.004
FinDev	955	26.681	24.625	0.489	129.544	30.191	44.102	105.320	27.939	3.096	1.891	6.556
PriveCred	964	25.738	13.245	6.635	81.757	14.518	34.291	68.540	17.979	24.075	2.155	12.995
Reserve	964	0.189	0.125	0.006	0.812	0.150	0.148	0.143	0.167	0.274	0.183	0.228
Law	964	3.482	1.252	1.000	7.000	4.000	3.000	4.000	5.000	3.000	4.833	1.000
EconFreedom	953	6.326	0.817	3.980	8.020	6.289	5.835	7.888	6.643	5.690	7.173	4.617
BankZScore	964	13.674	5.654	3.107	34.634	5.058	18.976	20.913	11.729	11.621	1.632	11.630
<i>Alternative Extra-Bank Determinants</i>												
GDP	964	0.030	0.040	-0.109	0.183	0.044	0.034	0.037	0.023	0.05	0.051	0.020
BankDep	964	29.188	14.334	12.945	87.774	21.091	46.428	50.107	20.015	20.774	24.388	18.706
ForeignBank	964	0.445	0.145	0.100	0.900	0.350	0.347	0.445	0.0	0.82	0.596	0.206
BankCostIncomeRatio	964	67.943	18.850	46.726	192.247	74.106	61.709	54.176	44.874	11.497	57.549	63.092
StockMKT0	910	20.549	21.082	0.000	90.791	11.820	46.082	1.135	2.855	3.610	8.771	3.257
Corrupt	964	3.068	1.102	1.300	7.500	2.922	3.791	1.121	3.441	1.765	3.731	2.353
LnGDPgrowth	964	1.297	0.815	0.185	6.854	2.171	1.377	0.773	1.754	0.344	0.892	1.630

4.2. Multivariate Analysis

The results described in Table 4 show that there is an inverse U-shaped relationship between the banks' capitalization and their performance measured by the net interest margin as the net interest revenue over the average earnings assets (*NIM1*). The signaling hypothesis is a forward looking hypothesis on the performance of banks which supports a positive relation with the capitalization. Under this hypothesis, managers will be willing to disclose valuable information to the markets concerning positive future prospects and a better capacity to generate cash flows and profits. Therefore, those banks expecting to improve their performance, might exhibit less debt in their financial statements, or in other words, higher capitalization ratios. The traditionally tested signaling hypothesis suggests that as the information between managers and investors is asymmetrically shared, it can be less costly for managers of low risk banks to signal the bank's quality through high capital ratios than for managers of high risk banks, suggesting a positive relationship between capital-asset ratio and the bank's profitability (Bergel, 1995b). Additionally, the expected bankruptcy costs hypothesis also supports the positive bank performance-capitalization relationship. The expected bankruptcy costs postulates that financial institutions will increase their capitalization whenever the exogenous factors increasing the expected bankruptcy costs are greater. This is a protective measure against the likelihood of default.

Table 4. Regression Analysis

Variables	Coeff.		Coeff.		Coeff.		Coeff.	
	(p-value)		(p-value)		(p-value)		(p-value)	
	Std. Dev.		Std. Dev.		Std. Dev.		Std. Dev.	
Intercept	0.0378	***	0.0515	***	0.0155	***	0.0382	***
	(0.0000)		(0.0000)		(0.0000)		(0.0000)	
	0.0051		0.0057		0.0039		0.0051	
NIM_{t-1}	0.4037	***	0.4332	***	0.4077	***	0.4157	***
	(0.0000)		(0.0000)		(0.0000)		(0.0000)	
	0.0058		0.0059		0.0108		0.0070	
Cap	0.0985	***	0.0685	***	0.1145	***	0.1129	
	(0.0000)		(0.0000)		(0.0000)		(0.0000)	
	0.0093		0.0124		0.0183		0.0205	
Cap ²	-0.1403	***	-0.1615	***	-0.1881	***	-0.1767	***
	(0.0000)		(0.0000)		(0.0000)		(0.0000)	
	0.0122		0.0311		0.0364		0.0418	
<i>Optimization of NIM1</i>	<i>0.3508</i>		<i>0.2119</i>		<i>0.3043</i>		<i>0.3194</i>	

Table 4. Regression Analysis

Variables	Coeff. (p-value) Std. Dev.		Coeff. (p-value) Std. Dev.		Coeff. (p-value) Std. Dev.		Coeff. (p-value) Std. Dev.
Diversif1	0.0195 *** (0.0000) 0.0020				0.0217 *** (0.0000) 0.0013		
Diversif2			-0.0380 *** (0.0000) 0.0010		*** (0.0000) 0.0011		-0.0447 *** (0.0000) 0.0011
Size	0.0044 *** (0.0000) 0.0003		0.0049 *** (0.0000) 0.0003		0.0017 *** (0.0000) 0.0003		0.0027 *** (0.0000) 0.0003
CreditRisk1	0.0449 *** (0.0000) 0.0028		0.0517 *** (0.0000) 0.0035		0.0575 *** (0.0000) 0.0015		0.0633 *** (0.0000) 0.0031
Loan	0.0659 *** (0.0000) 0.0019		0.0591 *** (0.0000) 0.0018		0.0241 *** (0.0000) 0.0022		0.0208 *** (0.0000) 0.0017
LernerIndex	0.0032 ** (0.0000) 0.0003		0.0029 ** (0.0000) 0.0003		0.0118 *** (0.0000) 0.0003		0.0148 *** (0.0000) 0.0003
Depta	0.0038 ** (0.0300) 0.0017		0.0314 *** (0.0000) 0.0014		0.0320 *** (0.0000) 0.0019		0.0476 *** (0.0000) 0.0030
Infl	0.0197 *** (0.0000) 0.0013		0.0209 *** (0.0000) 0.0013				
GDPgrowth	-0.0665 ** (0.0000) 0.0016		-0.0460 *** (0.0000) 0.0011		-0.0576 *** (0.0000) 0.0026		-0.0460 *** (0.0000) 0.0010
Law	-0.0058 *** (0.0000) 0.0007		-0.0120 *** (0.0000) 0.0007				
DummyContry			Yes		Yes		Yes
AR1	-3.400 *** (0.001)		-3.410 *** (0.001)		-3.400 *** (0.001)		-3.420 *** (0.010)
AR2	-0.57 (0.571)		-0.25 (0.801)		-0.64 (0.521)		-0.15 (0.881)
Sargan	664.61 *** (0.000)		606.1 *** (0.000)		750.36 *** (0.000)		661.47 *** (0.000)
Hansen	113.08 (0.848)		119.58 (0.802)		120.21 (0.810)		125.45 (0.798)
Wald	1.10E+06 *** (0.000)		4.48E+05 *** (0.000)		5.47E+06 *** (0.000)		5.17E+05 *** (0.000)
Sasabuck	32.488 ** (0.051)		38.158 *** (0.000)		45.715 *** (0.000)		54.190 *** (0.000)
Lag limits	(8.000)		(8.000)		(8.000)		(8.000)
Kostruents	(272.000)		(272.000)		(272.000)		(272.000)
OBS	955		955		955		955

The findings also show that the relationship between banks' performance and their capitalization ratio is negative. The traditional view of bank profitability suggests that an excessively high capitalization is associated with both a decrease in the risk on equity and the tax subsidy provided by interest deductibility on debt. Therefore, a bank with a high capital to assets ratio might denote to be operating with overcautiously policies. A too conservative management might be taking no advantage of certain market opportunities and consequently experiencing lower performance.

A more analytical view supplied by the efficiency-risk hypothesis also supports the negative relationship between the capitalization ratio and the performance of banks. This hypothesis suggests that more efficient banks tend to choose relatively low capital ratios, as higher expected returns from the greater profit efficiency substitute equity capital to some degree. Finally, the non-linear performance-capitalization relationship might also be supported by the trade-off theory (Saunders & Schumacher, 2000). Under this paradigm, the greater the use of debt -less equity capital in the financial statements; the greater the interest expense will be and the higher the probability that the bank will be unable to meet its financial duties. Consequently, the required rate of return by new incoming shareholders or saver units will increase to reflect the higher probability of bankruptcy. The trade-off between the debt's advantages -when the capitalization ratio increases; and its disadvantages -when the capitalization ratio decreases; might be described with a non-monotonic relation between profitability and the capitalization ratio. This non-monotonic relationship is statistically significant according to Sasabuchi test (Lind & Mehlum, 2010; Sasabuchi, 1980) in all the equations.

The results reported in Table 4 describe that the profitability increases up to a certain threshold as capitalization increases. Beyond this optimal level or threshold, the bank performance declines. Therefore, it might be figured out that there is a level or critical point of capitalization at which the performance of the bank is maximized. This critical point is estimated optimizing the net interest margin as a function of the capitalization ratio. Beneath the CAP^2 variable in Table 4 the optimal level of capitalization which maximizes the profitability ($NIM1$) is displayed. The findings show that, at an average level of equity capital of about 29.66% of total assets, the net interest margin is maximized for the Latin American banks included in the sample. Therefore, concerning our hypothesis on capitalization we confirm the expected non-monotonic inverse U-shaped relationship between the capital ratio and the banks performance.

Concerning the functional diversification of banks, the findings seem to show that there is a differential relationship between functional diversification and profitability. The relationship is positive for the asset diversification ($DIVERSIF1$) but negative and statistically significant for the revenue diversification ($DIVERSIF2$). It seems to be that assets different than loans are a source of profitability; while inflows coming from non-interest income impact negatively the performance of banks. Even though banks in Latin America have followed the global trend of performing non-interest income activities such as foreign exchange, investment banking, and security trading, among many others, it seems to be that those activities cause a negative impact on the performance of banks. However, the asset diversity such as derivatives and remaining earning assets are a source of value which impact positively the performance of banks.

The relative size of banks has also a positive relationship with the net interest margin. Therefore, economies of scale are observed in the Latin American banking industry. The larger the bank is, the larger the dimension of the operations the bank incurs and therefore the higher the risk, and thus the bank will charge higher margins impacting positively their net interest margins (Maudos & Solís, 2009).

The results show that credit risk (*CreditRisk1*) impacts positively the profitability. It seems to be that banks with greater loan-loss provisions as a percentage of gross loans will require a higher net interest margin to compensate for the greater default risk. In institutional settings where the interest of investors is weakly protected such as in Latin America, it seems that banks transfer the cost of higher risk to the client who, ultimately, pays higher prices for the banking services. This finding is related to the bank concentration measured by the market power variable (*LernerIndex*). Emerging economies are characterized for having less developed financial markets with most of the intermediary activity concentrated in a handful of banks or financial institutions which can charge higher prices than those in competitive markets. Recall that since the mid-90s the banking sector in Latin America has experienced profound changes due to financial liberalization, the increase in foreign investments, and greater merger activities which often occurred after periods of financial crisis (Singh, *et al.*, 2005; Yeyati & Micco, 2007). All this drove a substantial market concentration in a few large banks with its subsequent increase in their market power. The results show that when the concentration increases, the profitability of banks increases too. In other words, banks exercise their monopolistic power obtaining abnormal profits that, otherwise, would not exist in more competitive environments.

There is a positive and statistically significant relationship between bank loans (*Loan*) and performance. It means that banks take advantage of the economies of scale in order to improve their performance. The lack of competitive conditions in the banking industry in Latin America leads banks to finance their activities with higher proportions of custom deposits (*Depsta*). In that sense, deposits constitute a cheaper source of funds compared with other financing alternatives, improving the performance of banks.

Regarding the set of extra-bank determinants of the bank performance, our findings suggest that inflation rates (*Infl*) are fully anticipated by managers, which cause that earnings increase faster than costs, improving the net interest margins. For the sample of Latin American banks, it seems that the growth of the Gross Domestic Product per capita (*GDPgrowth*) impacts negatively on the net interest margin of the banking industry. These are somehow peculiar findings because one would expect that the demand for credits by both, the households and firms, might impact positively the performance of banks. Nevertheless, it seems that in periods of economic boom or substantial economic growth, banks adjust by dropping down their margins. Apparently, the better performance of the economy fosters markets, making them more competitive and therefore the abnormal profits in the banking industry are minimized.

This very last finding concerning more competitive and efficient markets is supported by the market capitalization ratio (*FinDev*). According to our results, the higher the stock market capitalization as a percentage of the GDP, the lower the bank performance. This variable is a proxy for the financial development, which indicates that countries with developed stock markets have more competitive environments that press down on bank interest margins (Demirgüç-Kunt & Levine, 2004). Oppositely to these arguments, the recent work of Naceur and Omran (2011) suggests that stock market development impacts positively bank performance, particularly in countries at low stages of financial

development. Our findings seem to support the hypothesis that more developed capital markets create a more competitive environment which limits the abnormal profits of banks instead.

One additional alternative measure of financial development used in this work is the credit to private sector as a percentage of the $GDP(PrivateCred)$. The results based on this variable are also in line with those of $FinDev$. The credit to the private sector impacts negatively on the performance of banks. This finding supports the hypothesis that the greater availability of credit to the corporate sector in the economy is linked to higher competition and more developed banking sectors, leading to lower net interest margins.

Following Naceur and Omran (2011) we used the ratio of non-interest earning assets over total assets as a proxy for reserve requirements (*Reserve*). Recall that the costs of reserve are considered as a tax on bank operating activities, and, therefore, such cost of reserve requirement is the opportunity cost of keeping such reserves. In three out of the four regressions the results support a positive relationship between the costs of reserve and the bank performance. It means that average banks in Latin America try to reflect this tax (opportunity cost of reserves) by increasing their explicit margins and passing it on to customers. Ultimately the demand for banking products is impelled to pay higher prices than competitive prices as the cost of reserve increases.

We observe that the legal enforcement (*Law*) as a measure of the effective rights of the minority shareholders has a positive impact on bank's interest margins. It seems to be that legal environments associated with higher levels of protection of investors allow the markets to perform with fewer frictions. Consequently lower abnormal profits and net interest margins are observed when the legal enforcement improves. This finding is also correlated with the economic freedom index (*EconFreedom*) which showed a negative correlation with the bank performance.

Briefly, considering the extra-bank determinants of profitability, it can be concluded that, when the economy performs with less frictions in its financial markets and under sound enforcement of the legal and institutional systems, the profits reached by the financial institutions look more like profits of competitive markets.

4.3 Principal Component Analysis

Since the number of extra-bank determinants is large relative to the number of countries included in the sample, in this section we perform a principal component analysis in order to comprise these 16 variables in three factors only (see Table 5). Each of these factors summarizes more than 70% of the variance of the variables included in the factor. We defined the first factor as the Macroeconomic Environment which explain the 70.07% of the variance in Gross Domestic Product (GDP), inflation rate ($Infl$) and GDP per capita ($GDPgrowth$). The second factor is the Degree of Financial Development, explaining 76.90% of the variance of the variables market capitalization ($FinDev$), bank deposits over GDP ($BankDep$), credit to private sector as a

¹⁰ For space reasons the regressions including this variable were not included in this work but are available upon request to the author.

share of $GDP(PrivCred)$, the percentage of foreign banks among total banks ($ForeignBank$), the assets of the three largest banks as a share of assets of all commercial banks ($BankConc$), the banking system risk¹¹ ($BankZScore$), the operating efficiency measured as the total costs as a share of total income of all commercial banks ($BankCostIncomeRatio$), and the stock market turnover ratio ($StockMkTO$). Finally, the Regulatory System factor comprises the variables $Reserve$, Law , $Corrupt$ which is based on the Perception Index of Transparency and Corruption, $LnGDPgrowth$ which is the natural logarithm of $GDPgrowth$ as a measure of institutional development, and $EconFreedom$ explaining 79.59% of their variance.

Table 5. Principal Component Analysis of Extra-Bank Determinants

Component Name	% Variance	Eigen Value	Original Variable	Component Matrix
Macroeconomic Environment	70.07	1.102	GDP	0.449
			Infl	0.449
			GDPgrowth	0.000
Financial Development	76.9	4.61	FinDep	0.175
			BankDep	0.088
			PrivCre	0.510
			ForeignBank	0.213
			Conc	0.177
			BankZScore	0.479
			BankCostIncomeRatio	0.180
			StockMkTO	0.196
			Regulatory System	79.59
			Law	0.206
			Corrupt	0.289
			LnGDPgrowth	0.114
			EconFreedom	0.414

Regressions in Table 6 include as extra-bank determinants the set of these three factors which are used as consistency tests of our previous findings. In this table, we can observe that the non-monotonic relationship between banks' capitalization and performance is optimized at a level of capitalization of 22.86% of total assets, calculated as the average of the four regressions shown in Table 6. In other words, the bank performance increases when more internal capital is used to finance the operations. Nevertheless, when banks use excessive capital, it has a negative impact on performance, as predicted by the theory. The results also support the fact that the functional diversification in Latin American banks is a source of value. New business opportunities not explored in previous decades such as investment banks, security trading, hedge funds, foreign exchange markets, assurance, among many others are now profitable businesses. Most of these new business options are a source of modernization of the banking industry as a result of the merger and acquisitions with and by foreign banks.

The size of the bank, as well as the amount of loans as a proportion of total assets, and the deposits demanded by customers still show a positive relationship with the performance variable, in the same way as discussed in the previous section. Therefore, the larger dimension of the bank and its capacity

¹¹ The bank Z-score is estimated as $\frac{(ROA+Equity)}{Assets}/\delta(ROA)$; where the standard deviation of ROA , $\delta(ROA)$ is calculated from underlying bank-by-bank unconsolidated data.

to both finance the operations of productive sectors and the ability to collect sources from saving units, impact positively its performance.

Table 6. Regression Analysis. Extra Bank Determinants are Comprised in Three Factors

Variables	Coeff. (p-value) Std. Dev.	Coeff. (p-value) Std. Dev.	Coeff. (p-value) Std. Dev.	Coeff. (p-value) Std. Dev.
Intercept	-0.0415 *** (0.0000) 0.0021	-0.0392 *** (0.0000) 0.0033	-0.0377 *** (0.0000) 0.0046	-0.0164 *** (0.0000) 0.0041
Nim1 _{t-1}	0.5336 *** (0.0000) 0.0174	0.5551 *** (0.0000) 0.0058	0.5461 *** (0.0000) 0.0084	0.5047 *** (0.0000) 0.0074
Cap	0.1107 *** (0.0000) 0.0042	0.0862 *** (0.0000) 0.0088	0.0722 *** (0.0000) 0.0080	0.0667 *** (0.0000) 0.0091
Cap2	-0.1639 *** (0.0000)	-0.1650 *** (0.0000)	-0.1982 *** (0.0000)	-0.1908 *** (0.0000)
Diversif1	0.0246 *** (0.0000) 0.0011	0.0365 *** (0.0000) 0.0007	0.0363 *** (0.0000) 0.0009	0.0226 *** (0.0000) 0.0017
Size	0.0052 *** (0.0000) 0.0007	0.0043 *** (0.0000) 0.0002	0.0036 *** (0.0000) 0.0003	0.0034 *** (0.0000) 0.0003
Cdt	0.0476 *** (0.0000) 0.0021	0.0713 *** (0.0000) 0.0021	0.0741 *** (0.0000) 0.0018	0.0431 *** (0.0000) 0.0048
Loan	0.0378 *** (0.0000) 0.0019	0.0389 *** (0.0000) 0.0013	0.0355 *** (0.0000) 0.0010	0.0321 *** (0.0000) 0.0028
Mktpow	0.0028 *** (0.0050) 0.0010	0.0106 *** (0.0000) 0.0010	0.0057 *** (0.0000) 0.0010	0.0084 *** (0.0000) 0.0017
Depta	0.0211 *** (0.0000) 0.0006	0.0259 *** (0.0000) 0.0009	0.0279 *** (0.0000) 0.0009	0.0235 *** (0.0000) 0.0024
Macroecon. Environment	0.0077 *** (0.0000) 0.0001			0.0085 *** (0.0000) 0.0001
Financial Development		0.0097 *** (0.0000) 0.0016		0.0239 *** (0.0000) 0.0044
Regulatory System			-0.0105 *** (0.0000) 0.0009	-0.0238 *** (0.0000) 0.0019
AR1	-3.580 *** (0.000)	-3.390 *** (0.010)	-3.370 *** (0.001)	-3.590 *** (0.000)
AR2	-0.55 (0.581)	-0.58 (0.561)	-0.57 (0.567)	-0.51 (0.610)
Sargan	1108.87 *** (0.000)	1225.96 *** (0.000)	1227.23 *** (0.000)	1090.71 *** (0.000)

Table 6. Regression Analysis. Extra Bank Determinants are Comprised in Three Factors

Variables	Coeff. (p-value) Std. Dev.	Coeff. (p-value) Std. Dev.	Coeff. (p-value) Std. Dev.	Coeff. (p-value) Std. Dev.
Hansen	127.69 (0.847)	124.53 (0.850)	124.05 (0.849)	128.26 (0.899)
Wald	4.50E+06 *** (0.000)	1.70E+06 *** (0.000)	1.05E+06 *** (0.000)	1.50E+05 *** (0.000)
Sasabuchi	74.845 ** (0.024)	70.186 *** (0.000)	50.478 *** (0.000)	54.680 *** (0.000)
Lag limits	(8.000)	(8.000)	(8.000)	(8.000)
Instruments	(386.000)	(386.000)	(386.000)	(386.000)
OBS	964	964	964	964

Concerning the credit risk and the market power generated by the concentration, the results show that banks with more risky loans will use their market power to require higher net interest margins to the ultimate clients to compensate for the greater risk of default. In other words, although there have been important advances in order to make the banking systems more competitive in Latin America over the last thirty years, there is still a strong concentration in the banking industry. This fact makes banks work with several monopolistic characteristics, particularly in the prices charged for the banking services, the quality of the product mix, their bargaining power, and their preference in financing certain economic sectors in detriment of others.

Finally, results in Table 6 show that each factor compounding the set of extra-bank determinants of bank performance is statistically significant. Therefore, we can confirm that, undoubtedly, we cannot ignore the fact that the performance of banks is linked to other external factors such as the macroeconomic environment, the current financial development of the country, and the regulatory and legal system where banks operate.

5. Conclusions

The Latin American banking sector has experienced a profound change over the last few decades. The improvements of the banking services and its modernization have been inspired by the waves of mergers, acquisitions and takeovers by foreign banks, on the one hand, and by the openness of the local economies and changes in the regulatory systems on the other hand. All this has caused, among other things, a high concentration of the banking system in the region, translated in high market power in a handful of banks which eventually have determined the performance of the banking industry in large extent.

The goal of this paper has been, therefore, to measure the impact of the intra- and extra-bank drivers of performance in a representative sample of Latin American banks over the 1993-2010 time period. In the empirical analysis we have applied a pragmatic approach that allows us to consider all the available historical information per bank during the period of analysis. This approach is supported by the panel data analysis with the system estimator under the generalized method of moments GMM. This method allows us to control for both econometric issues, the heterogeneity of banks considered in the sample

as well as the potential problems of endogeneity which are caused because the strict exogeneity assumption might not hold for some variables in this study.

The main findings uncover evidence supporting the non-linear relationship between the bank capitalization and its performance. It seems to be that the performance improves as the capital increases relative to the bank's total assets but until certain critical value where excessive capital is detrimental for the bank's value. The positive capital-performance relationships supported by the expected bankruptcy costs and the signaling hypotheses. However, the negative impact of the capital ratio on the performance is caused by the decrease in the tax subsidy provided by interest deductibility, on the one hand, and by the efficiency-risk hypothesis, on the other hand.

Another important finding is related to the functional diversification of the banking business. We observed that the asset diversification in the banking sector in Latin America has a positive impact on its performance. Conversely, the revenue diversification has a negative impact. Other internal determinants of bank profitability, such as the bank size and the demand for deposits, were also statistically significant. However, the addition of external determinants of bank performance in the model reported, perhaps, the most important findings. On the one hand, there is a clear positive impact of the efficiency of the regulatory systems on the bank performance. In the same way, fewer frictions in the operation of financial markets impact positively on the performance of banks.

As a consequence of these findings, we can derive direct policy implications. First, despite the significant development of the financial markets over the last decades, we still observe high market power concentrated in only a few banks. Although the deregulation of the markets has taken place in most of the Latin-American region, further measures to make the markets even more competitive are still needed. Abnormal positive profits are observed after the hypotheses test which uncovers the fact that the ultimate consumer is paying not necessarily competitive prices. It is suggested that policy makers should emphasize more competition in the banking industry across the countries in the region. Additionally, as it was confirmed in the empirical analysis, an enhancement of the efficiency in the financial system impacts banks' profit. Therefore, an important effect is that policies aimed to improve even further the efficiency of financial markets should be developed. A direct outcome of better financial markets is the access to external sources of funds for small and large firms, the reduction of the transaction costs, less potential of agency problems and expropriation of wealth, among many others. Therefore, this entire phenomenon should cause a review of the public policies implemented so far in the Latin American region on the matter of competition and the efficiency and regulation of the financial markets, in order to make the financial intermediation process less costly for the society as a whole.

Bibliografía

- Allen, L. (1988). The Determinants of Bank Interest Margins: A Note. *Journal of Financial & Quantitative Analysis*, 23(2), pp. 231-235.
- Alonso-Borrego, C., & Arellano, M. (1999). Symmetrically normalized instrumental variable estimation using panel data. *Journal of Business & Economic Statistics*, 17(1), pp. 36-49.

- Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest rate risk, and off-balance sheet banking. *Journal of Banking & Finance*, 21(1), pp. 55-87.
- Allen, L. (1988). The Determinants of Bank Interest Margins: A Note. *Journal of Financial & Quantitative Analysis*, 23(2), pp. 231-235.
- Alonso-Borrego, C., & Arellano, M. (1999). Symmetrically normalized instrumental variable estimation using panel data. *Journal of Business & Economic Statistics*, 17(1), pp. 36-49.
- Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking & Finance*, 21(1), pp. 55-87.
- Arellano, M. (2002). Sargan's Instrumental Variables Estimation and the Generalized Method of Moments. *Journal of Business & Economic Statistics*, 20(4), pp. 450-459.
- Athanasoglou, P., Brissimis, S., & Delis, M. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions, and Money*, 18(2), pp. 121-137.
- Baele, L., De Jonghe, O., & Vander Vennet, R. (2007). Does the stock market value bank diversification? *Journal of Banking & Finance*, 31(4), pp. 1999-2023.
- Baer, H., & Mote, L. (1985). The Effects of Nationwide Banking on Concentration: Evidence from Abroad. *Economic Perspectives*, 9(1), pp. 3-17.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2000). A New Database on the Structure and Development of the Financial Sector. *World Bank Economic Review*, 14(3), pp. 597-605.
- Berger, A. (1995a). The profit-structure relationship in banking: Test of market-power and efficiency-structure hypotheses. *Journal of Money, Credit, and Banking*, 27(2), pp. 404-431.
- Berger, A. (1995b). The relationship between capital and earning in banking. *Journal of Money, Credit, and Banking*, 27(2), pp. 432-456.
- Berger, A., & Bonaccorsi di Patti, E. (2006). Capital structure and firm performance: A new approach to testing agency theory and an application to the banking industry. *Journal of Banking & Finance*, 30(4), pp. 1065-1102.
- Berger, A., Hasan, I., & Zhou, M. (2010). The effects of focus versus diversification on bank performance: Evidence from Chinese banks. *Journal of Banking & Finance*, 34(7), pp. 1417-1435.
- Bikker, J. A., & Hu, H. (2002). Cyclical patterns in profits, provisioning and lending of banks and profitability of the new Basel capital requirements. *Banca Nazionale del Lavoro Quarterly Review*, 55(221), pp. 143-175.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), pp. 115-143.
- Bond, S. (2002). Dynamic panel data models: A guide to micro data methods and practice. *Portuguese Economic Journal*, 1(2), pp. 141-162.
- Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America, and Australia. *Journal of Banking & Finance*, 13(1), pp. 65-79.
- Bourke, P., & Rojas Suarez, L. (2000). Understanding the behavior of bank spreads in Latin America. *Journal of Development Economics*, 63(1), pp. 113-134.
- Brown, P., Beekes, W., & Verhoeven, P. (2011). Corporate governance, accounting and finance: A review. *Accounting & Finance*, 51(1), pp. 96-172.
- Buscher, S. A., Chen, A. H., & Kane, E. J. (1981). Federal Deposit Insurance, Regulatory Policy, and Optimal Bank Capital. *The Journal of Finance*, 36(1), pp. 51-60.
- Carbó Valverde, S., & Rodríguez Fernández, F. (2007). The determinants of bank margins in European banking. *Journal of Banking & Finance*, 31(7), pp. 2043-2063.
- Chaudhry, M., Chatrath, A., & Kamath, R. (1995). Determinants of bank profitability. *American Journal of Business*, 10(1), pp. 41-46.
- Chortareas, G. E., Garza-Garcia, J. G., & Girardone, C. (2011). Banking Sector Performance in Latin America: Market Power versus Efficiency. *Review of Development Economics*, 15(2), pp. 307-325.

- Cybo-Ottone, A., & Murgia, M. (2000). Mergers and shareholder wealth in European banking. *Journal of Banking & Finance*, 24(6), pp. 831-859.
- Demirgüç-Kunt, A., & Huizinga, H. (1999). Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence. *The World Bank Economic Review*, 13(2), pp. 379-408.
- Demirgüç-Kunt, A., Laeven, L., & Levine, R. (2004). Regulations, Market Structure, Institutions, and the Cost of Financial Intermediation. *Journal of Money, Credit and Banking*, 36(3), 593-622.
- Demirgüç-Kunt, A., & Levine, R. (2004). Financial structure and economic growth: A cross-country comparison of banks, markets, and development (1st ed.). Massachusetts: Massachusetts Institute of Technology.
- Demsetz, H. (1973). Industry structure, market rivalry, and public policy. *Journal of Law and Economics*, 16, pp. 1-9.
- DeYoung, R., & Roland, K. P. (2001). Product Mix and Earnings Volatility at Commercial Banks: Evidence from a Degree of Total Leverage Model. *Journal of Financial Intermediation*, 10(1), pp. 54-84.
- Fungáčová, Z., & Poghosyan, T. (2011). Determinants of bank interest margins in Russia: Does bank ownership matter? *Economic Systems*, 45(4), pp. 481-495.
- Gelos, R. G. (2009). Banking Spreads in Latin America. *Economic Inquiry*, 47(4), 796-814.
- Goddard, J., Molyneux, P., & Wilson, J. (2004). The profitability of European banks: A cross-sectional and dynamic panel analysis. *The Manchester School*, 72(3), pp. 363-381.
- Hansen, L. (1996). Finite-sample properties of some alternative GMM estimators. *Journal of Business & Economic Statistics*, 14(3), pp. 262-280.
- Hawtrey, K., & Liang, H. (2008). Bank interest margins in OECD countries. *The North American Journal of Economics and Finance*, 19(3), pp. 249-260.
- Heffernana, S. A., & Xiaoqing, F. (2010). Determinants of financial performance in Chinese banking. [Article]. *Applied Financial Economics*, 20(20), pp. 1585-1600.
- Ho, T., & Saunders, A. (1981). The Determinants of Bank Interest Margins: Theory and Empirical Evidence. [Article]. *Journal of Financial & Quantitative Analysis*, 16(4), pp. 581-600.
- Jahan, N. (2012). Determinants of bank's profitability: Evidence from Bangladesh. *Indian Journal of Finance*, 6(2), pp. 32-38.
- Jensen, M. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *The American Economic Review*, 72(6), pp. 323-329.
- Kristjanpoller, W., & Saavedra, O. (2014). La eficiencia técnica de los bancos durante la crisis Caso aplicado a la rentabilidad de la banca comercial en México y Chile. *Revista Contaduría y Administración*, 59(1), pp. 95-122.
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2006). What Works in Securities Laws? [Article]. *The Journal of Finance*, 61(1), pp. 1-32.
- Laeven, L., & Levine, R. (2007). Is there a diversification discount in financial conglomerates? *Journal of Financial Economics*, 85(2), pp. 331-367.
- Lepetit, B., Nys, E., Rous, P., & Tarazi, A. (2008). Bank income structure and risk: An empirical analysis of European banks. *Journal of Banking & Finance*, 32(8), pp. 1452-1477.
- Levine, R. (1981). Discussion: The Determinants Of Bank Interest Margins: Theory and Empirical Evidence. [Article]. *Journal of Financial & Quantitative Analysis*, 16(4), pp. 601-602.
- Lin, J.-L., Chung, H., Hsieh, M.-H., & Wu, S. (2012). The determinants of interest margins and their effect on bank diversification: Evidence from Asian banks. *Journal of Financial Stability*, 8(2), pp. 96-106.
- Lind, J. T., & Mehlum, H. (2010). With or Without U? The Appropriate Test for a U-Shaped Relationship. *Oxford Bulletin of Economics and Statistics*, 72(1), pp. 109-118.
- Maudos, J., & Fernández de Guevara, J. (2004). Factors explaining the interest margin in the banking sectors of the European Union. *Journal of Banking & Finance*, 28(9), pp. 2259-2281.

- Maudos, J., & Solís, L. (2009). The determinants of net interest income in the Mexican banking system: An integrated model. *Journal of Banking & Finance*, 33(16), pp. 1920-1931.
- Memmel, C., & Raupach, P. (2010). How do banks adjust their capital ratios? [doi: DOI: 10.1016/j.jfi.2009.10.002]. *Journal of Financial Intermediation*, 19(4), pp. 409-528.
- Mercieca, S., Schaeck, K., & Wolfe, S. (2007). Small European banks: Benefits from diversification? *Journal of Banking & Finance*, 31(7), pp. 1975-1998.
- Miller, S., & Noulas, A. (1997). Portfolio mix and large-bank profitability in the USA. *Applied Economics*, 29(4), pp. 505-512.
- Molyneux, P., Remolona, E., & Seth, R. (1998). Modeling Foreign Bank Performance and Lending Behavior. *Financial Markets, Institutions & Instruments*, 7(4), pp. 26-41.
- Molyneux, P., & Thornton, J. (1992). Determinants of European bank profitability: A note. *Journal of Banking & Finance*, 16, pp. 1173-1178.
- Myers, S. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), pp. 147-175.
- Naceur, S. B., & Goaid, M. (2008). The Determinants of Commercial bank interest margin and profitability: Evidence from Tunisia. *Frontiers in Finance and Economics*, 5(1), pp. 106-130.
- Naceur, S. B., & Omran, M. (2011). The Effects of Bank Regulations, competition, and financial reforms on banks' performance. *Emerging Markets Review*, 12(1), pp. 1-20.
- Perry, P. (1992). Do Banks Gain or Lose from Inflation? *Journal of Retail Banking*, 14(2), pp. 25-30.
- Ramlall, I. (2009). Bank-specific, Industry-specific and Macroeconomic determinants of profitability in Taiwanese banking system: Under panel data estimation. *International Research Journal of Finance and Economics*, 34, pp. 160-167.
- Rasiah, D. (2010). Review of Literature and Theories on Determinants of Commercial Bank Profitability. [Article]. *Journal of Performance Management*, 23(1), pp. 23-49.
- Saona, P. (2011). Determinants of the Profitability of the US Banking Industry. *International Journal of Business and Social Science*, 2(22), pp. 255-269.
- Sasabuchi, S. (1980). A Test of a Multivariate Normal Mean with Composite Hypotheses Determined by Linear Inequalities. *Biometrika*, 67(2), pp. 429-439.
- Saunders, A., & Schumacher, L. (2000). The determinants of bank interest rate margins: An international study. *Journal of International Money and Finance*, 19(6), pp. 813-832.
- Short, B. (1979). The Relation between Commercial Bank Profit Rates and Banking Concentration in Canada, Western Europe, and Japan. *Journal of Banking & Finance*, 3, pp. 209-219.
- Singh, A., Belaisain, A., Colyns, C., De Masi, P., Krieger, R., Meredith, G., et al. (2005). Stabilization and Reform in Latin America: A Macroeconomic Perspective on the Experience Since the Early 1990s IMF.
- Smirlock, M. (1985). Evidence of the (non) relationship between concentration and profitability in banking. *Journal of Money, Credit, and Banking*, 17, pp. 69-83.
- Sufian, P., & Habibullah, M. (2009). Bank specific and macroeconomic determinants of bank profitability: Empirical evidence from the China banking sector. *Frontiers of Economics in China*, 4(2), pp. 274-291.
- Trujillo-Ponce, A. (2013). What determines the Profitability of banks? Evidence from Spain. *Accounting & Finance*, 53(2), pp. 561-586.
- Vaithianathan, S. (2007). An introduction to global financial markets (5 ed.). New York: Palgrave Macmillan.
- Valelado, E., & Saona, P. (2011). An integrated model of capital structure to study the differences in the speed of adjustment to target long term debt ratio among developed countries. *International Journal of Banking, Accounting and Finance*, 3(4), pp. 258-293.
- Wall, L., & Eisenbeis, R. (1984). Risk considerations in deregulating bank activities. *Federal Reserve Bank of Atlanta Economic Review*, 64(5), pp. 6-19.
- Yeyati, E. L., & Micco, A. (2007). Concentration and foreign penetration in Latin American banking sectors: Impact on competition and risk. *Journal of Banking & Finance*, 31(6), pp. 1633-1647.