Does Banking Market Structure Matter to Growth? Evidence from Ecuador

Viviana del Cisne Espinoza Loayza[1]

Abstract

This paper aims to determine how the banking market structure affects growth in Ecuador at a country and regional level. Banking concentration is significant for the country's economic growth, although it has no effect in regions that are intensive in primary production and has a positive impact in areas where the commercial sector predominates. The Granger-Sims test shows that banking concentration negatively affects the country´s economic growth in the long run. We also found that credit deepening positively affects growth in regions with robust financial systems, while adverse effects are in areas with less financial development.

Keywords: *Banking Concentration, Financial Intermediaries, Economic Growth, Financial Development.*

Introduction

Modern banking theory provides the framework for understanding how financial intermediaries influence economic growth (Berger et al., 2020; Khan, Ahmad, et al., 2018) and how the market structure affects the economy differently. The effects of banking development on growth differ in each country and consider specific and internal aspects (Coccorese, 2008).

Studies confirm that bank concentration generates positive effects on growth generally, supporting the positive focus of concentration on growth (Beck et al., 2008; Burgstaller, 2013; Cetorelli, 2004; Cetorelli & Gambera, 2001; Coccorese, 2008; Mitchener & Wheelock, 2013; Öyildirim & Önder, 2008). But more concentrated banking systems generate a greater incentive for monopoly banks to establish credit relationships, promoting access to investment funds for companies (Cetorelli & Gambera, 2001).

The banking sector is the economy's engine, especially in low-income and developing countries like Ecuador. It is crucial to focus on this system due to how it has evolved and its characteristics within the country's financial market.

The article analyzes how the banking market structure affects growth at the aggregate and regional levels in Ecuador. Since 2000, new financial intermediaries have appeared, shifting the market structure in some areas traditionally neglected by the private banking sector. The study's more geographically disaggregated analysis better estimates the effect of concentrating growth, considering on a more regional level that it collects the specific characteristics of three Ecuadorian regions, bringing us closer to the notion of the relevant market. The effects of banking market structure on growth differ regionally.

This paper is structured in the following four sections: Introduction, Market Structure, Data and Methodology, Results, and Conclusions. First, in the Literature Review section, we present a detailed analysis of the existing literature on the relationship between market structure, concentration, and economic growth. Second, we provide an overview of the Ecuadorian banking industry structure. This is followed by Section Three, where we detail the data and methodology used to achieve the research objectives. In Section Four, we present the results obtained, and finally, we discuss the conclusions drawn from the study.

[1] Faculty of Economic and Business Sciences. Universidad Técnica Particular de Loja, Ecuador, Email: vdespinoza@utpl.edu.ec

Market Structure, Institutional Framework, And Economic Growth

This study of the financial system's effects on growth began in the 1950s, but it was not until 1990 that the authors started to generate empirical studies on the subject, thanks to the work of King & Levine (1993). The positive or negative effects vary in each country due to the structural characteristics of the financial system and its economy, institutions, and regulations. Most studies present a macroeconomic view: (Levine, 1997); (King & Levine, 1993); (Odedokun, 1996a, 1996b); (Rajan & Zingales, 1998); (Ahmed & Ansari, 1998); (Jalilian & Kirkpatrick, 2005); (Jung, 1986); (Tongurai & Vithessonthi, 2018); (Christopoulos & Tsionas, 2004). Using cross-country panel data, these studies have different conclusions. Thus, countries with better-functioning financial intermediaries improve the placement of resources and accelerate productivity growth with positive repercussions on long-run economic growth (Beck et al., 2000; Levine, 1997).

The financial sector does not always positively affect the entire economy; expanding the financial system can reduce economic growth (Cecchetti & Kharroubi, 2012). This is evidenced by Tongurai and Vithessonthi's (2018) results, who found that banking development has different effects on various countries' industrial and agricultural sectors. Banking development generates an adverse impact on the industry while not affecting the primary sector.

Some variables that generate differences in the impacts of financial development and economic growth are the size of the financial sector and each country's development. Arcand et al. (2015) found that in countries with large financial systems, the effect on growth is negative, while a robust, positive correlation between financial development and growth was observed in countries with medium and small financial sectors. Thus, better functioning of financial intermediaries improves the allocation of resources and accelerates the growth of factors such as productivity, which generates positive repercussions on long-term evolution (Levine et al., 2000).

The studies focused on analyzing the impact of banking structure on growth and presented different results. The effect of concentration on development varies in the country, and in a specific country, those effects differ. Credit is a critical factor in promoting productivity in a country and improving the economic growth rate when it shifts from loans to families to loans for companies (Cournede & Denk, 2015). The effects on growth differ in each country and their development stages, where banks exhibit different patterns of conduct (Coccorese, 2008). Along this line, Öyildirim & Önder (2008) found a positive, significant relationship between local loan provisions and Turkey's per capita regional output growth. The impact of bank loans on the local economy's well-being changed significantly with the province's geographical location (Öyildirim & Önder, 2008). Their study (Khan, Ghafoor, et al., 2018) found that Chinese firms in the concentrated banking industry have poor access to credit, which leads to less economic growth. Higher concentration in the banking sector shows less firm creation and economic development; banks perform the function of an information producer and establish a strong relationship with their customers. Khan et al. (2018 also considered that banks in competitive markets take less care in screening firms and charge higher loan rates; the higher cost of borrowing decreases the availability of funds.

Cetorelli and Paretto (2000) show that bank concentration has offsetting effects; while bank concentration reduces the total amount of loanable funds, it increases the incentives to screen borrowers and, thus, the efficiency of lending. Moretti (2012) found that, in European Union-15 countries, a higher degree of bank concentration is associated with lower firm turnover only in countries with a large banking sector. For middle-income and rich countries, bank concentration is insignificant. Still, for low-income countries, the relations hold (Beck et al., 2004); in some cases, financial development exerts a disproportionately positive effect, especially in small firms (Beck et al., 2008). Studies reveal causal links between banking concentration and regional economic growth; as our findings show, banking concentration is significant for the country´s economic growth, although the effects in each region differ. In areas that are more intensive in primary production, banking concentration has no effect.

The regulatory changes generate impacts on market power and enable economic activities to promote better financial development or, failing that, trigger financial crises, all due to the quality of regulation in each

financial market. Regulatory changes and policy implementation must create a friendly entrepreneurial environment that affects financial intermediaries and growth (Hasan et al., 2017). Berger et al. (2020) conclude that policymakers can directly affect banking market structure through merger and acquisition approval policies, regulating interstate branching, and legal requirements on banks that differ by size. Besides, they conclude that countries with poor quality institutions impede market development, and, in these cases, bank concentration has a minor negative effect on economic growth. (Fernández et al., 2010) mentioned that bank market concentration has less of a negative impact on promoting growth in the presence of less developed institutions. The regulation affecting the banking industry´s market structure will also impact nonfinancial product markets, perhaps undesirably (Cetorelli, 2016).

Ecuadorian Banking Structure

The Ecuadorian financial system comprises three sectors: the private, public, and popular and solidary financial sectors. 24 private banks, divided into sizes, make up the private sector. The Superintendence of Banking (SB) organizes private banks into large, medium, and small ones. Its business focuses mainly on commerce and consumption. Seventeen banks are commercial, placing loans in the abovementioned segments. Seven banks specialize in microcredit, concentrating only 4% of the total portfolio set.

Another important sector in the banking industry is the popular and solidarity economy sector. The Superintendence of Popular and Solidarity Economy (SPSE) classified the savings and credit cooperatives by segments from 1 to 5, using the variable of total assets. According to SPSE, in 2017, the cooperative financial sector constituted 696 entities.

The Herfindahl and Hirschman Index shows changes in the competition level in the banking industry. The Ecuadorian national banking system is a poorly concentrated industry, with an HHI exceeding 900 points. Even though the national financial system is a low concentration market, analyzing the financial system shows that it behaves differently in each region of the country. Using credit as a variable, we found that the Coast and Sierra regions have financial systems of medium concentration; the five most significant institutions concentrate more than 60 percent of the total credit granted in these regions. Table 1 shows the respective indices for the years 2007 and 2017.

Table 1. Concentration Index by Region in Ecuador: Data from SB and SPSE.

Concentration index	COAST		SIERRA		AMAZON		INSULAR	
	2007	2017	2007	2017	2007	2017	2007	2017
CR1	29%	19%	30%	21%	30%	19%	58%	38%
CR3	50%	46%	53%	50%	51%	40%	89%	97%
CR5	65%	67%	62%	65%	68%	56%	97%	99%
HHIndex	1238	1057	1350	1082	1381	856	3932	3224

The Amazon region experienced a major change in its concentration level due to a change in market size. In 2007, this region had thirty-five financial institutions, and in 2017, the number reached 41. Because of this, the HHI reduced to 856 points. The Island Region (Galápagos Islands) has a higher concentration level, with an HHI that exceeds 1,500 points.

Data And Methodology

Data and Variables for Measuring Banking Concentration

To measure banking concentration, two commonly used ratios, the Concentration Ratio 3 (CR3) and the Herfindahl-Hirschman Index (HHI), are utilized and combined in the variable CIndex. We employed the Concentration Ratio (CR) and the Herfindahl and Hirschman Index (HHI). These concentration measurements were determined using the variable of gross credit to the private sector. These indices were

selected for the twenty-four provinces of Ecuador from 2007 to 2017. A data panel was built, resulting in a balance sheet with 264 observations. Precisely the same process was used to establish regional concentration indices.

The three most significant financial institutions in each province were able to obtain the CR. We selected the three largest banks because they concentrate about 40 and 50 percent of the total credit market share.

The credit concentration ratio (CR3) was computed as follows:

$$1$$

$$CR3_t^r = \frac{\sum_{i=1}^{3} CRED_{i,t}^r}{\sum_{i=1}^{n} CRED_{i,t}^r}$$

CRED is the value of loans for financial institutions (i) at the end of each year (t). The amount of loans held by the central three financial institutions in each province (r) at the time (t) is divided by the total of loans of all the (n) active financial institutions of the same area (the term n varying according to each province) according to the number of intermediaries in each one.

CREDIT, which illustrates the relationship between the province's total financial system credit and its actual gross value added

DEPOSIT shows the ratio between the financial system's total deposits by the province and the real gross value added by the province.

To collect the heterogeneity in each province, we determined two measures:

OILPROV is a dummy variable to identify the oil provinces versus the non-oil ones, taking a value of 1 for oil provinces and zero for non-oil areas. We considered these measures because Ecuador is a traditional oil-producing country, and provinces in the Amazon region have the primary economic activity of oil extraction.

We use three variables that reflect the country's production orientation, which differs in each region.

AGRICULTURE: production level of the agriculture sector for the province over the gross national value-added (GNVA).

COMMERCIAL: production level of the commercial sector for the province over the GNVA.

MANUFACTURING: production level of the manufacturing sector for the province over the GNVA.

Due to the Gross Domestic Product (GDP) not being calculated in each province in Ecuador, we employ the real per capita Gross Value Added (GVAPCA) as an indicator for economic growth. This data comes from the Central Bank of Ecuador (BCE). The Gross Value Added (GVA) is the proxy for the GDP, which is used to measure economic growth.

Methodology For Analyzing the Relationship Between Banking Concentration and Economic Growth

To determine the relationship between banking concentration and economic growth, we use random effects panel data. We apply two regressions, both at the aggregated level and for each region. In the regional regressions, the variable that collects the producer orientation varies depending on its significance in the model.

The equation at the aggregate level is:

2

$$Growth = \beta_0 + \beta_1(CIndex) + \beta_2(CREDIT) + \beta_3(DEPOSIT) + \beta_4(OILPROV) + \beta_5(COMMERCIAL) + \varepsilon$$

Growth is the dependent variable and shows the variation of the real gross value added per capita by province. Cr3 and HHI are measures of banking concentration in each province; CREDIT and DEPOSIT are banking deepening measurements, including the credit and deposit relationship with the gross value added in each area. To establish the province's heterogeneity, we use two measures: COMMERCIAL is the ratio of the gross value added by the sector to the GDP in each province, and OILPROV is a dummy variable that defines an oil province.

The same variables used in the equations at the national level are considered. Depending on each region, the variables remain or change due to the degree of significance in the model. For the Sierra region, we use the variable AGRICULTURE; in the Coast, the variable added was COMMERCIAL; and finally, for the Amazon region, COMMERCIAL and OILPROV were used. Because the Insular (Galapagos) region has only one province, this significantly reduces the number of observations; therefore, it was not considered for the regional analysis.

Causality Relationship

Based on Coccorese (2008), we also use the Granger-Sims causality test to determine the causal relationship between bank concentration and economic growth. This relationship is applied to the aggregated level. We use the following unrestricted equations:

3

$$\Delta LGrowth = \beta_0 + \beta_1(\Delta LnCR3t_{-1}) + \beta_2(\Delta LGrowtht_{-1}) + ui$$

4

$$\Delta LnCR3 = \beta_0 + \beta_1(\Delta LGrowtht_{-1}) + \beta_2(\Delta LnCR3t_{-1}) + ui$$

LGrowth is the logarithm of the real gross value-added per capita in each province. LnCR3 is the logarithm of the concentration ratio.

Assuming we use panel information, the heteroscedasticity correction was applied when estimating the regressions to correct this problem in advance. We also determined that the model does not present autocorrelation problems.

Current growth rates are regressed on lagged growth rates; then, lagged values of concentration ratios are added as explanatory variables.

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Results

We present the results in two sections; first, the results at the aggregate level, and later, the results by region.

Aggregated Results

We have a balanced data panel that includes 264 observations. We transformed the growth and HHI variables into logarithms to stabilize the regressors and reduce possible outliers. We determined the effect of banking concentration on economic growth using random effects. Table 2 shows the model results.

Table 2. Model Results

Variables	[Model1]	[Model2]
CR3	0.435*	
	(2.56)	
CREDIT	-0.0918	-0.102
	(-0.49)	(-0.54)
DEPOSIT	0.294*	0.303*
	(2.47)	(2.54)
OILPROV	0.799***	0.811***
	(3.39)	(3.44)
COMMERCIAL	8.172*	8.117*
	(2.11)	(2.09)
lnHHI		0.127*
		(2.34)
Constant	0.670***	-0.00755
	(4.16)	(-0.02)
Observations	**262**	**262**
Adjusted R^2	within = 0.0609	within = 0.0571
	between = 0.3309	between = 0.3276
	overall = 0.3096	overall = 0.3063

t statistics in parentheses

*p< 0.05, **p< 0.01, ***p< 0.001

We carry out two equal models, changing only the variable that measures bank concentration, keeping the rest of the same variables. In model 1, we use CR3, and in model 2, the logarithm of HHI. In both models, these variables are significant and, therefore, affect growth. The same goes for the DEPOSIT and COMMERCIAL variables. In the two models, the variable that measures financial deepening as a function of credit (CREDIT) is not significant in predicting growth and is the only variable whose coefficient is negative (-0.019 and -0.102). Thus, financial deepening is negatively linked to growth, as demonstrated by Cournede & Denk (2015), Rousseau & Wachtel (2011), and C.H. Shen & Lee (2006).

The dichotomous variable (OILPROV) has a significant level in the two models. Provinces that, by their nature, are oil producers tend to impact economic growth; the relationship is also positive.

Bank concentration has positive effects on economic growth in Ecuador. The effect occurs to a greater extent when the concentration of the three largest financial entities is considered rather than concerning the HHI.

Regional Results

This section presents the results at the regional level, including Coast, Sierra, and Amazon. We determined the effect of banking concentration on economic growth using random effects for each region. Table 3 shows the model's results.

Table 3. Model Results by Region

	SIERRA			*COAST*			*AMAZON*	
	[Mo1]	**[Mo2]**		**[Mo1]**	**[Mo2]**		**[Mo1]**	**[Mo2]**
lnHHI	0.0191		**lnHHI**	0.237**		**lnHHI**	-0.728**	
	(0.52)			(3.11)			(-2.87)	
CREDIT	0.329***	0.329***	**CREDIT**	-0.822**	-0.899***	**CREDIT**	-4.486***	-4.397***
	(3.31)	(3.34)		(-3.15)	(-3.49)		(-5.96)	(-5.79)
DEPOSIT	0.284***	0.283***	**DEPOSIT**	0.994***	1.006***	**DEPOSIT**	-0.516	-0.486
	(4.80)	(4.78)		(4.66)	(4.81)		(-0.30)	(-0.28)
AGRICULTURE	68.11***	68.03***	**COMMERCIAL**	4.416***	4.530***	**COMMERCIAL**	798.7***	784.0***
	(6.70)	(6.70)		(5.57)	(5.88)		(6.66)	(6.48)
CR3		0.0709	**CR3**		0.902***	**MANUFACTURING**	-4606.6***	-4533.9***
		(0.61)			(3.52)		(-6.94)	(-6.77)
						OILPROV	0.403*	0.413*
							(2.25)	(2.27)
						CR3		-1.742*
								(-2.57)
Constant	0.490	0.589***	**Constant**	-0.669	0.566***	**Constant**	8.442***	4.088***
	(1.80)	(7.20)		(-1.22)	(4.15)		(4.14)	(6.69)
Observations	120	120		65	65		66	66
	within = 0.4293	0.4315	within	0.2032	0.1908	within	0.1484	0.1453
Adjusted R^2	between = 0.7237	0.7206	between	0.8489	0.8897	between	0.9921	0.9917
	overall = 0.6959	0.6933	overall	0.5899	0.6055	overall	0.8324	0.8283

t statistics in parentheses *p< 0.05, **p< 0.01, ***p< 0.001

Note: For the Amazon region, the oil variable is included, unlike the rest of the regions.

The results highlight significant variations in the impact of concentration on growth across different regions. The other variables used in the study show different effects, too. Deepening deposits has a positive impact on growth in the Sierra and Coast region, while in the Amazon, its effect is negative. The variables that govern productive activity in each region yield different results according to their importance in the region.

Bank concentration (CR3 and HHI) does not influence economic growth for the Sierra region because it has a poorly concentrated banking market. However, the variables (CREDIT and DEPOSIT) positively affect growth, highlighting the importance of the amount of credit available as well as the level of deposits in the economy, benefiting development (Moretti, 2012), (Christopoulos & Tsionas, 2004), (King & Levine, 1993a), (Nazmi, 2005), and (Nwosa et al., 2011). The agriculture variable is the one that has the most significant effect on growth; therefore, the higher the production level in the primary sector, the more significant the impact on growth.

In contrast, on the Coast, banking concentration positively affects growth; both are evidenced using the two concentration measures. The financial system in the region is like an oligopoly. The deepening of credit negatively affects growth; this result shows that, for this region in particular, credit does not promote growth, unlike deposits, whose effect is positive and significant, presenting the same product at the national level. Its high level of business characterizes the Coast region, which is focused on wholesale and retail trade. That is why the production level in this (commercial) sector has direct, significant impacts on the GVAPCA, unlike agriculture and manufacturing, which are not growth promoters for the region.

Finally, the Amazon region has different results; its highly concentrated financial system hurts growth. The limited supply of financial products and services generates this depressing effect on growth since the existing ones respond to two financial institutions. The same happens with the manufacturing variable; as it grows, the gross value added tends to decrease significantly. The contribution of the productive sector in the area is scarce in manufacturing companies; the region's productive development is focused on trade, much of it retail and informal; therefore, as trade increases, gross value added grows, generating a positive effect. The OILPROV variable also shows a positive relationship with growth, although it is less significant.

Causality Relationship

In addition, we applied the Granger-Sims causality test to determine the causal relationship between economic growth and concentration, using CR3 as a measure of banking concentration. Despite a positive relationship between bank concentration and economic growth at the macro level, the causal relationship between CR3 and growth presents a different connection for the short and long run, as shown in Table 4.

Table 4. Results Granger-Sims Causality Test

Granger – Sims Causality Test: results			
(a) Dependent variable: $\Delta LGrowth$	1-year difference	2-year difference	3-year difference
Constant	0.0214 (0.0054) ***	-0.0096 (0.0060)	-0.0019 (0.0093) ***
$\Delta LnCR3t_{-1}$	-0.0691 (0.0446)	-0.0895 (0.0317) ***	-0.0876 (0.0278) ***
$\Delta LGrowthAt_{-1}$	-0.2675 (0.0698) ***	-0.6741 (0.0520) ***	-0.7641 (0.0456)
Obs.	214	190	166

(b) Dependent variable: $\Delta LnCR3$			
Constant	-0.0130 (0.0065) **	0.0008 (0.0089)	0.0017 (0.0136)
$\Delta LGrowthAt_{-1}$	-0.0390 (0.0398)	-0.0408 (0.0369)	-0.0191 (0.0288)
$\Delta LnCR3t_{-1}$	-0.1475 (0.0679) **	-0.5114 (0.0601) ***	-0.6739 (0.0550) ***
Obs.	214	190	166

Generalized least squares panel estimations. Numbers in parentheses denote heteroskedasticity-adjusted t-statistics for the parameter estimates.

* Significance at 10%.

** Significance at 5%.

*** Significance at 1%.

The results show a causal relationship between growth and bank concentration in the long run (2-year and 3-year regressions) (significant at 1%). However, this relation is indirect, so the concentration causes negative impacts on economic growth. The more concentrated banking system tends to slow economic growth from the second and third years onward. These results are consistent with the idea that firms that operate in concentrated financial markets have less access to credit, hurting growth (Khan, Ghafoor, et al., 2018; Fernández et al., 2010).

In Ecuador, having a robust financial system is not favorable for growth in the long term; this finding is consistent with the theoretical prediction that higher bank concentration results in a lower amount of credit available in the economy as a whole (Cetorelli & Gambera, 2001). So, a more atomized market structure would be more advisable for the country in terms of its effects on general growth in the short and long run, considering that Ecuador is a developing country with its capital market still incipient. Therefore, it is necessary to improve the levels of competition between financial intermediaries, achieving a better allocation of credit towards productive activities that generate added value, thus contributing to the economic growth of each region and the country as a whole.

As results show in the short run, there is no causality between concentration and growth or reverse. Therefore, the CR3's measure of bank concentration is only a reliable predictor of economic growth over the long term; regardless, this effect is negative. The results show that growth does not affect bank concentration, indicating only an essential unidirectional relationship, unlike the results presented by Coccorese (2008a). In the long term, economic expansions tend to reduce banks' market shares and thus help achieve stronger competition among credit institutions. The relationship between variables is always negative, indicating that bank concentration does not spur economic growth in Ecuador, generating a depressant effect.

Conclusions

This paper aims to demonstrate whether bank concentration affects the economic growth rate in Ecuador. The results show significant differences at the national and regional levels; economic growth is affected by other variables besides banking concentration. The results indicate a direct, positive relationship between concentration and growth at the macro level. The variables used in the model (DEPOSIT, COMMERCIAL, and OILPROV) also turn out to be good predictors of growth, generating a positive effect at the national level. The impact of concentration and the rest of the variables considered differ significantly at the regional level. The CREDIT variable has no effect on the growth of the country as a whole, even though in the Amazon and Coast regions, its impact is negative, suggesting that the spatial distribution of local loans is vital in analyzing the local per capita growth rates at regional levels. In the Sierra region, the primary sector is the one that promotes growth, while bank concentration does not generate any effect. In the Coast and Amazon regions, the commercial industry is a good predictor of growth, and in the Coast, bank concentration is beneficial for growth, unlike in the Amazon. Thus, the regions with an excellent commercial orientation and less robust systems tend not to be efficient in placing credit, harming economic growth.

According to Öyildirim & Önder (2008), the impact of bank loans on the growth of the regional economy changed significantly with consideration of the geographical location of the provinces. Financial development, measured mainly by credit, constitutes a good precursor to growth in regions with less robust financial systems, where there is a more significant number of financial intermediaries and a greater diversity of them. Therefore, the quality and variety of financial intermediaries constitute a fundamental element for promoting financial development and regional and national growth.

Although this relationship is unidirectional and inverse, we found a significant (1%) causality between bank concentration and growth. An increase in the credit market share of the most critical financial institutions causes a decrease in growth in the long run. On the other hand, any variation in economic growth would not generate any effect or contribution to bank concentration. Our results confirm that for developing countries, banking concentration is essential for growth (Beck et al., 2004), even though, in the long run, this effect is negative (Deidda & Fattouh, 2002), (Berger et al., 2004), and (Khan, Ghafoor, et al., 2018).

Access to disaggregated macroeconomic information at the provincial level is one of the barriers to conducting this research. However, it is necessary to investigate the relationship between the banking industry and the generation of business and employment in each province to generate public policies focused on improving the stages of development according to existing regional disparities. In this paper, we use two concentration measurements to determine the effects on growth. Even though concentration impacts growth, we need to select the specific factors that promote growth in each region according to their different development stages.

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