

# **How institutions and regulation shape the influence of bank concentration on economic growth: International evidence \***

**Ana I. Fernández, Francisco González and Nuria Suárez<sup>†</sup>**

**University of Oviedo**

## *Abstract*

This paper analyzes how the effect of bank concentration on economic growth varies across countries depending on bank regulation, supervision, and institutions. Results for 84 countries over the 1980-2004 period indicate that bank concentration generally has a negative effect on economic growth, an effect that disappears in countries with poorer-quality institutional environments. This result is consistent with the idea that bank concentration contributes more to the development of lending relationships with borrowers in countries where the poor quality of institutions impedes market development. Tighter restrictions on bank activities also reduce the negative influence of bank concentration on economic growth. More market monitoring, however, is associated with a stronger negative influence of bank concentration on economic growth.

*Keywords:* Bank concentration, institutions, bank regulation, bank supervision, economic growth.

*JEL Classification:* G10, G20, E44, O40.

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<sup>†</sup>Corresponding author: Nuria Suárez-Suárez, School of Economics and Business, Department of Business Administration, Avenida del Cristo s/n, 33071, Oviedo, (Spain) Tel.: +34985102820. Fax: +34985103708. E-mail: suareznuria@uniovi.es.

## 1. Introduction

This paper examines empirically how the quality of the institutional environment and bank regulation and supervision across countries modify the influence of bank concentration on economic growth. We integrate three strands of the literature by relating research that focuses on the role of institutions and bank regulation and supervision to research focusing on the influence of bank market structure on economic growth.

Many authors have established that the development of both banking and stock markets is positively associated with higher real per capita growth.<sup>1</sup> Following this finding, researchers have analyzed the country characteristics that favor the development of both stock markets and the banking sector. On the one hand, the law and finance literature has found that financial markets are better developed in countries with strong legal frameworks and institutions (see La Porta *et al.*, 1998; Beck and Levine, 2002; Demirgüç-Kunt and Maksimovic, 2002; Tadesse, 2002).

On the other hand, a number of recent cross-country studies have highlighted the importance of bank regulation and supervision for the functioning and development of a country's banking system. Barth *et al.* (2004) analyze the relation between specific regulatory and supervisory practices and banking-sector development in 107 countries. Their findings suggest that policies that rely on guidelines that force accurate information disclosure and foster incentives for private agents to exert corporate control are more effective in promoting bank development than policies that rely excessively on direct government supervision and regulation of bank activities.

There has also been cross-country research on the effects of the structure of the banking system on financial-sector stability, access to financing, and growth (see Berger *et al.*, 2004, for a review). For example, Demirgüç-Kunt *et al.* (2004) investigate the effects of banking regulations, market structure, and institutions on the cost of financial intermediation. Beck *et al.* (2006) show that crises are less likely in more concentrated banking systems. Cetorelli and Gambera (2001) analyze the relevance of bank market concentration for economic growth. While bank concentration has an overall negative effect on growth, it in fact promotes the

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<sup>1</sup> Evidence demonstrating that well-functioning banks promote growth is provided using country-level data by King and Levine (1993) and Levine and Zervos (1998), and using industry-level data by Rajan and Zingales (1998), Beck and Levine (2002), and Claessens and Laeven (2003). Demirgüç-Kunt and Maksimovic (1998, 1999, 2002), and Levine *et al.* (2000) also provide evidence using firm-level data that companies in countries with a large banking sector grow faster than predicted by individual firm characteristics.

growth of industrial sectors that are more in need of external financing by facilitating credit access for younger firms.

Our research extends previous evidence showing that the effect of bank concentration on economic growth is also conditioned by the quality of institutions and by bank regulation and supervision in a country. We use data for 84 countries over the 1980-2004 period. We find bank market concentration has less of a negative impact on promoting growth in the presence of less developed institutions, more relaxed market discipline, and tighter restrictions on bank activities. These findings have clear implications for the regulatory and supervisory features of the banking industry that would best promote economic growth when the banking sector is highly concentrated.

The rest of the paper is organized as follows. Section 2 provides a brief review of the related literature and discusses the hypotheses we test. Section 3 describes the characteristics of the database and the methodology, while Section 4 discusses the empirical results. Section 5 checks the robustness of our basic results and Section 6 presents the conclusions.

## **2. Theoretical Background and Hypotheses**

The banking literature suggests two possible opposing effects of bank concentration on economic growth through its effect on the access of firms to external financing. In a market without information asymmetries, where agents have perfect information on the quality of the goods being exchanged, market power results in a higher price for credit and less credit availability. According to this argument, one would expect a negative relation between bank concentration and external firm financing, and thus between bank concentration and economic growth.

In markets with asymmetric information, however, higher bank market concentration may give banks more of an incentive to invest in the acquisition of soft information by establishing close relationships with borrowers over time (*relationship banking*) and facilitating the availability of credit, thereby reducing firms' financial constraints (Petersen and Rajan, 1994, 1995; Boot, 2000; Dell'Araccia and Marquez, 2004). Accordingly, one would expect a positive relation between bank market concentration and economic growth, although this positive effect may vary with the intensity of hold-up problems (Rajan, 1992). Hold-up problems may lead borrowers to be less willing to enter into such relationships, thus reducing the benefits of concentration for encouragement of growth.

Empirical evidence regarding the influence of bank concentration on debt availability is mixed. Petersen and Rajan (1994, 1995) and Berlin and Mester (1998) show for the US

market that firms in less concentrated credit markets are subject to greater financial constraints. González and González (2008) analyze firms in 39 countries and conclude that bank concentration expands firms' access to long-term debt, especially in countries with weaker protection of creditor rights.

D'Auria *et al.* (1999) for Italian firms and Degryse and Ongena (2005) for Belgian firms, however, find that an increase in bank market concentration increases the cost of financing provided by banks. Cetorelli and Gambera (2001) directly analyze the effect of bank concentration on economic growth. They find that the general effect of bank concentration on growth is negative even as it promotes growth of those industrial sectors that are more in need of external financing by facilitating credit access for younger firms.

The fact that there are opposing arguments and mixed empirical evidence means that the influence of bank market concentration on growth is basically an empirical question. We examine whether cross-country differences in the influence of bank concentration on economic growth may be explained by differences in (1) the quality of institutions, (2) bank regulation, or in (3) bank supervision.

### *2.1. Institutions*

For a market to function well, firms must be able to rely on the enforceability of contracts. Weak legal systems and poor institutional infrastructure impede market development (La Porta *et al.*, 1997, 1998; Demirgüç-Kunt and Maksimovic, 2002). Rajan and Zingales (1998) argue that bank-based architecture survives and is more effective in this case, because banks can use their power to protect their interests in the absence of effective legal provision.

Bank concentration could be more beneficial in solving adverse selection and moral hazard problems between firms and banks in less developed markets that have weak legal systems and poor institutional infrastructure. The difficulty of developing markets in these environments may make long-term relationships between banks and debtors helpful in solving the problem (La Porta *et al.*, 1997, 1998). Bank concentration in these markets may favor these relationships and thereby have a positive effect on economic growth. Bank concentration in underdeveloped markets may thus substitute for strong legal protection of creditors and property, and work in the absence of strong institutions to reduce information asymmetries and agency costs between banks and firm owners.

In developed markets, however, private contracting conflicts and information asymmetries may be solved by institutions that function well. Now bank concentration is no longer necessary for promoting long-term relationships, which thus become less beneficial. As

information asymmetries are reduced, bank concentration in these environments may bring to bear the typical negative effect associated with market power in well-functioning markets.

Following these arguments, our first hypothesis is:

*H.1. Bank concentration has a more positive (less negative) effect on economic growth in countries with less developed institutions.*

## 2.2. Bank Regulation

Empirical evidence shows that restrictions on non-traditional bank activities like securities, insurance, real estate, and control of non-financial firms have a negative influence on bank performance and stability (Barth *et al.*, 2004). Claessens and Laeven (2004) have shown that more strictly regulated banking markets are less competitive. We know of no studies analyzing how the need for banks to focus on traditional lending and deposit activities affects the influence of bank concentration on economic growth.

On the one hand, the need to focus on deposits and loans favors specialization of bank activities and may make it more helpful for banks to establish lending relationships with firms. In this case, bank concentration may play a crucial role in promoting lending relationships; That is, concentration facilitates the exploitation of economies of scale and scope, and thus may have a more positive (less negative) influence on economic growth. Boot and Thakor (1997) have suggested on the other hand, that hold-up problems occur more often in less competitive financial systems. Firms may be less willing to enter into close relationships with a bank under more stringent restrictions on non-traditional bank activities if, as Claessens and Laeven (2004) suggest, these restrictions serve to reduce competition.

As theory might predict both effects, we make no *a priori* forecast of how restrictions on non-traditional bank activities might affect the influence of bank concentration on economic growth, treating this rather as an empirical issue. We analyze the influence of restrictions on the mixing of banking and commerce separately. These rules explicitly define the relationships between financial intermediaries and the productive sector and try to address the potential conflicts of interest, risk sharing, franchise value, diversified incomes, and competitive issues that banks may face when they are part of financial conglomerates.<sup>2</sup>

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<sup>2</sup> See Saunders (1994) for a more detailed review of the benefits and costs traditionally associated with the affiliation between banking and commerce.

Restrictions on bank ownership of non-financial firms may have a more obvious effect on the contribution of bank concentration to economic growth. Stricter restrictions regarding the mixing of banking and commerce may increase the marginal benefit of bank concentration as a substitute for solving the conflicts of interest and information asymmetries between banks and debtors through the promotion of long-term relationships. Moreover, stricter restrictions regarding the mixing of banking and commerce may mitigate hold-up problems, as a bank that is only a lender will have less power than a bank that is both a shareholder and a lender to a firm. Hence, the capacity of bank concentration to promote long-term relationships between banks and their debtors increases with the extent of restrictions on the mixing of banking and commerce.

According to these arguments, our second hypothesis is:

*H.2. Bank concentration has a more positive (less negative) effect on economic growth in countries with stricter restrictions on the mixing of banking and commerce.*

### *2.3. Bank Supervision*

The new Basel Accord assumes that both the strict official supervision and private monitoring make banks more stable, although empirical evidence would caution us with regard to the question of strengthening official bank supervision. A Barth *et al.* (2004) analysis of country-level data concludes that policies that promote private monitoring are better for bank development and stability than policies that rely on direct official supervision. And in analysis of bank-level data, Caprio *et al.* (2007) find official supervision has no significant effect on bank valuation. As far as we know, there are no studies analyzing how private and official supervision relates to the influence of bank concentration on economic growth.

Policies that rely on guidelines that force accurate information disclosure empower private-sector corporate control of banks, favor the development of financial markets, and may reduce the benefits of bank concentration in solving agency and adverse selection problems between banks and firms by facilitating close lending relationships. Greater supervisory power, however, may be defined as an alternative to empowering private-sector corporate control of banks. In this case, stricter supervision would increase the benefits of bank concentration in solving agency cost and adverse selection problems through close lending relationships.

Following these arguments, our last two hypotheses are:

*H.3. Bank concentration has a more positive (less negative) effect on economic growth in countries with more powerful official supervision.*

*H.4. Bank concentration has a less positive (more negative) effect on economic growth in countries with more private monitoring.*

### 3. Data and Methodology

Our empirical analysis relies on data from 84 developed and developing countries over the 1980-2004 period. To analyze how the influence of bank concentration on economic growth varies across countries depending on national characteristics, we modify the standard cross-country growth regression model to include an interaction term between banking concentration and institutional, legal, and supervisory variables.

The model is:

$$\begin{aligned}
 GROWTH_{i,t} = & \theta_0 + \theta_1 GDP_{pc1980_i} + \theta_2 BANK_{i,t} + \theta_3 MARKET_{i,t} + \\
 & + \theta_4 CONC_{i,t} + \theta_5 REGINST_{i,t} + \theta_6 CONC_{i,t} * REGINST_{i,t} + \theta_7 \sum_{t=1980}^{2004} T_t + \omega_{i,t}
 \end{aligned} \tag{1}$$

where  $i$  refers to countries, and  $t$  refers to time periods (years or five-year periods). Because they may be a non-linear relation between economic growth and the assortment of explanatory variables, we use natural logarithms of the regressors.

We follow the general growth literature in measuring economic growth (GROWTH), bank development (BANK), and market development (MARKET), and in controlling for convergence effects by including gross domestic product per capita ( $GDP_{pc1980}$ ) in the first year of the analysis period.<sup>3</sup> Following Demirgüç-Kunt *et al.* (2004), we measure bank market concentration by the fraction of bank assets held by the three largest commercial banks in the country (CONC). REGINST is a set of proxy variables for the institutions and bank regulation and supervision in the country.

We sequentially incorporate an interaction term between bank concentration and each variable proxying for the institutional, legal, and supervisory environment (CONC \* REGINST) to analyze how bank concentration affects economic growth in different legal and institutional environments. Analysis of this interaction term is the main contribution of our research. The limited number of instruments, the extensive number of country variables, and the need to use

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<sup>3</sup> See, among others, King and Levine (1993), Jayaratne and Strahan (1996), Rajan and Zingales (1998), and Levine *et al.* (2000).

interaction terms with the concentration variable all support incorporation of the coefficients separately rather than at the same time.<sup>4</sup>

Our indicator of the quality of a country's legal environment is the Index of Economic Freedom published by the Heritage Foundation (FREEDOM). The index ranges from 1 to 5; higher values indicate better protection of freedom. Demirgüç-Kunt *et al.* (2004) and Beck *et al.* (2006) use this index for purposes similar to ours.

Proxies for regulatory and supervisory variables come from the World Bank's Bank Regulation and Supervision Database, and are defined following Barth *et al.* (2004). The first regulatory variable is an indicator (RESTRICT) of restrictions on non-traditional bank activities (securities, insurance, and real estate markets, and bank ownership and control of non-financial firms). This indicator ranges from 4 to 16. We also split the variable to consider only restrictions on bank ownership and control of non-financial firms (RESTOWN). This indicator varies between a minimum value of 1 and a maximum value of 4.

Supervisory variables describe both the intensity of official supervision and the private monitoring of banks. A country's official supervisory power (OFFICIAL) is measured by adding a value of 1 for each affirmative answer to 14 questions intended to gauge the power of supervisors to undertake prompt corrective action, to restructure and reorganize troubled banks, and to declare a deeply troubled bank insolvent. We use three indicators of private supervision. Two come from Barth *et al.* (2004): the private monitoring index (MONITOR), and the indicator of accounting and information disclosure requirements in a country (ACCOUNT).

A third traditional proxy of private monitoring is the presence of explicit deposit insurance in a country. It has long been suggested that more generous deposit insurance weakens the market discipline enforced by depositors, and encourages banks to take more risk (Merton 1977). Recent empirical evidence confirms this effect, showing that deposit insurance increases the likelihood of banking crises (Demirgüç-Kunt and Detragiache, 2002). The analysis must, however, take into account both explicit and implicit deposit insurance that may impact depositors' expectations of public intervention in times of distress. Gropp and Vesala (2004) suggest that, in the absence of explicit deposit insurance, European banking systems have been characterized by strong implicit insurance. In this case, the introduction of an explicit system may imply a de facto reduction in the safety net. For this reason, we do not make a clear forecast for the impact of explicit deposit insurance on the influence of bank concentration on economic growth. To capture whether there is deposit insurance in the

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<sup>4</sup> Barth *et al.* (2004) use a similar sequential procedure to analyze the influence of regulatory and supervisory practices on bank development.



banking system, we use a dummy variable (INS) that takes a value of 1 if there is explicit deposit insurance and 0 otherwise.

Panel A of Table 1 reports descriptive statistics, averaged over the 1980-2004 period, and Panel B reports the correlations. The real GDP per capita growth is positively correlated with bank and market development and with the quality of institutional development in a country. Market supervision of banks and the presence of deposit insurance in the country are also positively related to economic growth, while restrictions on bank activities and official supervision are negatively related to economic growth.

(INSERT TABLE 1 ABOUT HERE)

We use two econometric procedures. First, we employ a pure cross-sectional estimator, where data are averaged over the period 1980-2004. Second, following Beck *et al.* (2000), Levine *et al.* (2000), and Beck and Levine (2002), we construct a panel dataset with data averaged over each of the five 5-year periods between 1980 and 2004 (1980-1984, 1985-1989, 1990-1994, 1995-1999, 2000-2004). We then use a random-effects estimator to control for unobserved country-specific effects not explicitly included in the regressions. In this type of estimation, we also include a set of dummy time variables for each five-year period over 1980-2004 ( $\sum_{t=1980}^{2004} T_t$ ). These dummies capture any unobserved country-invariant time effects not included in the regression, but their coefficients are not reported for reasons of space.

In both types of estimations, we resolve concerns regarding the potential endogeneity of each country variable (BANK, MARKET, CONC, and REGINST) using instrumental variables (IV) estimation. This methodology allows us to extract the exogenous component of each regressor and control for potential simultaneity bias and reverse causality from growth rates to bank concentration and other explanatory variables. A major stumbling block when analysis includes institutional, regulatory, and supervisory variables is separating out the effects and the correlated outcomes. For instance, it is quite likely that a concentrated banking sector may have strong lobbying power and therefore influence the institutional framework of the country, or vice versa. Such interrelations and the potential endogeneity of country variables make it difficult to tease out the specific effect of each variable and to know which of them plays the major role in economic growth.

We select much the same set of instruments as other authors. Following Barth *et al.* (2004), we use as instruments five binary variables to describe the origin of the national legal code (English common law, French civil law, German civil law, Scandinavian civil law, and the socialist/communist code); the latitudinal distance from the equator; and the religious composition of the population in each country (Catholic, Protestant, Muslim, other). We also

check to see that results do not vary when we use as instruments only the country's legal origin as in La Porta *et al.* (1998), Beck *et al.* (2000), and Levine *et al.* (2000) or when we add the legal origin, the rule of law, the total GDP, and the country's population, as in Cetorelli and Gambera (2001).

We perform a Durbin-Wu-Hausman test of overidentifying restrictions for each regression (Davidson and MacKinnon 1993). The test verifies the null hypothesis that the introduction of IVs has no effect on the estimates of the regression's coefficients. The test is rejected at the one percent level in all the estimations. As OLS estimations are not consistent, we report IV estimates.

## 4. Results

We first analyze the main hypothesis that the effect of bank market concentration on economic growth varies across countries, depending on institutions and the characteristics of bank regulation and supervision.

### 4.1. Institutions, Bank Concentration, and Growth

Table 2 reports the results of regressions analyzing the influence of institutions on the role of bank concentration in economic growth. Panel A reports results using cross-country data averaged over the whole period, and Panel B reports results using the random effects estimator in the panel dataset with data averaged over each of the five 5-year periods between 1980 and 2004.

Results in the first two columns of each panel replicate traditional regressions of the growth literature. The results are consistent with previous literature showing a positive influence of bank financial development on economic growth. The positive coefficients of BANK are statistically significant at the one percent level in the random effects estimations, although they are not statistically significant in the cross-country estimations. The market development variable does not have statistically significant coefficients.

Consistent with conclusions in Cetorelli and Gambera (2001), the negative and statistically significant coefficients of CONC in the cross-country estimations (columns 1 and 2) suggest an average depressive effect of bank concentration on economic growth. Negative coefficients of CONC in the panel data estimations are not statistically significant.

The positive coefficients of FREEDOM in columns (2) and (5) confirm the importance of a well-developed institutional environment for economic growth as suggested by, among

others, La Porta *et al.* (1998), Demirgüç-Kunt and Maksimovic (1998, 1999, 2002), Claessens and Laeven (2003). Given the positive correlation between the quality of institutions and market development, we do not simultaneously introduce both variables in the estimations.<sup>5</sup>

(INSERT TABLE 2 ABOUT HERE)

The first novel result of this paper is shown in columns (3) and (6) where we incorporate the interaction of bank concentration and the development of the institutional environment in the country. In both types of estimations, we obtain a positive coefficient for CONC and a negative one for the interaction term CONC \* FREEDOM. These results confirm our H.1, suggesting that the better the quality of institutions in a country, the greater the negative influence of bank concentration on economic growth. In fact, the positive coefficient of CONC in these estimations indicates that a higher bank market concentration can foster economic growth in countries with the poorest quality of institutions.

This result is consistent with a higher value of close relationships between banks and firms in countries where a poor-quality institutional environment does not favor the development of markets. Bank concentration may in this case play a positive role in the development of close relationships in these environments, and thus, have a more positive influence on economic growth. In countries with higher-quality institutional environments, where markets are more developed, and close relationships between firms and banks less frequent or less beneficial, bank concentration has less of an ability to favor growth through the promotion of close relationships, while the negative effects associated with market power in well-functioning markets dominate.

The influence of institutions on the effect of bank concentration on economic growth is also economically significant. For instance, using the coefficients in column (6), a one-standard deviation improvement in the quality of institutions (0.647) would reduce the positive influence of bank concentration on economic growth by 18.95 times the standard deviation of economic growth.

In Table 3 we test for a possible non-linear influence of bank concentration on economic growth. The observed negative influence of bank concentration might occur because of increased hold-up problems associated with a higher concentration. In this case, we could expect that the negative influence of bank concentration would be observed only for high levels of bank concentration but not for low levels. Results in Table 3 do not confirm this

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<sup>5</sup> Claessens and Laeven (2003) analyze the relation between financial development and property rights and economic growth. They find that in countries with better institutional quality and more secure property rights, which protect returns of assets against competitors' actions, firms can allocate resources better, leading to higher economic growth.

possible non-linear effect because coefficients for the square of bank concentration are not significant in most of the estimations. A non-linear effect is observed only in column (2).

(INSERT TABLE 3 ABOUT HERE)

#### *4.2. Bank Regulation, Concentration, and Growth*

We next examine whether regulatory restrictions on non-traditional bank activities modify the impact of bank market concentration on economic growth. Results in Table 4 show positive and statistically significant coefficients for the interaction terms of  $CONC * RESTRICT$  and  $CONC * RESTOWN$ . This result indicates that tighter restrictions on both bank activities in the securities, insurance, and real estate markets and on bank ownership and control of non-financial firms reduce the negative influence of bank concentration on economic growth. The effect of restrictions on non-traditional activities is also economically significant. For instance, using the coefficients in column (3), a one-standard deviation increase in the restrictions on non-traditional activities (2.558) would reduce the negative influence of bank concentration on economic growth by 4.26 times the standard deviation of economic growth.

Different causes may explain this result. Tighter restrictions on engaging in these activities oblige banks to focus more on the traditional activities of lending and borrowing, and therefore, increase their incentives to establish close lending relationships with firms. Limiting bank ownership and control of non-financial firms may also reduce the market power of banks associated with a given bank concentration, thus reducing the hold-up problem in the lending relationship. Higher restrictions on bank ownership of non-financial firms may also increase the marginal benefit of bank concentration to solve the conflicts of interests that can not be reduced when banks are not allowed to hold equity in their debtors.

(INSERT TABLE 4 ABOUT HERE)

#### *4.3. Bank Supervision, Concentration, and Growth*

Next we analyze whether the effect of bank market concentration on economic growth varies depending on official supervisory actions as well as private monitoring.

The results are reported in Table 5. We do not observe a significant effect for official supervision. Neither  $OFFICIAL$  nor the interaction term  $CONC * OFFICIAL$  has statistically significant coefficients. Consistent with our H.4, however, greater market discipline magnifies the negative influence of bank concentration on economic growth in cross-country estimations. The negative coefficients of  $CONC * MONITOR$  and  $CONC * ACCOUNT$  in the OLS estimations are consistent with a reduction of the benefits of market concentration in

promoting a close relationship between banks and firms where private supervision and financial information disclosure make well-functioning financial markets possible. Thus, in more developed markets, the negative effect of greater market power associated with a higher bank concentration dominates the positive effect of the establishment of less frequent lending relationships.

This negative influence of bank market concentration is also observed in countries with explicit deposit insurance, as the interaction term  $CONC * INS$  has a negative coefficient. Although negative, the coefficients of the interaction terms of  $CONC$  with  $MONITOR$ ,  $ACCOUNT$ , and  $INS$  are not statistically significant in the random-effects estimations.

(INSERT TABLE 5 ABOUT HERE)

## 5. Robustness Checks

In further analysis we check the robustness of the results. First, we consider three alternatives to the Economic Freedom Index as measures of the quality of a country's legal and institutional environment: 1) the KKZ index. This is calculated by Kaufman *et al.* (2005) as the average of six indicators: voice and accountability in the political system; political stability; government effectiveness; regulatory quality; rule of law; and control of corruption; 2) the law and order index of the International Country Risk Guide; and 3) the property rights index from the Economic Freedom Index. Results are not significantly different from those reported for the Economic Freedom Index.

A second robustness check uses alternative measures of bank market concentration: 1) the fraction of deposits held by the five largest commercial banks in total banking system deposits, from the World Bank's Bank Regulation Supervision Database developed by Barth *et al.* (2004), and 2) the Herfindahl Index averaged over the 1980-1997 period, from Beck *et al.* (2006). Results are similar to those previously reported.

## 6. Conclusions

We have analyzed how the influence of bank concentration on economic growth varies across countries depending on bank regulation, supervision, and institutions. Results for 84 countries over 1980-2004 indicate that bank concentration has an overall negative effect on economic growth that disappears in countries with a poor-quality institutional environment. This result is consistent with the idea that bank concentration contributes most to building lending

relationships with borrowers in countries where the poor quality of institutions impedes market development. Tighter restrictions on non-traditional bank activities and on bank ownership of non-financial firms reduce the negative influence of bank concentration on economic growth. More market monitoring is associated, however, with a greater negative influence of bank concentration on economic growth.

These results have important policy implications. First, they suggest that antitrust enforcement may actually damage economic growth in countries with poor-quality institutional environments, tighter restrictions on non-traditional bank activities, or less market discipline. Second, optimal antitrust legislation or policies will therefore vary across environments, depending on the combination of legal, supervisory, and institutional forces acting upon a country's banking system.

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**Table 1**  
**Summary statistics**

Panel A reports descriptive statistics. Values are averaged over the 1980-2004 period. GROWTH is the growth rate of real per capita GDP in each country. BANK measures the bank financial development as the value of private credits by deposit money banks and other financial institutions to the private sector divided by GDP. MARKET measures market financial development as stock market capitalization divided by GDP. CONC is the bank market concentration. FREEDOM is the Index of Economic Freedom. RESTRICT is an indicator of the degree to which bank activities are restricted outside the credit and deposit business. RESTOWN is an indicator of the extent to which banks may own and control non-financial firms. OFFICIAL measures official supervisory power. MONITOR measures market monitoring. ACCOUNT is an index of accounting and information disclosure requirements. INS is a dummy variable that takes a value of 1 if the country has an explicit deposit insurance scheme and 0 otherwise. Panel B reports the correlation matrix. \*\*\*, \*\* and \* represent significance at the 1%, 5%, and 10% level, respectively.

**Panel A: Descriptive statistics**

	GROWTH	BANK	MARKET	CONC	FREEDOM	RESTRICT	RESTOWN	OFFICIAL	MONITOR	ACCOUNT	INS
Mean	-0.189	0.490	0.431	0.757	3.031	9.857	2.523	9.690	7.059	4.095	0.160
Median	-0.696	0.323	0.073	0.967	2.980	10.000	3.000	10.000	7.000	4.000	0.000
Std. Dev.	0.355	0.428	0.483	0.224	0.658	2.558	0.810	2.680	1.571	1.020	0.366
Min.	-0.990	0.024	0.003	0.259	1.540	4.000	1.000	4.000	3.000	0.000	0.000
Max.	2.389	2.648	3.229	1.430	4.336	16.000	4.000	14.000	10.000	6.000	1.000

**Panel B: Correlations**

	GROWTH	BANK	MARKET	CONC	FREEDOM	RESTRICT	RESTOWN	OFFICIAL	MONITOR	ACCOUNT	INS
GROWTH	1.000										
BANK	0.506***	1.000									
MARKET	0.369***	0.649***	1.000								
CONC	-0.141**	-0.279***	-0.081	1.000							
FREEDOM	0.497***	0.707***	0.535***	-0.255***	1.000						
RESTRICT	-0.355***	-0.384***	-0.357***	0.033	-0.384***	1.000					
RESTOWN	-0.226***	-0.156***	-0.237***	-0.013	-0.147***	0.560***	1.000				
OFFICIAL	-0.135**	-0.097*	-0.084	-0.149**	-0.100**	0.171***	0.057	1.000			
MONITOR	0.172***	0.482***	0.289***	-0.346***	0.563***	-0.259***	0.004	0.018	1.000		
ACCOUNT	0.017	0.264***	0.226***	-0.222***	0.408***	-0.145***	0.161***	0.023	0.674***	1.000	
INS	0.304***	0.386***	0.116*	-0.159**	0.333***	-0.246***	-0.277***	-0.139***	0.349***	0.020	1.000

**Table 2**  
**Institutions, bank concentration and growth**

Results of regressions analyzing the influence of institutions on the role of bank concentration for economic growth. In Panel A, regressions are estimated using OLS estimators for cross-country data. We use the mean value for each variable in each country over the 1980-2004 period. In Panel B we present the results of regressions estimated using random effects estimators. In this case, data was averaged over each of the five 5-year periods between 1980 and 2004. In all regressions the dependent variable is the growth rate of real per capita GDP in each country (GROWTH). GDP<sub>80</sub> is the real per capita GDP in the initial period (1980). BANK measures the bank financial development as the value of private credits by deposit money banks and other financial institutions to the private sector divided by GDP. CONC is the bank market concentration. MARKET measures market financial development as stock market capitalization divided by GDP. FREEDOM is the Index of Economic Freedom. In all estimations we use the natural logarithm of the regressors. Year dummy variables are included on estimations in Panel B, but are not reported. The Durbin-Wu-Hausman statistic tests the null hypothesis that the use of instruments for BANK, CONC, MARKET, and FREEDOM does not change the estimation outcome. We report IV estimates as the test is rejected at the one percent level. Instruments are: legal origin, latitudinal distance from the equator, and the religious composition of the population in each country. T-statistics are between parentheses. \*\*\*, \*\*, and \* indicate significance levels of 1%, 5% and 10%, respectively.

Explanatory Variables	Expected Sign	Panel A: Cross-country data			Panel B: Panel data		
		(1)	(2)	(3)	(4)	(5)	(6)
GDP <sub>80</sub>	-	-0.246*** (-3.58)	-0.308*** (-5.65)	-0.293*** (-5.56)	-0.195*** (-9.29)	-0.212*** (-13.28)	-0.202*** (-12.55)
BANK	+	0.82 (1.38)	0.124 (0.34)	-0.012 (-0.04)	0.798*** (5.08)	0.386*** (4.57)	0.359*** (4.33)
CONC	-/+	-4.916** (-2.09)	-3.941** (-2.34)	31.689** (2.33)	-0.628 (-0.53)	-0.503 (-0.68)	16.824** (2.27)
MARKET	+	0.332 (1.23)			-0.039 (-0.31)		
FREEDOM	+		7.049*** (6.94)	4.119*** (2.78)		2.217*** (7.51)	8.926*** (3.11)
CONC * FREEDOM	-			-55.420** (-2.64)			-27.052** (-2.35)
Time Dummies		-	-	-	YES	YES	YES
Adjusted R <sup>2</sup>		0.399	0.634	0.660	0.453	0.559	0.567
F-Test		15.30***	37.08***	33.29***	-	-	-
Wald Test		-	-	-	164.90***	349.74***	371.46***
Observations		87	84	84	348	336	336
Durbin-Wu-Hausman Test		18.14***	5.57***	6.31***	94.18***	25.16***	32.09***

**Table 3**  
**Institutions, bank concentration and growth**

Results of regressions analyzing the influence of institutions on the role of bank concentration for economic growth. In Panel A, regressions are estimated using OLS estimators for cross-country data. We use the mean value for each variable in each country, over the 1980-2004 period. In Panel B we present the results of regressions estimated using random effects estimators. In this case, data was averaged over each of the five 5-year periods between 1980 and 2004. In all regressions the dependent variable is the growth rate of real per capita GDP in each country (GROWTH). GDP<sub>80</sub> is the real per capita GDP in the initial period (1980). BANK measures bank financial development as the value of private credits by deposit money banks and other financial institutions to the private sector divided by GDP. CONC is bank market concentration. CONCSQUARE is the square of bank concentration. MARKET measures market financial development as stock market capitalization divided by GDP. FREEDOM is the Index of Economic Freedom. In all estimations we use the natural logarithm of the regressors. Year dummy variables are included on estimations of Panel B, but are not reported. The Durbin-Wu-Hausman statistic tests the null hypothesis that the use of instruments for BANK, CONC, MARKET, and FREEDOM does not change the estimation outcome. We report IV estimates as the test is rejected at the one percent level. Instruments are: legal origin, latitudinal distance from the equator, and the religious composition of the population in each country. T-statistics are between parentheses. \*\*\*, \*\*, and \* indicate significance levels of 1%, 5% and 10%, respectively.

Explanatory Variables	Expected Sign	Panel A: Cross-country data			Panel B: Panel data		
		(1)	(2)	(3)	(4)	(5)	(6)
GDP <sub>pc1980</sub>	-	-0.231*** (-3.36)	-0.231*** (-5.29)	-0.275*** (-5.29)	-0.195*** (-9.23)	-0.212*** (-13.21)	-0.201*** (-12.56)
BANK	+	1.543** (1.99)	0.690 (1.66)	0.487 (1.18)	0.804*** (4.24)	0.370*** (4.10)	0.333*** (3.78)
CONC	+/-	-85.109 (-1.45)	-106.187** (-2.55)	-10.030 (-0.17)	0.174 (0.02)	-3.884 (-0.60)	12.212 (1.38)
CONCSQUARE	+/-	6.643 (1.24)	8.616** (2.31)	7.161* (1.95)	-0.072 (-0.08)	0.316 (0.53)	0.511 (0.87)
MARKET	+	0.173 (0.60)			-0.044 (-0.32)		
FREEDOM	+		7.033*** (7.16)	41.482*** (2.84)		2.220*** (7.48)	9.294*** (3.38)
CONC * FREEDOM	-			-124.087** (-2.36)			-28.443** (-2.59)
Time Dummies		-	-	-	YES	YES	YES
Adjusted R <sup>2</sup>		0.407	0.658	0.677	0.453	0.559	0.569
F-Test		12.83***	33.04***	30.07***	-	-	-
Wald Test		-	-	-	163.07***	343.94***	375.06***
Observations		87	84	84	348	336	336
Durbin-Wu-Hausman Test		14.31***	6.14***	6.27***	93.03***	24.93***	31.68***

**Table 4**  
**Bank regulation, concentration and growth**

Results of regressions analyzing the influence of bank regulation on the role of bank concentration for economic growth. In Panel A, regressions are estimated using OLS estimators for cross-country data. We use the mean value for each variable in each country, over the 1980-2004 period. In Panel B we present the results of regressions estimated using random effects estimators. In this case, data was averaged over each of the five 5-year periods between 1980 and 2004. In all regressions the dependent variable is the growth rate of real per capita GDP in each country (GROWTH). GDP<sub>80</sub> is the real per capita GDP in the initial period (1980). BANK measures the bank financial development as the value of private credits by deposit money banks and other financial institutions to the private sector divided by GDP. CONC is the bank market concentration. FREEDOM is the Index of Economic Freedom. RESTRICT is an indicator of the degree to which banks' activities are restricted outside the credit and deposit business. RESTOWN is an indicator of the extent to which banks may own and control non-financial firms. In all estimations we use the natural logarithm of the regressors. Year dummy variables are included on estimations of Panel B, but are not reported. The Durbin-Wu-Hausman statistic tests the null hypothesis that the use of instruments for BANK, CONC, FREEDOM, RESTRICT, and RESTOWN does not change the estimation outcome. We report IV estimates as the test is rejected at the one percent level. Instruments are: legal origin, latitudinal distance from the equator, and the religious composition of the population in each country. T-statistics are between parentheses. \*\*\*, \*\*, and \* indicate significance levels of 1%, 5% and 10%, respectively.

Explanatory Variables	Expected Sign	Panel A: Cross-country data		Panel B: Panel data	
		(1)	(2)	(3)	(4)
GDP <sub>80</sub>	-	-0.290*** (-5.33)	-0.285*** (-5.26)	-0.214*** (-13.22)	-0.202*** (-12.65)
BANK	+	0.617 (1.03)	-0.022 (-0.06)	0.185 (1.29)	0.336*** (3.43)
CONC	+/-	-28.712** (-2.06)	-32.109*** (-2.76)	-13.446** (-2.04)	-16.064** (-2.46)
FREEDOM	+	7.091*** (7.11)	7.064*** (7.02)	2.213*** (7.60)	2.338*** (7.98)
RESTRICT		0.307** (2.09)		-0.404** (-2.16)	
RESTOWN			0.678* (1.69)		-1.496** (-2.19)
CONC * RESTRICT	+/-	2.655* (1.84)		1.395** (1.96)	
CONC * RESTOWN	+/-		12.052** (2.45)		6.348** (2.35)
Time Dummies		-	-	YES	YES
Adjusted R <sup>2</sup>		0.648	0.653	0.567	0.570
F-Test		26.56***	27.04***	-	-
Wald Test		-	-	366.85***	375.44***
Observations		84	84	336	336
Durbin-Wu-Hausman Test		4.18***	4.46***	31.69***	33.84***

**Table 5**  
**Bank supervision, concentration and growth**

Results of regressions analyzing the influence of bank supervision on the role of bank concentration for economic growth. In Panel A, regressions are estimated using OLS estimators for cross-country data. We use the mean value for each variable in each country, over the 1980-2004 period. In Panel B we present the results of regressions estimated using random effects estimators. In this case, data was averaged over each of the five 5-year periods between 1980 and 2004. In all regressions the dependent variable is the growth rate of real per capita GDP in each country (GROWTH).  $GDP_{80}$  is the real per capita GDP in the initial period (1980). BANK measures bank financial development as the value of private credits by deposit money banks and other financial institutions to the private sector divided by GDP. CONC is bank market concentration. FREEDOM is the Index of Economic Freedom. OFFICIAL measures official supervisory power. MONITOR measures market monitoring. ACCOUNT is an index of accounting and information disclosure requirements. INS is a dummy variable that takes a value of 1 if the country has an explicit deposit insurance scheme and 0 otherwise. In all estimations we use the natural logarithm of the regressors. Year dummy variables are included on estimations in Panel B, but are not reported. The Durbin-Wu-Hausman statistic tests the null hypothesis that the use of instruments for BANK, CONC, FREEDOM, and supervisory variables does not change the estimation outcome. We report IV estimates as the test is rejected at the one percent level. Instruments are: legal origin, latitudinal distance from the equator, and the religious composition of the population in each country. T-statistics are between parentheses. \*\*\*, \*\*, and \* indicate significance levels of 1%, 5% and 10%, respectively.

Explanatory Variables	Expected Sign	Panel A: Cross-country data				Panel B: Panel data			
		(1)	(2)	(3)	(4)	(5)	(6)	(8)	(7)
$GDP_{80}$	-	-0.311*** (-5.64)	-0.283*** (-5.44)	-0.309*** (-5.81)	-0.290*** (-5.40)	-0.216*** (-13.36)	-0.210*** (-12.59)	-0.212*** (-13.41)	-0.209*** (-12.47)
BANK	+	0.063 (0.14)	0.786 (0.79)	0.176 (0.37)	0.789 (1.39)	0.346** (3.59)	0.339 (1.52)	0.235* (1.94)	0.423** (2.57)
CONC	+/-	-12.370 (-1.15)	35.722*** (2.84)	41.804** (2.07)	-0.887 (-0.36)	-3.743 (-0.80)	5.375 (0.63)	11.660 (0.96)	0.145 (0.10)
FREEDOM	+	7.125*** (6.93)	7.144*** (7.35)	7.007*** (6.93)	7.021*** (7.07)	2.210*** (7.48)	2.252*** (7.50)	2.315*** (7.78)	2.235*** (7.45)
OFFICIAL		0.039 (0.39)				-0.092 (-0.75)			
MONITOR			-0.551 (-1.66)				0.200 (0.87)		
ACCOUNT				-0.815** (-2.20)				0.880 (1.22)	
INS					-1.744** (-2.18)				0.405 (0.47)
CONC * OFFICIAL	*	0.801 (0.75)				0.286 (0.58)			
CONC * MONITOR	-		-4.968*** (-3.26)				-0.781 (-0.77)		
CONC * ACCOUNT	-			-10.870** (-2.25)				-2.981 (-1.03)	
CONC * INS	+/-				-10.147* (-1.96)				-1.938 (-0.54)
Time Dummies		-	-	-	-	YES	YES	YES	YES
Adjusted R <sup>2</sup>		0.629	0.673	0.652	0.651	0.563	0.560	0.564	0.559
F-Test		24.47***	29.47***	27.03***	26.83***	-	-	-	-
Wald Test		-	-	-	-	351.15***	342.51***	356.85***	340.04***
Observations		84	84	84	84	336	336	336	336
Durbin-Wu-Hausman Test		2.94**	5.91***	4.46***	4.34***	27.76***	25.60***	29.19***	24.98***