

**DETERMINANTS OF BANK MARKET STRUCTURE:
EFFICIENCY AND POLITICAL ECONOMY VARIABLES**

Francisco González

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Determinants of bank market structure: Efficiency and political economy variables

Francisco González*
University of Oviedo
School of Economics and Business

Abstract

This paper analyzes the influence of bank efficiency and political economy variables on bank market structure (market share and market concentration) using a panel data of 2,592 banks from 69 countries over the 1996-2002 period. Results indicate that the validity of the efficiency-structure hypothesis to explain bank market structure varies across countries depending on national political economy variables. In particular, higher entry requirements, more generous deposit insurance and higher extent of government bank ownership reduce the positive influence of bank efficiency on market share and market concentration. However, tighter restrictions on bank activities, better quality of the contracting environment, more market monitoring, and more market orientation and development of the financial system increase the positive influence of bank efficiency on market share and market concentration.

JEL classification: G18, G21, G28.

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1. Introduction.

Unsurprisingly, market structure has been thoroughly and widely focused on in the economic literature, since it not only effects market competitiveness but also has a knock-on effect on the general welfare of the economy. This interest is heightened in banking for two reasons: first, the workings of a banking system has an influence on the structure and growth of other industrial sectors, and therefore, on economic growth¹; secondly, knowing the effect of bank regulation on the market structure is valuable, as banking is one of the most heavily regulated industries in the world.

The literature on economic and industrial organization has earmarked two potential determinants of market structure: differences in efficiency levels between companies in the same market, and regulatory or institutional barriers to entering, expanding in and abandoning markets. The traditional efficiency-structure hypothesis (EFS) propounds that higher market concentration is due to more efficient banks growing more rapidly than their less efficient counterparts, or to more efficient banks taking over less efficient ones. Given such a scenario, more efficient banks gain market share, which leads to a higher market concentration (Demsetz, 1973, 1974; Peltzman, 1977).

Traditionally, the EFS hypothesis has been empirically tested as part of a more general analysis of the concentration-performance relationship, i.e., the literature has sought to demonstrate whether a positive relation between concentration and performance is due to companies in more concentrated markets being more efficient (the EFS hypothesis), or on contrast, whether companies in more concentrated markets are able to extract monopolistic rents (structure-conduct-performance or SCP hypothesis). This latter hypothesis propounds that concentration is the source of greater profitability, rather than the consequence of more

¹ Evidence demonstrating that well-functioning banks promote growth is provided by King and Levine (1993a, 1993b), Demirgüç-Kunt and Maksimovic (1998), Levine and Zervos (1998), Rajan and Zingales (1998), Beck et al.(2000), Wurgler (2000), Claessens and Laeven (2003) and reviews by Levine (1997, 2004). Moreover, Cetorelli and Strahan (2005) have provided recent evidence that competition and structure in local U.S. market affects the market structure of non-financial sectors.

efficient companies increasing their market share.² However, differences in the causality of the concentration-performance relation are not the only issues on which the two hypotheses diverge. The endogeneity of market concentration is another difference: whereas market concentration is exogenous according to the SCP hypothesis, it is endogenous and dependent on bank efficiency according to the EFS hypothesis. Both hypotheses also have contrasting policy implications: if the SCP hypothesis were dominant, antitrust enforcement would be socially beneficial, whereas policies that penalize or impair mergers would be socially costly if the EFS hypothesis were to predominate.

Studies providing empirical analysis of the endogeneity of market concentration and the link with bank efficiency are few and far between. To our knowledge, only Berger (1995), Goldberg and Rai (1996), Berger and Hanan (1997) and Maudós (2001) have investigated whether greater bank concentration is the outcome of more efficient organizations' increased market share. However, none of these studies contemplate the influence of political economy variables on market structure; nor do they analyze whether such variables influence the validity of EFS hypothesis explanations of market structure.

Recent empirical studies have employed international bank databases to demonstrate the influence of these variables on the development and stability of the financial system.³ This paper attempts to complement this research by analyzing the influence of political economy variables on market structure and on the validity of the EFS hypothesis. A failure to include political economy variables means that variations across countries of the efficiency hypothesis cannot be captured and may explain the contrasting results of studies that have used bank samples from a single country to tease apart the EFS and SCP hypotheses.

In this paper, we distinguish between the direct influence that country variables have on market structure and the indirect effect they may have on it by influencing the validity of the EFS hypothesis. For instance, differences across countries in restrictions on entering the

² See, Berger et al. (2004) for a review of the existing literature on the effect of bank market concentration on bank performance.

³ See, among others, Barth et al. (2001, 2004), La Porta et al. (2002), Beck et al. (2005) and Demirgüç-Kunt et al. (2004).

banking sector would directly affect bank market structure by determining the number of participants in the market. However, a poor legal environment that holds back market development and more efficient banks' ability to take over less efficient counterparts would indirectly reduce bank concentration.

The political economy variables analyzed in this paper are the characteristics of bank regulation (legal restrictions on bank entry and on non-traditional bank activities and the generosity of deposit insurance), bank supervision (private and official), the quality of institutions and enforceability of contracts, financial structure (the relative importance of banks versus markets, the extent of foreign and government ownership of banks) and the country's financial development. In the empirical analysis we not only use an international sample of banks from 73 countries amongst which political economy variables vary but also have a panel database that serves to control for unobservable bank heterogeneity and to avoid the bias derived from omitting relevant explanatory variables.

Results from the paper confirm that political economy variables directly influence market structure and also affect the validity of the EFS hypothesis. Higher entry restrictions into banking, more generous deposit insurance and extended government ownership associate with a higher market concentration and market share, but a reduced validity of the EFS hypothesis, i.e., there is a greater concentration in these environments which is not originated by the growth of more efficient banks. In contrast, tighter restrictions on non-traditional bank activities, higher market monitoring, better quality of institutions and enforceability of contracts, more foreign bank ownership, and more market-orientation and development of the financial system are all linked with an enhanced validity of the EFS hypothesis, i.e., they foster market concentration by smoothing the way for the growth of more efficient banks. These results have clear policy implications, suggesting, as they do, that antitrust legislations are not equally optimal solutions in every country, and that they are socially more costly the stricter the restrictions on bank activities, the higher the market monitoring, the stronger the institutions, and the greater the market-orientation and development of the financial system.

The remainder of this paper is organized as follows. Section 2 describes the theoretical background of the market structure-efficiency relationship in banking and the measures used in this paper for the two variables. Section 3 discusses the potential influence of political economy variables on market structure and how they are measured. Section 4 describes data and methodology. Results are presented in Section 5, and finally Section 6 concludes the paper.

2. Market structure and efficiency

The basis of our choice of potential determinants of market structure is the propositions of the EFS hypothesis claiming that higher bank market share and higher market concentration are the consequence of greater bank efficiency. Together with bank efficiency, we include the characteristics of regulation, supervision, institutions, financial structure and financial development in the country as additional explanatory variables.

Paucity, contrasting results and a failure to consider the influence of political economy variables are all hallmarks of empirical evidence on the determinants of market structure. In the US market, Berger (1995) and Berger and Hannan (1997) analyze whether bank efficiency affects market structure positively. Results are contradictory, but on balance do not support the forecasts of the EFS hypothesis, since only scale efficiency is observed to exercise a positive influence on market share and none of the efficiency measurements were seen to have a positive effect on market concentration. Jayaratne and Strahan (1998) also provide US-based evidence that entry restrictions reduce the validity of the EFS hypothesis, pointing out that bank performance improves significantly after restrictions on bank expansion are lifted due to better banks growing at the expense of their less efficient rivals.

In Europe, Goldberg and Rai (1996) fail to encounter a clear relationship between concentration and bank efficiency for a sample of banks across 11 European countries; in

their results, bank efficiency does not have a significant influence on market share and its influence on market concentration varies depending on the efficiency measure applied. Maudós (2001) does not find a significant positive influence of bank efficiency on market share and market concentration in Spain either.

However, none of these studies control for inter-country differences in legal and institutional environments. We therefore propose to build upon this earlier evidence in this paper by employing an international database to analyze how the political economy hallmarks of different countries impinge upon bank market structure and the validity of the EFS hypothesis. Measures of market structure and bank efficiency for a broad cross-section of countries are needed to fulfill this aim.

2.1. Measuring market structure

Given that the EFS hypothesis establishes that more efficient banks gain higher market shares and, in consequence, increased market concentration, market concentration (CONC) and market share (MS) are both used in this study as variables of market structure. Following Demirgüç-Kunt et al. (2004) and Beck et al. (2005), bank market concentration is measured as the fraction of bank assets held by the three largest commercial banks in the country. Figures were obtained from the World Bank Database, whose base source is the Fitch IBCA's Bankscope Database. The public availability of this measure of market concentration enhances the value of using it, as it means that studies can be compared and any bias resulting from differences in calculated values also eliminated. Market concentration ranges in our sample from Luxembourg's 0.247 to Finland's, Iceland's and Sweden's score of 1. All bank assets were held by three or fewer banks in the latter three countries at least during one of the years.

Bank market share for each bank in each year is used as a second measure of market structure. It is calculated as the fraction of bank assets on total assets of commercial banks in the country. The data is obtained from the Fitch IBCA's Bankscope Database. Table 1

shows that the mean values of market share vary in our sample between Switzerland's 0.0006 and Iceland's 0.2877.

2.2. Measuring bank efficiency

Following Berg et al. (1992), Elyasiani and Mehdi (1992), Fare et al. (1994), Bhattacharya et al. (1997), Leightner and Lovell (1998), Wheelock and Wilson (1999), Isik and Hassan (2003), among others, we use a non-parametric method, Data Envelopment Analysis (DEA), to measure bank efficiency. DEA is a linear programming technique that forms a piecewise-linear convex isoquant over the data points.⁴ Thus, the DEA frontier represents the set of efficient observations for which no other production unit or linear combination of units employs as little or less of every input without changing the output quantities generated (input orientation) or produces as much or more of every output without altering the input quantities used (output orientation). DEA has been widely used in recent years to estimate efficiency in a variety of industries and national markets. Compared to parametric models, DEA has the advantage that it does not require knowledge of the proper functional form of the frontier, error and inefficiency structures (Evanoff and Israilevich, 1991; Grifell-Tatje and Lovell, 1997; Bauer et al. 1998; Wheelock and Wilson, 1999).⁵

As market structure is defined per country, we also measure bank efficiency by applying DEA separately to each country using a bank panel database over the 1996-2002 period. We estimate bank efficiency following the output orientation and imposing variable returns to scale. We check that the results do not vary when we follow the input orientation and impose constant returns to scale. We thus estimate efficient production frontiers in order to provide measures of technical efficiency and pure technical efficiency for each bank in each year in its respective national market. Efficiency scores vary between zero and 1, with

⁴ A more detailed description of DEA can be found in Fried et al. (1993) and Cooper et al. (2000).

⁵ The piece-wise linear form of the non-parametric frontier in DEA can cause a few difficulties in efficiency measurement due to the existence of slacks (Coelli et al. 1998). In the paper, we only consider the radial efficiency and not the potential slacks.

fully efficient banks having efficiencies equal to 1 and inefficient banks having efficiencies less than 1.

An appropriate definition of bank inputs and outputs is important in obtaining reliable efficiency predictions. The literature on the theory of banking describes two main competing approaches: the production and the intermediation approaches. Like many studies on banking efficiency (DeYoung and Nolle, 1998; Berger and Mester, 1997; DeYoung and Hasan, 1998; Isick and Hassan, 2002), we adopt an “intermediation” or “asset approach,” which requires a definition of input and output that is valid for the whole set of countries included in our sample.⁶ Accordingly, we use three inputs: (1) Personal expenses, (2) the book value of fixed assets and (3) loanable funds (the sum of deposits and non-deposit funds). As for output, we use (1) total loans and (2) non-interest income. We replicate the results by breaking down the output vector. Short-term and long-term loans are thus considered separately instead of total loans, just as non-interest income is also broken down into commission, trading and other operating income. Results were robust across the different definitions. Data on these bank variables was obtained from the Fitch-IBCA Bankscope Database for the period 1996-2002. Whenever available, consolidated data was used and all data was obtained in US dollars and in real prices.

Mean per country values of the measure of bank efficiency for the 1996-2002 period and for each year are reported in Table 1. They range between the average value of 0.1919 for US banks to the average value of 0.9633 for Japanese banks, which indicates that the biggest discrepancies in efficiency occur amongst U.S. banks, in contrast to Japan, where efficiency levels are very similar.

⁶ Humphrey (1985) presents and extended discussion of the alternative approaches over what a bank produces.

3. Market structure and political economy variables

This section deals with the expected influence of political economy variables on bank market structure. It distinguishes between direct influences on market structure and the spin-offs caused by indirect influences brought about by their effects on the validity of the EFS hypothesis. The political economy variables considered are the characteristics of regulation, supervision, institutions, financial structure and financial development in each country. Macroeconomic variables also figure as control variables. Appendix A summarizes the political economy variable measures and their sources employed in the paper.

3.1 Bank regulation

The paper analyses the influence of three bank regulation variables on bank market structure: restrictions to entry into banking, restrictions on non-traditional bank activities and the generosity of deposit insurance.

As entry restrictions (ENTRY) determine the participants in the market, we expect that higher entry restrictions increase bank market concentration. Moreover, if market competitiveness depends on the number of participants, the degree of restrictions on banking may also affect the likelihood of more efficient firms taking over their less efficient counterparts. Thus, higher restrictions in banking may indirectly reduce market concentration by reducing the validity of EFS hypothesis propositions. Consistent with this argument, Jayaratne and Strahan (1998) demonstrated that long-standing branching in USA banking served as entry barriers that prevented more efficient bank from expanding at the expense of their less efficient rivals.

Entry restrictions are measured by the fraction of rejected entry applications (both domestic and foreign) reported by Barth et al. (2004), with higher values indicating more restriction. This variable ranges from 1 for Thailand, where all entry applications were rejected, to 0

for countries such as Argentina, Australia, Bolivia, Cyprus, Finland, France, Germany, Greece, Iceland, Ireland, Japan, Luxembourg, Morocco, Netherlands, Nigeria, Oman, Peru, Portugal, Spain, Switzerland and Slovenia, who all granted licenses to every applicant. This measure has also been used by Demirgüç-Kunt et al. (2004), Beck et al. (2005) and Laeven and Majnoni (2005).

The second regulatory variable considered is whether banks are allowed to take part in activities that generate non-interest income (securities, insurance, real estate and bank ownership of non-financial firms) (RESTRICT). The relevance of restricting bank activities on the behavior of banks has been highlighted by empirical studies demonstrating its negative influence on bank performance and stability (Barth et al. 2001, 2004; Beck et al. 2005). Moreover, Claessens and Laeven (2004) have shown that more stringently regulated bank markets are less competitive. According to this evidence, tighter restrictions would reduce the likelihood of market concentration being due to efficient banks gaining market share at the expense of their less efficient rivals, thereby limiting the validity of the EFS hypothesis. Tighter restrictions may also reduce concentration because they encourage more specialization in the economy, similarly reducing the chances of smaller banks being absorbed by larger conglomerates. As a result, smaller banks are better able to coexist with larger ones. As we expect EFS hypothesis arguments to be less valid as explanations of market structure the tighter the restrictions on bank activities, we predict an indirect negative influence of RESTRICT on market structure.

The measure of restrictions on bank activities was obtained from Barth et al. (2004). Average restrict measures indicate whether bank activities in the securities, insurance and real estate markets, and bank ownership and control of non-financial firms are (1) unrestricted, (2) permitted, (3) restricted, or (4) prohibited. Although this indicator can in theory range from 4 to 16, with higher values indicating more restrictions on bank activities and non-financial ownership and control, in our sample it varies between a minimum value of 5 for United States and a maximum value of 14 for Ecuador and El Salvador.

The third regulatory variable is the generosity of deposit insurance in the country (HAZARD). It has long been suggested that more generous deposit insurance reduces the market discipline enforced by depositors and encourages banks to take higher risk (Merton, 1977; Bhattacharya and Thakor, 1993). Recent empirical evidence (Demirgüç-Kunt and Detragiache, 2002) confirms this effect, showing that deposit insurance increases the likelihood of banking crisis and that loss-control features such as risk-sensitive deposit insurance premiums, coverage limits, and coinsurance temper the risk-shifting incentives exacerbated by the introduction of explicit deposit insurance (Hovakimian et al. 2003). According to this evidence, if more generous deposit insurance increases the probability of suffering banking crisis, we would expect it to also boost bank market concentration, since the number of organizations folding as a result of taking excessive risk would increase.

However, the effect of the generosity of deposit insurance on the validity of the EFS hypothesis is less clear-cut. We are unaware of any study that analyzes its impact on the bank market competitiveness. We therefore make no a priori forecast of the influence of HAZARD on the validity of the EFS hypothesis, preferring to treat it as an empirical issue.

To measure the generosity of deposit insurance we follow Demirgüç-Kunt and Detragiache (2002) and define the variable HAZARD as the sum of eight dummy variables. Each dummy variable adds the value of one in each of the following cases: 1) if membership is mandatory, 2) nominal coverage limits are not specified, 3) coinsurance does not exist for any depositors, 4) deposit-insurance obligations are funded in some way, 5) funding comes partially or totally from government, 6) the system is partially or totally managed by the government, 7) foreign-denominated deposits are explicit covered, 8) interbank deposits are formally guaranteed. All these characteristics are positively related to moral hazard of deposit insurance and, therefore, a higher value of HAZARD would indicate a country's greater moral hazard problems originated by deposit insurance. In our sample, HAZARD ranges from the value of 1 for Switzerland to the value of 8 for Mexico. This index has also been used for similar purposes by Hovakimian et al. (2003), Cull et al. (2005), and Caprio et al. (2003). Although HAZARD is only defined for countries with explicit deposit insurance, in order to include every country in the analysis, we also defined a dummy

variable, INS, which takes a value of one in countries with explicit deposit insurance and zero otherwise. Results obtained using INS coincide with those from using HAZARD.

3.2. Bank supervision

The influence of supervision is explicitly incorporated into the analysis by employing the same variables as Barth et al. (2004) to gauge both the intensity of private monitoring (MONITOR) and official supervision (OFFICIAL) of banks. If stronger private market discipline and greater powers of supervisors to intervene in banks were useful for reducing bank risk-taking, we would expect both MONITOR and OFFICIAL to be negatively related to bank market concentration, as the likelihood of bank runs would be lower. The new Basel Accord has faith in the ability of both types of supervision to increase bank stability, and promotes official monitoring in Pillar 2 and private monitoring in Pillar 3. However, empirical evidence points to the need for caution on the question of reinforcing official bank supervision. Barth et al. (2004) analyze country-level data to conclude that policies that promote private monitoring are better for bank development and stability than policies that rely on direct government supervision. Using bank-level data, Caprio et al. (2003) do not find any significant effect of the power of official supervision on bank valuation. According to this evidence, we would expect MONITOR to exercise a greater negative influence on bank market structure than OFFICIAL.

With regards to influencing on the validity of the EFS hypothesis, we expect MONITOR to have a positive effect, since the development of private monitoring is a necessary condition for the development of markets. Thus, if more intense private monitoring is linked to the markets functioning better, it will also be positively linked to the relative efficiency of each individual bank, determining market share and therefore lending greater validity for the EFS hypothesis. However, this forecast would be different for official supervision. Greater power of supervisors to intervene in banks need not correlate with banks working more efficiently. Quite the opposite in fact: if official supervision thrives at the expense and in

place of fewer private monitoring incentives⁷, it will develop more wherever the market least works. Therefore, unlike the forecast for private monitoring, we expect the EFS hypothesis to be less valid, the greater official supervisory power is.

The measure of private supervision is obtained by adding a value of one for each of the following characteristics of a country: 1) if an outside licensed audit is required of the financial statements issued by banks, 2) if the income statement includes accrued or unpaid interest or principal on nonperforming loans and when banks are required to produce consolidated financial statements, 3) if off-balance sheet items are disclosed to the public, 4) if banks must disclose risk management procedures to the public, 5) if subordinated debt is allowable (required) as a part of regulatory capital, and finally is added 6) the percentage of the top 10 banks that are rated by international credit-rating agencies. This variable therefore ranges from 0 to 6, with higher values indicating more private oversight. Each country's official supervisory power is measured by adding a value of one for each affirmative answer to 14 questions that gauge the power of supervisors to undertake prompt corrective action, to restructure and reorganize troubled banks and to declare a deeply troubled bank insolvent. This variable may range from 0 to 14, with a higher value indicating more official supervisory power.

3.3. Institutions, financial structure and financial development

The influence of the quality of institutions, bank orientation and the level of financial development of the financial system on bank market structure is jointly analyzed, as the literature generally intertwines these three variables.

Well-functioning markets rely on contracts and their legal enforceability. In contrast, weak legal systems and poor institutional infrastructure impedes market functioning. Rajan and Zingales (1998) argue that bank-based architecture survives and is more effective in the latter scenario because banks can use their power to protect their interests in the absence of

⁷ The dispersion of depositors and the guarantee provided by deposit insurance curb incentives for depositors to monitor bank managers (Greenbaum and Thakor, 1995).

effective legal provision. La Porta et al. (1997, 1998) find that markets develop better in countries where the rights of the minority shareholders are well protected. Because well-defined shareholder rights are found in common-law countries, they conclude that it comes as no surprise that markets are larger in common-law countries than civil-law countries. Likewise, Levine (1998, 1999) finds that banks develop better in countries where the rights of the secured creditors are well protected. Hence, market-based systems work better where more stringent contractual environments are in place, and bank-based systems fare well where they are lacking.

Moreover, weak legal systems, poor property rights and fragile regulatory institutions characterize less developed countries (La Porta et al. 1998), and lead to financial underdevelopment (La Porta et al. 1997). The diversity of contractual and informational environments across countries leads one to expect a systematic pattern in the effectiveness of different financial architectures. Given the weak legal and institutional structure in financially underdeveloped countries, it appears more likely for bank-based financial architecture to prevail and be more effective in these economies.

The above findings suggest a positive correlation between the quality of the contracting environment, market orientation and the development of the financial system, which leads to the expectation that each of these facets will have the same effect on the validity of the EFS hypothesis. If we assume that relating bank efficiency to differences in market share requires the legal system to work well, we would forecast an increase in the validity of the EFS hypothesis not only in line with the quality of the legal system but also with market orientation and development of the financial system.

We use the KKZ index as an indicator of the quality of a country's legal environment. This was calculated by Kaufman et al. (2001) as the average of six indicators: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. This index has also been used for similar purposes to ours by Demirgüç-Kunt et al. (2004) and Beck et al. (2005). We also checked the robustness of results by including alternative measures of the quality of the legal and institutional

environment that are used in other papers: 1) the law and order index of the International Country Risk Guide (LAW), and 2) the property rights index from the Economic Freedom index used initially by La Porta et al. (1998). Results were not significantly different to those reported in the paper using the KKZ index.

To measure the comparative importance of stock markets and banks, we use the structure-aggregate variable (STRUCT) described by Beck and Levine (2002) and defined as the first principal component of two variables that measure the relative activity and size of markets and banks. Each of the underlying components is constructed so that higher values indicate more market-based financial systems. To measure a country's financial development we follow Levine and Zervos (1998) and Beck and Levine (2002) in using the Finance-Aggregate index (FINAN). This index equals the first principal component of two underlying variables of financial development that measure, respectively, the overall activity of financial intermediaries and markets and the overall size of the financial sector. The data to calculate the measures of STRUCT and FINAN come from the Financial Structure and Economic database developed by Beck et al. (2003).

3.4. Foreign and government ownership

In addition to the degree of market- or bank-orientation of the financial system, we also analyze a further two facets of a country's financial structure: the extent of both foreign (FOREIGN) and government (STATE) bank ownership in the national banking system.

As a large share of foreign bank ownership would correlate to lower entry restrictions into the national banking industry, we forecast a direct negative influence of FOREIGN on bank market structure. However, the indirect effect of FOREIGN on market structure stemming from its influence on the validity of the EFS hypothesis would be the opposite. Barth et al. (2004) indicate that barriers to foreign bank participation enhance bank fragility. Claessens et al. (2001) and Claessens and Laeven (2004) provide empirical evidence demonstrating that for most countries greater foreign bank entry increases the level of competition of national banking markets, which in the long run may improve their functioning, with

positive welfare implications for banking customers. One spin-off of these results would be a greater role for the EFS hypothesis, the larger the share of foreign ownership of banks in the market, as concentration would more likely be the outcome of the survival of the fittest. The above arguments lead us to forecast that foreign bank entry in the national market is positively related to the importance of the EFS hypothesis, and in consequence has an indirect positive effect on market concentration.

Since government ownership of banks is associated with greater levels of government intervention in the economy and the banking system, we expect a greater banking concentration. However, we expect the influence of government bank ownership on the EFS hypothesis to be negative and to curb concentration processes caused by the progress of the more efficient banks, i.e. if markets work worse, the more state presence there is in bank ownership (La Porta et al. 2002), so banks are less likely to gain market share by enhancing their efficiency and therefore the propositions of the EFS hypothesis will lose validity.

The presence of foreign and state banks is also measured using the data provided by Barth et al. (2004). FOREIGN is measured as the fraction of the banking system's assets held by banks that are 50 percent or more foreign-owned and STATE is measured by the share of banking assets in banks that are majority owned by the government. In our sample of countries, Bangladesh, Iceland, India and Romania have banking systems where state-owned banks account for more than 60% of the market whereas foreign ownership accounts for more than 60% of the national market in Hungary, Jordan and Luxembourg.

3.5. Macroeconomic variables

Finally, macroeconomic characteristics are considered as control variables. We followed Demirgüç-Kunt and Huizinga (2001), Demirgüç-Kunt et al. (2004) and Smirlock (1985), among others, when selecting the macro-economic variables that might impact upon market structure: inflation rate (INFLATION) and the growth of deposits (GROWTH). Demirgüç-Kunt and Huizinga (2001) and Demirgüç-Kunt et al. (2004) have shown that banks have

greater margins and greater profitability in inflationary environments. The percentage growth in market deposits is employed because rapid growth should expand profit opportunities for existing banks (Smirlock, 1985; Shepherd, 1986). Additionally, following Berger and Hannan (1997) we include the natural logarithm of country population (LNPOPULATION) as an explanatory variable of CONC and MS to control for the influence of country size. Macroeconomic data was obtained from the International Financial Statistics of the International Monetary Fund (IMF).

Table 2 summarizes the forecasted influence of each political economy variable on bank market structure and their descriptive statistics.

As a first step to assessing whether more efficient banks have larger market share and are in more concentrated markets, we might consider the correlations reported in Table 3. Consistent with the EFS hypothesis, we find that the four measures of bank efficiency and both measures of market structure correlate positively. We also find that several country characteristics correlate significantly with market structure. CONC and MS appear to be significantly higher on average in countries with higher entry barriers, less generous deposit insurance, lower official supervisory power, weaker institutional environment, more foreign-owned banks, more state-owned banks, more bank-oriented and less developed financial systems in the country. Finally, correlations between political economy aspects coincide with those documented in the literature, and the highest correlations (more than 0.5) are the positive ones observed between the quality of the legal system, market orientation and development of financial systems. As expected, higher entry barriers correlate positively with a higher extent of state ownership and lower quality of contracting environment. Moreover, more generous deposit insurance is positively associated with tighter restrictions on bank activities and is negatively associated with the extent of foreign bank ownership. The other correlations between political economy variables are lower than 0.5.

4. Methodology and data

We use cross-section and time series data of individual banks' balance sheet and income statement items from 73 countries over a 7-year period from 1996 to 2002 compiled in the Fitch-IBCA Bankscope database to estimate bank efficiency and market share. The other variables are the country-level variables previously described, which are culled from three sources: the World Bank Bank Regulation and Supervision Database, the Financial Structure and Economic Development Database, and the IMF's International Financial Statistics.

The model estimated is:

$$\text{CONC}_{jit} = \alpha_0 + \alpha_1 \text{EFF}_{it} + \alpha_2 Z_{jit} + \alpha_3 M_{jit} + \alpha_4 \sum_{t=1996}^{2002} Y_t + \mu_{1i} + \varepsilon_{1it} \quad [1]$$

$$\text{MS}_{it} = \beta_0 + \beta_1 \text{EFF}_{it} + \beta_2 Z_{jit} + \beta_3 M_{jit} + \beta_4 \sum_{t=1996}^{2002} Y_t + \mu_{2i} + \varepsilon_{2it} \quad [2]$$

where CONC_{jit} is the bank market concentration of country j of bank i in year t , MS_{it} is the market share of bank i in year t , EFF_{it} is the efficiency of bank i in year t , and Z_{jit} is the set of political economy variables (regulation, supervision, quality of institutions, financial structure and financial development) of country j of bank i in year t , M_{jit} is the set of macroeconomic variables of country j of bank i in year t . $\sum_{t=1996}^{2002} T_t$ is a set of dummy time

variables. The 1996 dummy is omitted from the regressions. These dummies capture any unobserved bank-invariant time effects not included in the regression, but their coefficients are not reported for reasons of space. Finally, u_i are unobservable bank-specific effects that are constant over time but vary from institution to institution, and ε_{it} are white-noise error terms.

The availability of a data panel enables unobserved bank-specific and time-specific effects to be corrected for. Since banks are heterogeneous, there are always characteristics influencing market share and, by extension, market concentration that are difficult to measure or hard to obtain, and which do not enter our models. Failure to control for such heterogeneity entails a risk of obtaining biased results in view of the correlation between the error term and some of the explanatory variables. We control for such potential bias by using a panel database and applying a random effects model. The natural alternative specification of fixed effects is not feasible in our framework, given that there is no within-variation in the regulatory and supervisory variables.⁸ The random effects specification is supported by the Breusch and Pagan (1980) Lagrange multiplier test, (LM test), which rejects the null hypothesis that errors are independent within banks, i.e., individual effects are not irrelevant.

In models [1] and [2], positive coefficients for α_1 y β_1 would be consistent with the efficiency-structure hypothesis after controlling for country variables. However, the way the EFS hypothesis varies across countries depending on the characteristics of the political economy variables is not captured in these specifications. To do so, and to differentiate between the direct and the indirect effect of each political economy variable on market structure, we introduce interaction terms of each political economy variable and the bank efficiency measure sequentially. The model estimated is:

$$\text{CONC}_{jit} = \gamma_0 + \gamma_1 \text{EFF}_{it} + \gamma_2 Z_{jit} + \gamma_3 \text{EFF}_{it} * Z_{jit} + \gamma_4 M_{jit} + \gamma_5 \sum_{t=1996}^{2002} Y_t + \mu_{1i} + \varepsilon_{1it} \quad [3]$$

$$\text{MS}_{it} = \delta_0 + \delta_1 \text{EFF}_{it} + \delta_2 Z_{jit} + \delta_3 \text{EFF}_{it} * Z_{jit} + \delta_4 M_{jit} + \delta_5 \sum_{t=1996}^{2002} Y_t + \mu_{2i} + \varepsilon_{2it} \quad [4]$$

⁸ La Porta et al. (2000, 2002) use a random effects specification with the same type of database and legal origin variables.

In models [3] and [4], γ_2 and δ_2 would denote the direct influence of each political economy variable on market concentration and market share respectively, whereas γ_3 and δ_3 would denote the indirect influence that each political economy variable exerts on market structure via its influence on the EFS hypothesis. The greater the positive values of γ_3 and δ_3 , the more different bank efficiencies will spark differences in market structure, i.e., the more efficient banks would expand at the expense of their less efficient rivals in line with an increase in the value of the corresponding political economy variable. This is what we have called ‘an indirect positive effect’ on market structure. In contrast, negative values of γ_3 and δ_3 would indicate that the respective political economy variable reduces the validity of the EFS hypothesis. Greater bank efficiency will lead to value reductions rather than to enhanced market share and market concentration. In such a case, the indirect effect of the political economy variable on market structure would be negative.

5. Results.

5.1. *Efficiency and market structure*

Only results obtained following the output orientation imposing variable returns to scale (VRTS) are presented for reasons of space. As the efficiency-structure hypothesis assumes that more efficient banks increase their market share to the detriment of their less efficient counterparts we have a preference for the output orientation. Moreover, the use of VRTS is justified because it constitutes a measure of X-efficiency, which has been mainly analyzed in parametric analyses. Nevertheless, all estimations were replicated three more times assuming constant returns to scale (CRTS) and following an input orientation with VRTS and CRTS. The high correlations between the four measures of bank efficiency led to results being identical to those described here.

The influence of bank efficiency and political economy variables on bank concentration is reported in Table 4, whilst their influence on market share is reported in Table 5. As some

political economy variables correlate, they are introduced sequentially. Furthermore, as the quality of legal system exerts its influence on market orientation and development of the financial system, and as the regulatory variables correlate with the extent of both foreign and government bank ownership in the national banking system, regulation, supervision and legal quality variables are not combined in the same regression with those of financial structure and development of the financial system. The former variables are controlled for in columns (1)-(3), whilst the latter are controlled for in columns (4)-(6). Macroeconomic variables are incorporated in all the regressions. The direct influence of political economy variables on market structure is not separated from their indirect influence via their effect on the validity of the EFS hypothesis. Their coefficients capture the total effect of respective country variables on market structure.

Results in all estimations are consistent with the efficiency-structure hypothesis, since EFF has statistically significant positive coefficients both in the market share and in the market concentration equations. Moreover, the positive influence of bank efficiency on bank market structure remains significant regardless of the combination of political economy variables controlled for. The influence of bank efficiency is also of economic significance. For instance, using the EFF coefficients in column (1) of tables 4 and 5, a standard deviation increase in bank efficiency (0.3242) would originate an increase in the market concentration and in the bank market share that represents, respectively, 0.071 times and 0.057 times the standard deviation of each of these variables.

The influence of regulatory variables is reported in column (1). Consistent with our forecasts, stricter entry restrictions increase market concentration and market share, since DENIED exhibits positive coefficients in tables 4 and 5. Legal restrictions on non-traditional bank activities have a negative influence on market concentration although they do not have a negative influence on bank market share. The negative coefficients of RESTRICT are consistent with the argument that tighter restrictions on banks outside the credit and deposit business may reduce concentration because they encourage further specialization in the economy and diminish the chances of large conglomerates absorbing smaller banks.

The generosity of the deposit insurance system (HAZARD) has a positive influence on both market concentration and market share. This is consistent with the evidence of its adverse effects on bank risk-taking incentives. If more generous deposit insurance increases the probability of suffering bank crises, it would also be associated with more concentrated markets.

The influence of regulatory variables, which has already been commented on, is robust under different specifications and remains significant after controlling for supervisory and legal variables in columns (2) and (3) of tables 4 and 5. Estimations that include supervisory variables show that higher market concentration is associated with lower official supervision and higher private monitoring. These results are consistent with the differences expected in the validity of the EFS hypothesis depending on supervisory power and market monitoring. In column (3), the KKZ index has a positive coefficient on the market concentration equation and a non-significant one on the market share equation. This confirms that a better quality contracting environment smoothes the way for more efficient banks to take over the less efficient ones and thereby increase their market concentration.

Columns (4)-(6) of tables 4 and 5 highlight that, after controlling for efficiency and macroeconomic variables, higher market share and concentration is observed in more market-oriented and less developed financial systems, and in banking systems more dominated by state banks and with lower foreign penetration. These latter two relationships are consistent with the fact that greater bank ownership and lower foreign penetration are associated with higher bank entry barriers.

Finally, macroeconomic variables also have significant coefficients. Inflation and the growth rate of deposits in the national market are positively associated with market concentration, whereas the size of the country, measured by its population, favors a lower market concentration. However, the results documented in tables 4 and 5 fail to distinguish between the direct influence of political economy variables and their indirect affects caused by them affecting the EFS hypotheses. We will now turn to consider the two effects individually.

5.2. *The Efficiency Hypothesis and political economy variables*

If a political economy variable increases (reduces) the validity of the EFS hypothesis, it would indirectly promote a greater (lower) market concentration as a result of the gain of market share by more efficient banks. Interaction terms of the efficiency variable and each of the political economy variables were incorporated into the equations in order to test their indirect influence on market structure. A positive (negative) coefficient of the respective interaction term would be consistent with a positive (negative) influence of the respective political economy variable on the propositions of the EFS hypothesis, and therefore would also be consistent with a positive (negative) indirect influence on market concentration and market share. Interaction terms were incorporated sequentially instead of simultaneously to avoid correlation problems between the political economy variables. Results are reported in tables 6 and 7.

The results reported in table 6 indicate that higher entry restrictions, more generous deposit insurance and a higher extent of state ownership reduce the validity of the efficiency hypothesis as an explanation of bank market concentration, given that coefficients $EFF*DENIED$, $EFF*HAZARD$ and $EFF*STATE$ are negative and statistically significant. A standard deviation increase in our measures of the above three factors would originate, respectively, a reduction in the market concentration of 0.12, 0.018, and 0.20 times its standard deviation. These results are consistent with our forecasts, which established that the fewer participants resulting from higher entry requirements may reduce market competitiveness and, by extension, the validity of the EFS hypothesis. The negative coefficient of $STATE$ is consistent with market underperformance in banking systems dominated by state banks (La Porta et al. 2002). Although we originally approached the effect of the generosity of deposit insurance on the validity of the EFS hypothesis as if it were an empirical question, its negative influence suggests that the adverse effect of deposit insurance not only on bank risk-taking incentives but also on differences in growth across banks is due to differences in bank efficiency.

In contrast, the validity of the efficiency hypothesis increases with tighter restrictions on non-traditional bank activities (RESTRICT), the quality of the institutional environment and enforceability of contracts (KKZ), market orientation (STRUCT) and development of financial system (FINAN), as the coefficients of the interaction terms of each one of these variables and EFF are positive and statistically significant. The positive influence of the KKZ index confirms that the quality of the contracting environment is essential for a well performing market, and that greater market concentration is born of the growth of more efficient organizations. Since greater quality in the contracting environment correlates with greater market-orientation and development of the financial system, we also observe enhanced validity for the propositions of the EFS hypothesis, the greater STRUCT and FINAN are. However, the positive influence of RESTRICT contradicts our expectations that tighter restrictions on non-traditional bank activities would reduce the validity of the EFS hypothesis by reducing market competitiveness and fostering further specialization in the economy.

Finally, the interactions terms of private monitoring (EFF*MONITOR), official oversight (EFF*OFFICIAL) and the extent of foreign ownership (EFF*FOREIGN) have the expected coefficients. However, they are not statistically significant.

The results reported in Table 7, obtained by using market share as the dependent variable, confirm the negative effect of DENIED and the positive effect of RESTRICT on the validity of the EFS hypothesis. Moreover, the above-mentioned positive influence of EFF*MONITOR when using market concentration as the dependent variable is now statistically significant. This result is consistent with our forecasts. As private monitoring is a necessary condition for well-functioning markets, it is positively linked with the validity of the EFS hypothesis. EFF*FOREIGN, although non significant, also has a positive coefficient. The positive influence of FOREIGN on the EFS hypothesis would be consistent with the positive relationship found by Claessens et al. (2001) and Claessens and Laeven (2004) between market competitiveness and foreign bank entry. The remaining interaction terms do not have statistically significant coefficients.

6. Conclusions

This paper analyzes the influence of bank efficiency and political economy variables on bank market structure (market share and market concentration) using a panel data of 2,592 banks from 69 countries over the 1996-2002 period. We distinguish between the direct influence of each political economy variable and the indirect influence they exercise via their effect on the validity of the EFS hypothesis. Results are consistent with the EFS hypothesis, as more efficient banks have on average larger national market shares that intensify market concentration. However, the validity of the EFS hypothesis as an explanation of market structure varies across countries depending on the characteristics of bank regulation, supervision, institutions, financial structure and financial development. In particular, the positive influence of bank efficiency on market share and market concentration increases with legal restrictions on non-traditional bank activities, the quality of the contracting environment, private monitoring, and market orientation and development of the financial system. Although a greater extent of foreign bank ownership is also associated to a higher validity of the EFS hypothesis in the national market, we do not obtain statistically significant coefficients for this relationship. In fact, higher entry requirements, more generous deposit insurance and higher extent of government bank ownership reduce the positive influence of bank efficiency on market share and market concentration and the validity of the EFS hypothesis.

Besides their indirect influence on market structure caused by their influence on the validity of the EFS hypothesis, political economy variables have a further direct effect: more bank market concentration is associated with higher bank entry restrictions, weaker restrictions on non-traditional bank activities, more generous deposit insurance, higher private monitoring, lower official supervision, a stronger legal environment, more market orientation, lower levels of foreign bank ownership and higher levels of state bank ownership after controlling for bank efficiency.

These results have clear policy implications on optimal antitrust legislation, given that policies that inhibit mergers are more socially costly, the greater the validity of the EFS

hypothesis. Our results therefore confirm that optimal antitrust legislation must vary across different environments, depending on the web of legal, supervisory and institutional forces acting upon the banking system. Antitrust enforcement would be socially costly in environments where there are tighter legal restrictions on bank activities, stronger contracting environment, more private supervision, more market orientation and more developed financial systems.

Table 1**Descriptive statistics of market share and bank efficiency**

Mean per country values. CONC is the fraction of assets held by the three largest commercial banks in each country; MS is the bank market share in the national market. Efficiency is estimated per country over the 1996-2002 period using DEA and following the output orientation and imposing variable returns to scale (VRTS). The inputs considered are: (1) personal expenses, (2) the book value of fixed assets and (3) loanable funds. The outputs used are: (1) total loans and (2) non-interest income.

	# observations	Market structure		Bank efficiency							
		CONC	MS								
				1996	1997	1998	1999	2000	2001	2002	Average 1996-2002
Argentina	253	0.4826	0.0156	0.5816	0.5899	0.5847	0.5345	0.5690	0.5761	0.7065	0.5735
Australia	151	0.6264	0.03953	0.5783	0.6655	0.6989	0.7672	0.7189	0.7150		0.6814
Austria	131	0.7599	0.0280	0.3637	0.3882			0.4534	0.4529	0.4619	0.4135
Bangladesh	117	0.5712	0.0401	0.5918	0.5840	0.5826	0.6635	0.7164	0.7528	0.7658	0.7037
Bolivia	77	0.5739	0.07458	0.8779	0.9120	0.9670	0.9392	0.8988	0.8807	0.9328	0.9195
Brazil	131	0.4536	0.0124	0.6435	0.7096	0.5824	0.7038	0.6497	0.7336	0.7201	0.6751
Chile	107	0.6033	0.0617	0.8014	0.8192	0.8599	0.8415	0.8610	0.8835	0.8934	0.8534
China-People's Rep.	43	0.7313	0.0326				0.6816		0.6989		0.6892
Colombia	173	0.3757	0.0380	0.5796	0.6036	0.6229	0.5900	0.6986	0.6950	0.7049	0.6399
Croatia	194	0.0354	0.6863	0.4624	0.5299	0.6154	0.7041	0.5492	0.5842	0.6774	0.5688
Cyprus	31	0.8799	0.0647	0.4947	0.8806	0.7640	0.7317	0.8083	0.8343	0.1000	0.8115
Czech Republic	10	0.8250	0.0213	0.9599	0.8983	0.6458	0.6412	1.0000			0.8883
Denmark	354	0.8217	0.0192	0.2904	0.3333	0.3753	0.3926	0.4053	0.3479	0.3730	0.3596
Ecuador	79	0.6070	0.0352		0.8677	0.8496			0.7878		0.8408
El Salvador	41	0.7851	0.1071			0.9160	0.8064	0.7921	0.7608	0.7518	0.7970
Spain	486	0.7960	0.0143	0.4611	0.4976	0.5415	0.5761	0.6219	0.6014	0.6192	0.5595
Finland	36	0.9818	0.1634		0.7453	0.8339	0.8311	0.8208	0.8163	0.9002	0.8224
France	512	0.5128	0.0075	0.3520	0.3784			0.4776	0.4711	0.5537	0.4152
Germany	329	0.6347	0.0070	0.5281	0.5951	0.5787	0.5965	0.6430	0.5990	0.5626	0.5860
Ghana	23	0.7662	0.1115	0.6343	0.6848	0.5700	0.6553	0.7616	0.6189	0.7215	0.6273
Greece	64	0.7214	0.0420	0.6698	0.7122	0.8020	0.8497	0.8781	0.9863	0.9003	0.8308
Guatemala	150	0.3555	0.0330	0.5678	0.5541	0.5997	0.6394	0.6350	0.6834	0.6733	0.6203
Hong Kong	207	0.7452	0.0334	0.7084	0.7755	0.7349	0.7109	0.7485	0.7383	0.7578	0.7384
Hungary	67	0.6283	0.0624	0.6211	0.6300	0.7405			0.8551	0.8624	0.7469
Iceland	16	0.9922	0.2877		0.8921	0.9316	0.9085	0.8339	0.8995	0.1000	0.8220
India	351	0.3433	0.0187	0.5848	0.5911	0.5829	0.6282	0.6358	0.7624	0.8669	0.6432

Indonesia	302	0.5324	0.0195	0.4961	0.5667	0.4318	0.3024	0.3574	0.3486	0.3461	0.4225
Ireland	41	0.7204	0.0210	0.8508	0.9013	0.8840	0.8860	0.8081	0.7781	0.6700	0.8161
Israel	88	0.7591	0.0794	0.9122	0.8870	0.8982	0.8937	0.9409	0.9218	0.9436	0.9124
Italy	612	0.5000	0.0111	0.2995	0.3477	0.3702	0.4182	0.4552	0.4332	0.5484	0.3994
Jamaica	39	0.9091	0.1765	0.9283	0.8463	0.8648	0.6082	0.7338	0.7716	0.7228	0.7771
Japan	20	0.5850	0.0222	0.9750	0.9720	0.9661	1.0000	0.8644	1.0000		0.9633
Jordan	34	0.8941	0.2059	0.8274	0.8405	0.8145	0.8291	0.8470	0.9096	0.8297	0.8430
Kenya	196	0.5737	0.0344	0.7085	0.7460	0.7006	0.6194	0.6024	0.5938	0.5993	0.6622
Korea Rep.	124	0.4537	0.0513	0.6782	0.7372	0.7575	0.6803	0.6191	0.6170	0.7706	0.6959
Lithuania	54	0.8981	0.1239	0.8128	0.7516	0.8240	0.8381	0.8279	0.9196	0.9440	0.8458
Luxembourg	292	0.2562	0.0128	0.3472	0.3733			0.4746	0.4551	0.4507	0.4029
Malaysia	204	0.4594	0.0334	0.7488	0.7901	0.8049	0.7317	0.7636	0.7677	0.8812	0.7773
Mauritius	36	0.8769	0.1599	0.9312	0.8472	0.8142	0.7063	0.6410	0.6951	0.6613	0.7657
Mexico	167	0.6333	0.0389	0.8120	0.7504	0.7732	0.6987	0.7524	0.7663	0.7906	0.7595
Morocco	34	0.5579	0.1217	0.9470	0.9824	0.9666	0.9867	0.9667	0.9238		0.9595
Namibia	21	0.9285	0.2711		0.9434	0.9675	0.9243	0.9198	0.9942	0.1000	0.9525
Netherlands	70	0.8255	0.0515	0.6057	0.7414			0.7826	0.7077	0.6479	0.6830
Nigeria	59	0.4421	0.0211	0.7937	0.8019	0.7392	0.7426	0.7808	0.8234	0.6724	0.7709
Norway	68	0.9109	0.1027	0.7929	0.9271	0.9177	0.9532	0.9572	0.9487	0.9529	0.9182
Oman	42	0.8491	0.1653	0.8335	0.8605	0.8953	0.9080	0.9356	0.9055	0.8860	0.8889
Pakistan	136	0.6896	0.0513	0.8361	0.8151	0.7972	0.7817	0.7774	0.7768	0.7818	0.7961
Panama	147	0.3780	0.0275	0.6837	0.6226	0.6726	0.6667	0.6569	0.6629	0.7029	0.6628
Paraguay	84	0.5360	0.0582	0.6703	0.7744	0.7557	0.7535	0.7692	0.7125	0.7188	0.7513
Peru	115	0.6980	0.0517	0.7867	0.8078	0.8996	0.8635	0.8998	0.8632	0.8655	0.8531
Philippines	159	0.4628	0.0414	0.8666	0.8563	0.8387	0.7936	0.7856	0.7487	0.8065	0.8156
Poland	208	0.5800	0.0324	0.5707	0.6226	0.7649	0.7343	0.7582	0.8256	0.8960	0.7117
Portugal	121	0.7975	0.0550	0.4778	0.5990	0.6435	0.6602	0.7546	0.7797	0.8731	0.6534
Romania	57	0.7605	0.0499			0.6877	0.7779	0.8943			0.8027
Saudi Arabia	39	0.5853	0.1795	0.8919	0.8652	0.8719	0.8626	0.8594	0.8635	0.9515	0.8750
Singapore	72	0.9153	0.0816	0.8808	0.8805	0.8880	0.9350	0.8931	0.9471	0.9683	0.9085
Slovakia	84	0.7270	0.0758	0.8626	0.7972	0.7341	0.6386	0.6615	0.6577	0.7586	0.7410
Slovenia	86	0.6637	0.0790	0.8827	0.8527	0.9274	0.9128	0.9290	0.9075	0.9395	0.9030
South Africa	71	0.8151	0.0918	0.7339	0.6980	0.7151	0.8252	0.7114	0.7047	0.8320	0.7429
Sri Lanka	37	0.7879	0.1469	0.9029	0.9296	0.9052	0.8995	0.8957	0.9356		0.9109
Sweden	19	0.9903	0.1561			0.8402	0.8994	0.9241			0.8885
Switzerland	55	0.8578	0.0006	0.8708	0.8961	0.9028	0.8972	0.9554	0.9894	0.9561	0.9226
Thailand	66	0.0635	0.0965	0.8640	0.7195	0.7163	0.7311	0.6258	0.6537	0.7012	0.7032
Trinidad and Tobago	39	0.7668	0.1747	0.8976	0.9352	0.9485	0.9775	0.9664	0.9722	0.9920	0.9515
Tunisia	88	0.4984	0.0795	0.8778	0.8888	0.8676	0.7714	0.8645	0.9029	0.9043	0.8665
Turkey	53	0.5417	0.0575				0.9095	0.8864	0.7325	0.8006	0.8413
U.K.	42	0.4178	0.0105	0.9163	0.7423	0.7754	0.8701	0.9073	0.9050	0.8281	0.8300
U.S.A.	2391	0.3104	0.0028	0.1616	0.1693	0.1836	0.1936	0.2105	0.2219	0.2231	0.1919
Venezuela	135	0.5319	0.0412		0.8655	0.7643	0.6895	0.7056	0.7208	0.7812	0.7357
Mean		0.5393	0.0350	0.4861	0.5294	0.5708	0.5745	0.5822	0.5859	0.5949	0.5521
Std. dev.		0.2010	0.0828	0.3134	0.3182	0.3238	0.3229	0.32127	0.3214	0.3349	0.3242
Minimum		0.2408	0.00000	0.0068	0.0058	0.0056	0.0024	0.0062	0.056	0.0049	0.0024
			6								
Maximum		1	0.9334	1	1	1	1	1	1	1	1

Table 2
Descriptive statistics

CONC is the fraction of assets held by the three largest commercial banks in each country, MS is the bank market share in the country market, DENIED is the share of bank license applications rejected, RESTRICT is an indicator of the degree to which banks' activities are restricted outside the credit and deposit business, HAZARD is an index of moral hazard measuring the generosity of deposit insurance, OFFICIAL measures official supervisory power, MONITOR measures market monitoring, KKZ is an indicator of the quality of institutional development, STRUCT measures the market orientation of the financial system, FINAN is a measure of financial development, FOREIGN is the share of banking assets in banks that are majority owned by foreign shareholders, STATE is share of banking assets in banks that are majority owned by the government, INFLATION is the annual change in the consumer price index, GROWTH is the growth rate of the total deposits, LN(POPULATION) is the natural logarithm of country population. Detailed definitions and sources are in the data appendix

Forecasted influence on CONC and MS							
	Direct effect	Indirect Effect (EFS hypothesis)	Mean	Minimum	Maximum	Std. Deviation	# of observations
DENIED	+	-	0.1580	0	1	0.2642	9012
RESTRICT		-	9.5783	5	14	2.1901	10517
HAZARD	+		5.5016	1	8	1.5711	8706
OFFICIAL	-/+	-	11.5409	3	14	2.7798	10193
MONITOR	-	+	7.1298	3	10	1.2944	9840
KKZ		+	4.0352	-7.2	11.91	4.7603	11152
STRUCT		+	-0.7146	-6.8675	1.3481	1.2554	11152
DEVELOP		+	-1.1730	-6.1096	1.4620	1.7350	11152
FOREIGN	-	+	0.1531	0	0.9497	0.1531	8805
STATE	+	-	0.1730	0	0.8	0.2277	9308
INFLATION			5.5137	-3.9758	75	8.9448	11152
GROWTHD			10.7584	-17.7263	102.5702	12.3292	11152
LN (POPULATION)			3.7405	-1.3093	7.1587	1.7429	11152

Table 3
Correlations

	MS	CONC	EFF-	INFLATION	GROWTH D	LN(POPULATION)	DENIED	RESTRICT	HAZARD	OFFICIAL	MONITOR	KKZ	FOREIGN	STATE	STRUCT
CONC	0.299***														
EFF	0.396**	0.0421***													
INFLATION	0.103***	0.128***	0.187***												
GROWTHD	0.125***	0.173***	0.282***	0.484***											
LN (POPULATION)	-0.2711***	-0.481***	-0.367***	0.038***	-0.146***										
DENIED	0.105***	0.096***	0.239***	0.260***	0.247***	0.122***									
RESTRICT	0.076***	-0.250***	-0.021**	0.173***	0.016*	0.252***	0.140***								
HAZARD	-0.021**	-0.172***	-0.209***	0.161***	-0.064***	0.525***	0.094***	0.549***							
OFFICIAL	-0.039***	-0.322***	-0.154***	0.014***	-0.023**	0.077***	-0.053***	0.200***	0.257***						
MONITOR	-0.005	-0.116***	-0.123***	-0.144***	-0.146***	0.074***	-0.344***	0.319***	0.349***	0.315***					
KKZ	-0.185***	-0.143***	-0.408***	-0.439***	-0.385***	0.158***	-0.633***	-0.249***	-0.006	0.057***	0.253***				
FOREIGN	0.117***	0.052***	0.174***	-0.027***	0.099***	-0.616***	-0.040***	-0.292***	-0.567***	0.099***	-0.024**	-0.185***			
STATE	0.066***	0.091***	0.284***	0.274***	0.333***	0.017***	0.674***	0.024***	-0.249***	-0.159***	-0.443***	-0.484***	-0.024**		
STRUCT	-0.166***	-0.234***	-0.342***	-0.216***	-0.263***	0.518***	-0.268***	0.064***	0.471***	0.100***	0.434***	0.527***	-0.317***	-0.295***	
DEVELOP	-0.198***	-0.214***	-0.380***	-0.349***	-0.388***	0.368***	-0.411***	-0.115***	0.187***	0.071***	0.409***	0.734***	-0.292***	-0.451***	0.833***

*** Significant at 1 % level. ** Significant at 5 % level. * Significant at 10 % level.

Table 4
Determinants of bank market concentration

Results of random effects regression. The dependent variable is market concentration (CONC) measured as the fraction of assets held by the three largest commercial banks in each country, EFF is the measure of bank efficiency obtained using DEA, DENIED is the share of bank license applications rejected, RESTRICT is an indicator of the degree to which banks' activities are restricted outside the credit and deposit business, HAZARD is an index of moral hazard measuring the generosity of deposit insurance, OFFICIAL measures the official supervisory power, MONITOR measures market monitoring, KKZ is an indicator of the quality of institutional development, STRUCT measures the market orientation of the financial system, FINAN is a measure of financial development, FOREIGN is the share of banking assets in banks that are majority owned by foreign shareholders, STATE is share of banking assets in banks that are majority owned by the government, INFLATION is the annual change in the consumer price index, GROWTHD is the growth rate of the total deposits, LN(POPULATION) is the natural logarithm of country population. Detailed definitions and sources are in the data appendix. Year dummy variables were included for all estimations but are not reported. T-statistics are shown in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

Expected sign								
	Direct effect	Indirect effect	(1)	(2)	(3)	(4)	(5)	(6)
EFF			0.0441*** (7.46)	0.0261*** (5.00)	0.0333*** (6.44)	0.0462*** (9.41)	0.0457*** (8.38)	0.0497*** (8.60)
INFLATION			0.0045*** (17.87)	0.0034*** (15.22)	0.0039*** (17.11)	0.0023*** (15.29)	0.0016*** (10.09)	0.0021*** (11.44)
GROWTHD			0.0006*** (6.68)	0.0007*** (7.97)	0.0006*** (7.11)	0.0001 (1.59)	0.0002** (2.23)	0.0001 (0.70)
LN (POPULATION)			-0.0360*** (-14.28)	-0.0995*** (-60.71)	-0.1030*** (-63.96)	-0.0363*** (-19.89)	-0.0649*** (-27.47)	-0.0650*** (-26.47)
DENIED	+	-	0.0426** (2.10)	0.0172 (1.36)	0.0723*** (5.42)			
RESTRICT		-	-0.0305*** (-13.18)	-0.0247*** (-20.53)	-0.0228*** (-19.53)			
HAZARD	+		0.0310*** (9.31)	0.0146*** (7.53)	0.0141*** (7.55)			
OFFICIAL	-/+	-		-0.0094*** (-11.22)	-0.0095*** (-11.90)			
MONITOR	-	+		0.0122*** (4.75)	0.0125*** (5.08)			
KKZ		+			0.0048*** (10.22)			
STRUCT		+				-0.0025 (-1.17)		0.0061** (2.08)
DEVELOP		+				0.0040** (2.04)		-0.0042* (-1.62)
FOREIGN	-	+					-0.3423*** (-19.30)	-0.3846*** (-21.82)
STATE	+	-					0.1366*** (8.34)	0.1607*** (9.16)
Time Dummies			Yes	Yes	Yes	Yes	Yes	Yes
R ² overall			0.3431	0.7763	0.7837	0.3207	0.3688	0.3878
Wald χ^2			1161.91***	74134.69***	7662.08***	1102.29***	1354.99***	26454.46***
LM test			9798.08***	5005.68***	4892.33***	12874.18***	12836.84***	10373.76***
# observations			7944	7488	7488	10940	9248	8617
# banks			1764	1636	1636	2592	2075	1985

Table 5
Determinants of bank market share

Results of random effects regression. The dependent variable is bank market share (MS), EFF is the measure of bank efficiency obtained using DEA, DENIED is the share of bank license applications rejected, RESTRICT is an indicator of the degree to which banks' activities are restricted outside the credit and deposit business, HAZARD is an index of moral hazard measuring the generosity of deposit insurance, OFFICIAL measures official supervisory power, MONITOR measures market monitoring, KKZ is an indicator of the quality of institutional development, STRUCT measures the market orientation of the financial system, FINAN is a measure of financial development, FOREIGN is the share of banking assets in banks that are majority owned by foreign shareholders, STATE is share of banking assets in banks that are majority owned by the government, INFLATION is the annual change in the consumer price index, GROWTHH is the growth rate of the total deposits, LN(POPULATION) is the natural logarithm of country population. Detailed definitions and sources are in the data appendix. Year dummy variables were included for all estimations but are not reported. T-statistics are shown in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

Expected sign								
	Direct effect	Indirect effect	(1)	(2)	(3)	(4)	(5)	(6)
EFF			0.0147*** (9.74)	0.0132*** (8.66)	0.0132*** (8.66)	0.0217*** (14.72)	0.0203*** (12.84)	0.0211*** (13.35)
INFLATION			0.0003*** (5.36)	0.0004*** (6.83)	0.0004*** (6.75)	0.0003*** (7.18)	0.0002*** (4.25)	0.0003*** (5.71)
GROWTHD			0.00004* (1.76)	0.00003 (1.54)	0.00003 (1.48)	-0.0000 (-0.21)	-0.0000 (-0.58)	-0.0000 (-0.21)
LN (POPULATION)			-0.0090*** (-11.05)	-0.0112*** (-11.74)	-0.0112*** (-11.70)	-0.0060*** (-8.78)	-0.0094*** (-9.90)	-0.0085*** (-9.29)
DENIED	+	-	0.0143** (2.11)	0.0161** (1.97)	0.0164** (1.97)			
RESTRICT		-	0.0010 (1.36)	0.0009 (1.11)	0.0009 (1.12)			
HAZARD	+		0.0052*** (4.70)	0.0025** (1.96)	0.0024** (1.96)			
OFFICIAL	-/+	-		0.0002 (0.32)	0.0002 (0.32)			
MONITOR	-	+		0.0027* (1.63)	0.0027* (1.63)			
KKZ		+			0.00003 (0.20)			
STRUCT		+				0.0027*** (4.19)		0.0054*** (6.38)
DEVELOP		+				-0.0029*** (-4.58)		-0.0043*** (-5.19)
FOREIGN	-	+					-0.0266*** (-3.64)	-0.0303*** (-4.28)
STATE	+	-					0.0175*** (2.57)	0.0101 (1.48)
Time Dummies			Yes	Yes	Yes	Yes	Yes	Yes
R ² overall			0.1504	0.1546	0.1547	0.1470	0.1576	0.1672
Wald χ^2			612.81***	411.82***	411.93***	1093.04***	940.02***	946.11***
LM test			14797.45***	13760.10***	13651.14***	25016.99***	21025.33***	18734.52***
# observations			7944	7488	7488	10940	9248	8617
# banks			1764	1636	1636	2592	2075	1985

Table 6
Market concentration and the EFS hypothesis

Results of random effects regression. The dependent variable is market concentration (CONC) measured as the fraction of assets held by the three largest commercial banks in each country, EFF is the measure of bank efficiency obtained using DEA, DENIED is the share of bank license applications rejected, RESTRICT is an indicator of the degree to which banks' activities are restricted outside the credit and deposit business, HAZARD is an index of moral hazard measuring the generosity of deposit insurance, OFFICIAL measures official supervisory power, MONITOR measures market monitoring, KKZ is an indicator of the quality of institutional development, STRUCT measures the market orientation of the financial system, FINAN is a measure of financial development, FOREIGN is the share of banking assets in banks that are majority owned by foreign shareholders, STATE is the share of banking assets in banks that are majority owned by the government, INFLATION is the annual change in the consumer price index, GROWTH is the growth rate of the total deposits, LN(POPULATION) is the natural logarithm of country population. Detailed definitions and sources are in the data appendix. Year dummy variables were included for all estimations but are not reported. T-statistics are shown in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

	Expected sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EFF		0.0423*** (6.89)	-0.1570*** (-6.93)	0.0942*** (4.82)	0.0624*** (2.98)	-0.0068 (-0.21)	-0.0116 (-1.45)	0.0738*** (11.19)	0.0805*** (11.57)	0.0475*** (6.38)	0.0758*** (9.91)
EFF*DENIED	-	-0.0761*** (-3.14)									
EFF*RESTRICT	-		0.0211*** (8.62)								
EFF*HAZARD				-0.0116*** (-3.26)							
EFF*OFFICIAL	-				-0.0026 (-1.46)						
EFF*MONITOR	+					0.0057 (1.23)					
EFF*KKZ	+						0.0084*** (7.53)				
EFF*STRUCT	+							0.0276*** (7.30)			
EFF*FINAN	+								0.0222*** (7.68)		
EFF*FOREIGN	+									0.0200 (0.82)	
EFF*STATE	-										-0.1257*** (-4.95)
INFLATION		0.0048*** (18.77)	0.0048*** (18.89)	0.0048*** (18.73)	0.0048*** (18.80)	0.0048*** (18.84)	0.0048*** (18.91)	0.0021*** (11.41)	0.0021*** (11.66)	0.0021*** (11.37)	0.0020*** (11.25)
GROWTHD		0.0004*** (3.88)	0.0003*** (3.43)	0.0004*** (4.15)	0.0004*** (3.91)	0.0003*** (3.81)	0.0004*** (3.94)	0.0001 (1.16)	0.0001 (1.24)	0.0001 (0.71)	0.0000 (0.47)
LN (POPULATION)		-0.1009*** (-59.90)	-0.1001*** (-59.64)	-0.1019*** (-60.41)	-0.1017*** (-59.91)	-0.1011*** (-59.69)	-0.0999*** (-59.61)	-0.0615*** (-24.79)	-0.0621*** (-25.29)	-0.0655*** (-26.72)	-0.0641*** (-26.38)
DENIED	+	0.1005*** (4.94)	0.0497*** (3.67)	0.0565*** (4.14)	0.0559*** (4.06)	0.0505*** (3.67)	0.0458*** (3.39)				
RESTRICT		-0.0222*** (-18.70)	-0.0345*** (-18.50)	-0.0227*** (-18.88)	-0.0222*** (-18.61)	-0.0220*** (-18.37)	-0.0221*** (-18.81)				
HAZARD	+	0.0101*** (5.25)	0.0127*** (6.52)	0.0160*** (5.85)	0.0092*** (4.73)	0.0102*** (5.15)	0.0118*** (6.09)				
OFFICIAL	-/+	-0.0100*** (-12.28)	-0.0097*** (-11.98)	-0.0107*** (-13.11)	-0.0090*** (-7.43)	-0.0101*** (-12.22)	-0.0094*** (-11.67)				
MONITOR	-	0.0173*** (6.90)	0.0185*** (7.40)	0.0171*** (6.80)	0.0176*** (7.00)	0.0136*** (3.36)	0.0158*** (6.32)				
KKZ		0.0034*** (6.60)	0.0038*** (7.44)	0.0030*** (5.88)	0.0032*** (6.31)	0.0033*** (6.50)	-0.0016* (-1.91)				

STRUCT							-0.0127*** (-3.24)	0.0058** (1.99)	0.0066** (2.25)	0.0061** (2.09)	
DEVELOP							-0.0041* (-1.59)	-0.0181*** (-5.72)	-0.0044* (-1.68)	-0.0033 (-1.25)	
FOREIGN	-						-0.3803*** (-21.79)	-0.3808*** (-21.87)	-0.3967*** (-17.974)	-0.3823*** (-22.01)	
STATE	+						0.1391*** (7.90)	0.1396*** (7.96)	0.1619*** (9.35)	0.2371*** (10.23)	
Time Dummies		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
R ² overall		0.7807	0.7828	0.7803	0.7796	0.7797	0.7849	0.4001	0.4023	0.3911	0.4012
Wald χ^2		7560.99***	7681.06***	7546.12***	77645.98***	7505.78***	7733.89***	1528.92***	1541.04***	1496.20***	1513.00***
LM test		4318.51***	4213.02***	4247.16***	4327.32***	4319.63***	4133.74***	10443.19***	10485.58***	9488.89***	10295.82**
# observations		7098	7098	7098	7098	7098	7488	8617	8617	8617	8617
# banks		1604	1604	1604	1604	1604	1636	1985	1985	1985	1985

Table 7
Market share and the EFS hypothesis

Results of random effects regression. The dependent variable is bank market share (MS), EFF is the measure of bank efficiency obtained using DEA, DENIED is the share of bank license applications rejected, RESTRICT is an indicator of the degree to which banks' activities are restricted outside the credit and deposit businesses, HAZARD is an index of moral hazard measuring the generosity of deposit insurance, OFFICIAL measures official supervisory power, MONITOR measures market monitoring,, KKZ is an indicator of the quality of institutional development, STRUCT measures the market orientation of the financial system, FINAN is a measure of financial development, FOREIGN is the share of banking assets in banks that are majority owned by foreign shareholders, STATE is the share of banking assets in banks that are majority owned by the government, INFLATION is the annual change in the consumer price index, GROWTH is the growth rate of total deposits, LN(POPULATION) is the natural logarithm of country population. Detailed definitions and sources are in the data appendix. Year dummy variables were included for all estimations but are not reported. T-statistics are shown in parentheses. *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

	Expected sign	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EFF		0.0173*** (10.03)	0.0000 (0.01)	0.0067 (1.21)	0.0189*** (3.15)	-0.0119 (-1.41)	0.0159*** (8.03)	0.0208*** (11.48)	0.0212*** (11.02)	0.0192*** (9.46)	0.0218*** (10.27)
EFF*DENIED	-	-0.0178** (-2.94)									
EFF*RESTRICT	-		0.0016** (2.39)								
EFF*HAZARD				0.0015 (1.50)							
EFF*OFFICIAL	-				-0.0000 (-0.73)						
EFF*MONITOR	+					0.0039*** (3.19)					
EFF*KKZ	+						-0.0000 (-0.89)				
EFF*STRUCT	+							-0.0000 (-0.33)			
EFF*FINAN	+								0.0000 (0.03)		
EFF*FOREIGN	+									0.0100 (1.51)	
EFF*STATE	-										-0.0036 (-0.52)
INFLATION		0.0004*** (5.60)	0.0004*** (5.89)	0.0004*** (5.81)	0.0004*** (5.77)	0.0004*** (5.66)	0.0004*** (5.80)	0.0003*** (5.70)	0.0003*** (5.70)	0.0003*** (5.74)	0.0003*** (5.67)
GROWTHD		0.00003* (1.82)	0.00003* (1.66)	0.00003* (1.64)	0.00004* (1.79)	0.00003* (1.65)	0.00003* (1.75)	-0.0000 (-0.24)	-0.0000 (-0.21)	-0.0000 (-0.17)	-0.0000 (-0.23)
LN (POPULATION)		-0.0092*** (-10.09)	-0.0092*** (-10.14)	-0.0093*** (-10.17)	-0.0094*** (-10.26)	-0.0092*** (-10.07)	-0.0094*** (-10.33)	-0.0086*** (-9.30)	-0.0084*** (-9.27)	-0.0087*** (-9.41)	-0.0085*** (-9.24)
DENIED	+	0.0228*** (2.65)	0.0116 (1.48)	0.0114 (1.45)	0.0125 (1.60)	0.0102 (1.30)	0.0121 (1.56)				
RESTRICT		0.0013* (1.72)	0.0003 (0.38)	0.0014* (1.85)	0.0013* (1.74)	0.0014* (1.87)	0.0013* (1.76)				
HAZARD	+	0.0025** (2.13)	0.0026** (2.22)	0.0016 (1.22)	0.0023** (1.97)	0.0028** (2.32)	0.0023*** (1.98)				
OFFICIAL	-/+	-0.0001 (-0.14)	-0.0001 (-0.19)	-0.0001 (-0.16)	0.00004 (0.08)	-0.0000 (0.00)	-0.0002 (-0.33)				
MONITOR	-	0.0017 (1.08)	0.0018 (1.19)	0.0018 (1.16)	0.0018 (1.13)	-0.0009 (-0.51)	0.0018* (1.17)				
KKZ		0.0001 (0.69)	0.0001 (0.90)	0.0001 (0.78)	0.0001 (0.67)	0.0001 (0.71)	0.0002 (1.10)				

STRUCT							0.0057*** (5.20)	0.0055*** (6.39)	0.0055*** (6.42)	0.0054*** (6.35)
DEVELOP							-0.0043*** (-5.21)	-0.0043*** (-4.56)	-0.0043*** (-5.17)	-0.0042*** (-5.12)
FOREIGN	-						-0.0304*** (-4.31)	-0.0304*** (-4.30)	-0.0359*** (-4.50)	-0.0302*** (-4.26)
STATE	+						0.0104 (1.50)	0.0101 (1.46)	0.0107 (1.56)	0.0123* (1.53)
Time Dummies		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R ² overall		0.1560	0.1560	0.1567	0.1570	0.1553	0.1561	0.1679	0.1673	0.1673
Wald χ^2		595.37***	383.86***	588.87***	378.72***	596.45***	380.95***	541.89***	951.59***	542.43***
LM test		11288.6***	11349.4***	11368.8***	11195.3***	11337.1***	10870.5***	18078.3***	18186.6***	18396.2***
# observations		7098	7098	7098	7098	7098	7098	8617	8617	8617
# banks		1604	1604	1604	1604	1604	1604	1985	1985	1985

Appendix A. Description and sources of the country variables

<i>Variable</i>	<i>Description and source</i>
CONC	Fraction of assets held by the three largest commercial banks in each country, annual data over the 1996-2002 period. Source: Fitch IBCA's Bankscope Database.
MS	Market share calculated as the bank's asset divided by total commercial bank assets in the country, annual data over the 1996-2002 period. Source: Fitch IBCA's Bankscope Database.
EFF	Bank efficiency estimated applying DEA separately to the sample of banks from each country using a panel database over the 1996-2002 period. It is estimated following the output orientation and imposing variable returns to scale. The input considered are: (1) personal expenses, (2) the book value of fixed assets and (3) loanable funds. The outputs considered are: (1) total loans and (2) non-interest income. In the regressions we present results obtained following the output orientation and imposing variable returns to scale. Source: Fitch IBCA's Bankscope Database.
DENIED	Number of entry applications denied as a fraction of the number of applications received from domestic and foreign entities. Source: Barth et al.(2004).
RESTRICT	A measure of a bank's ability to engage in non-traditional bank activities (including securities, insurance, real estate, and bank ownership and control of non-financial firms). This variable ranges from 4 to 16 with higher scores indicating more restrictions on banks to engage in such activities. Source: Barth et al.(2004).
HAZARD	Index of moral hazard elaborated through principal component analysis with eight binary variables. Each variable takes on the value of unity in the following cases: 1) membership is mandatory, 2) nominal coverage limits are not specified, 3) coinsurance does not exist for any depositors, 4) deposit-insurance obligations are funded in some way, 5) funding comes partially or totally from government, 6) the system is partially or totally managed by the government, 7) foreign-denominated deposits are explicit covered, 8) interbank deposits are formally guaranteed. Source: Demirgüç-Kunt and Detragiache (2002).
OFFICIAL	Index of official supervisory power. Adds one for an affirmative response to each for the following 14 questions: 1. Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? 2. Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud or insider abuse? 3. Can supervisors take legal actions against external auditors for negligence 4.Can the supervisory authority force a bank to change its internal organizational structure? 5.Are off-balance sheet items disclosed to supervisors? 6. Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses? 7. Can the supervisory agency suspend the directors' decision to distribute: a) Dividends? b) Bonuses? c) Management fees? 8. Can the supervisory agency legally declare-such that this declaration supersedes the rights of bank of bank shareholders-that a bank is insolvent? 9. Does the Banking Law give authority to the supervisory agency to intervene that is, suspend some or all ownership rights-a problem bank? 10. Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency do the following: a) Supersede shareholder rights? b) Remove and replace management? c) Remove and replace directors? Source: Barth et al.(2004).
MONITOR	This variable increases by a value of one for each of the following characteristics for a country: 1) if an outside licensed audit is required of the financial statements issued by banks; such an audit would presumably indicate the presence or absence of an independent assessment of the accuracy of financial information released to the public; 2) if the income statement includes accrued or unpaid interest or principal on non-performing loans and when banks are required to produce consolidated financial statements; 3) if off-balance sheet items are disclosed to the public; 4) if

	banks must disclose risk management procedures to the public; 5) if subordinated debt is allowable (required) as a part of regulatory capital, and finally is added 6) the percentage of the top 10 banks that are rated by international credit-rating agencies (the greater the percentage, the more the public may be aware of the overall condition of the banking industry as viewed by an independent third party). This variable therefore ranges from 0 to 6, with higher values indicating greater private oversight. Source: Barth et al. (2004).
KKZ INDEX	An indicator of the quality of institutional development in the country. Calculated as the average of six indicators: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control and corruption. Average for the 1998 period. Source: Kaufmann et al. (2001).
STRUCT	The first principal component of two variables that measure the comparative activity and size of markets and banks. Each of the underlying components is constructed so that higher values indicate more market-based financial systems. The first component (STRUCT-ACTIV) is the natural logarithm of the ratio of value traded to bank credit. Value traded equals the value of stock transactions as a share of national output. Bank credit equals the claims of the banking sector on the private sector as a share of GDP. The second component (STRUCT-SIZE) equals the natural logarithm of the ratio of market capitalization to bank credit. Market capitalization is defined as the value-listed shares divided by GDP, and is a measure of the size of stock markets relative to the economy. Annual data over the 1996-2002 period. Source: Beck et al. (2003).
FINAN	The first principal component of two underlying measures of financial development. The first (FINAN-ACTIV) is a measure of the overall activity of financial intermediaries and markets. It equals the natural logarithm of the product of private credit (the value of credits by financial intermediaries to the private sector divided by GDP) and value traded (the value of total shares traded on the stock market exchange divided by GDP). Private credit includes credits by both bank and non-bank intermediaries. The second (FINAN-SIZE) is a measure of the overall size of the financial sector and equals the natural logarithm of the sum of private credit and market capitalization. Annual data over the 1996-2002 period. Source: Beck et al. (2003).
FOREIGN	Share of banking assets in banks that are majority owned by foreign shareholders. Source: Barth et al. (2004).
STATE	Share of banking assets in banks that are majority owned by the government. Source: Barth et al. (2004).
INFLATION	The annual change in the consumer price index, annual data over the 1996-2002 period. Source: International Financial Statistics. IMF.
GROWTH	The growth rate of the total deposits in the country, annual data over the 1996-2002 period. Source: International Financial Statistics. IMF.
LN (POPULATION)	The natural logarithm of the country population, annual data over the 1996-2002 period. Source: International Financial Statistics. IMF.

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