

# Bank Concentration: Cross-Country Evidence

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## ***I. Introduction***

Concentration in the banking industry may have far-ranging and long-lasting implications for financial sector efficiency, bank stability, industrial competitiveness, and the policies, regulations, and institutions essential for long-run economic growth.<sup>1</sup> Some argue that concentration will intensify market power and thereby stymie competition and efficiency. Others argue that economies of scale drive bank mergers and acquisitions, so that increased concentration goes hand-in-hand with efficiency improvements. In terms of stability, greater concentration may augment the size, market power, and profits of banks, and thereby enhance diversification and create greater incentives for secure banks to avoid imprudent risk-taking. On the other hand, bigger, politically connected banks may become more leveraged and take on greater risk since they can rely on policymakers to help when adverse shocks hurt their solvency or profitability. Similarly, large, politically influential banks may shape the policies and regulations influencing bank activities. Moreover, powerful banks may influence tax systems, anti-trust legislation, the degree of corruption, and a broad set of institutions governing economic interactions in ways that help banks, but not necessarily in ways that help the overall economy. Finally, policymakers frequently use concentration as a proxy for competition. While excessive competition may create an unstable banking environment, insufficient competition – and contestability – in the banking sector may breed inefficiencies. For these reasons, policymakers are concerned about commercial bank concentration.

Not only is commercial bank concentration an important public policy issue, the degree of concentration is quite different across countries and is changing rapidly in some nations. Over

the period 1990-7, the average level of bank concentration – measured by the fraction of commercial bank loans controlled by the three largest banks – across 99 countries was 0.72, but ranged from 1.0 to 0.2, with a standard deviation of 0.2. Over this period, the level of concentration in India rose from 0.44 to 0.88 and France’s bank concentration ratio jumped from 0.27 to 0.46. The United States also experienced numerous “supermegamergers” involving over \$100 billion each (e.g., Citicorp-Travelers, BankAmerica-NationsBank, Banc One-First Chicago, etc.). Moreover, in many countries, the merger of two foreign banks may importantly influence domestic bank concentration if those foreign banks had a substantial share of the domestic market. For instance, the purchase of Banco Santiago by Banco Santander -- two Spanish banks -- induced intense concern in Chile because of its impact on the Chilean banking sector. Since mergers are expected to intensify in the next decade, bank concentration is likely to receive even more attention from policymakers in coming years.

Though a central policy issue around the world, existing empirical work on bank concentration has two notable weaknesses: (1) research overwhelmingly focuses on the United States banking industry and (2) there is an absence of econometric evidence on the political economy aspects of bank concentration. Microeconomic studies of the banking industry of the United States have produced convincingly ambiguous evidence: it is difficult to argue that greater bank concentration is strongly linked – positively or negatively – with changes in financial sector efficiency or bank stability. While rigorous and useful, studies of the U.S. may not be directly applicable to developing countries. For instance, the United States has over 23,000 banking institutions, which is large even compared to Japan (4,635), Germany (3,509),

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<sup>1</sup> We cite specific authors in section II when we review theoretical and empirical research on the determinants and effects of bank concentration. Here, we simply state some of the broad issues surrounding bank concentration.

and France (547).<sup>2</sup> The United States has very well developed nonbank financial markets and institutions, while developing economies frequently do not. The United States has legal, regulatory, and political institutions that are very different from many developing country systems. In terms of the political economy aspects of bank concentration, existing research on commercial bank concentration has yet to shed much direct evidence on the relationship between bank concentration and the enactment of financial sector policies, bank regulations, corruption, and other institutions. Thus, important work remains.

This paper contributes to the literature both by extending the analysis of bank concentration to a broad cross-section of countries, including developing countries, and by directly examining the political economy aspects of bank concentration. Regarding the first contribution, we study the relationship between bank concentration and measures of financial sector efficiency, bank stability, industrial competitiveness, and a wide range of policies, regulations, and institutions essential for economic interactions in a cross-section of up to 94 countries. The strength of our research is to extend the literature beyond the United States (and a few other country studies) to a wide-array of countries. The weakness of our work is that we use broad cross-country comparisons instead of detailed, microeconomic studies of individual banking sectors. Future research involving microeconomic studies of the determinants and implications of bank concentration in developing countries would materially improve our understanding of bank concentration.

This paper's second contribution is that it studies the relationship between bank concentration and the structure of the tax system, tax compliance, policies toward industrial competition, political corruption, and the efficiency of legal and accounting systems. While

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<sup>2</sup> These statistics are for 1996 and are taken from Berger, Demsetz, and Strahan (1999, Table 5), where the primary data source is the Bank of International Settlements.

policymakers are concerned about banking sector efficiency and stability, it is critical to assess the impact of concentration on the political economy of a nation because this will shape a broad array of policies, regulations, and institutions. For instance, concentrated, powerful banks may argue against granting generous deposit insurance since that levels the playing field for smaller banks that do not enjoy the too-big-to-fail policy of most governments. Similarly, big banks may argue successfully against regulations restricting their ability to expand into securities, insurance, real estate, and other businesses. Concentrated banks may seek to stymie stock market development by pushing for higher taxes on capital gains and by discouraging regulations that (1) protect the rights of small investors and (2) promote accounting transparency. To boost the profitability of large clients, powerful banks may also seek to control “unruly” markets by weakening anti-trust laws and other policies designed to promote competition. Finally, if concentrated powerful banks unduly influence the formation of policies and regulations, this may hinder political integrity and reduce tax compliance. While this is speculative, these linkages are not implausible, have extensive implications, and are uninvestigated. This is the first paper that systematically assesses the links between bank concentration and a wide assortment of policy, regulatory, and institutional factors that influence economic development.

Specifically, we assess whether banking system concentration (as measured by the share of the loan market controlled by the three largest banks) is strongly linked with:

1. Financial development and bank efficiency measures, i.e.,
  - Greater net interest income as a share of total assets,
  - Greater overhead costs as a share of total assets,
  - Bank profits as a share of total assets,
  - Overall banking system size relative to GDP,
  - Stock market size and liquidity,
  - Public ownership of banks as a share of total bank assets,
  - Foreign bank penetration,
2. Financial sector policies, i.e.,
  - Generosity of deposit insurance policies

- Restrictions on bank activities (underwriting, brokering, insurance, real estate, etc.),
  - Capital gains tax rates,
  - Dividend income tax rates,
  - Interest income tax rates,
  - Personal income tax rates,
3. Industrial competition, i.e.,
    - Market domination by a few firms,
    - Effectiveness of anti-trust laws,
    - Perceived climate of business competitiveness,
  4. Institutional environment indicators, i.e.,
    - Political corruption,
    - Extent to which the rule of law governs interactions,
    - Protection of outside investors (minority shareholders and creditors) in firms,
    - Transparency and accuracy of the corporate financial statements.

This paper's results address each of these considerations. Bank concentration is not strongly linked with measures of financial sector development and efficiency. While there is frequently a negative relationship between bank concentration and stock market liquidity, this relationship is not robust to changes in the condition information set or different indicators of liquidity. These results hold after controlling for other features of the banking and economic environment, such as public bank ownership, the role of foreign banks in the economy, openness to international trade, and the level of economic development.

Bank concentration is negatively associated with restrictions on bank activities, but the relationship between bank concentration and other financial sector policy indicators is weak – albeit frequently of the anticipated sign. Specifically, bank concentration is not statistically significantly associated with the generosity of the deposit insurance regime, the personal income tax rate, or the tax rates on interest, dividend income or capital gains. We do, however, find that countries that permit their banks to engage in a wide range of financial activities also tend to have relatively high levels of bank concentration. These results hold after controlling for the overall level of economic development, the role of foreign banks in the economy, the degree to

which state-owned banks dominate the banking landscape, and openness to international trade. Causality is difficult to untangle, however. It is unclear from our analyses whether the lack of restrictions leads to a concentrated banking system, or whether concentrated, powerful banks lobby to prevent restrictions on their activities.

Bank concentration is strongly linked with the integrity of (lack of corruption in) the political system, but it is not robustly linked with measures of industrial competition or institutional development. Specifically, countries with higher levels of bank concentration tend to have higher levels of political integrity, i.e., lower levels of corruption. It may be the case that countries with high levels of political integrity do not fear the corrupting influences of bank concentration and therefore permit greater bank concentration. To assess whether bank concentration has a strong independent relationship with financial development, bank efficiency, bank policies and regulations, industrial competition, and institutional development after controlling for political integrity, we re-ran all of the regression in this paper while controlling for political integrity. This does not alter the paper's conclusions.

Finally, we examine the relationship between bank concentration and the fragility of the banking system. Specifically, we run logit regressions to assess the association between bank concentration and the probability that a country suffers a major banking crisis. While there is generally a negative relationship between concentration and the probability of a crisis, this relationship is not robust: there is not a robust link between bank concentration and banking sector fragility.

It is important to qualify and clarify this paper's conclusions. Policies, laws, and regulations concerning commercial bank competition are likely to remain important public policy issues. This paper's international comparisons simply suggest that greater concentration

per se is not closely associated with banking sector efficiency, bank fragility, financial development, industrial competition, or a broad range of institutional indicators. While one may question the accuracy of individual data series, the consistency across a wide array of variables strengthens the conclusions. These results may be interpreted as casting doubt on the usefulness of concentration as an accurate proxy for competition and contestability. Thus, future research that focuses more precisely on regulations, laws, and policies that directly restrict competition and contestability in the banking system may provide more informative results. Also, we conduct broad, cross-country comparisons. These results do not imply that concentration is unimportant for any particular country. Country-specific factors are certainly critical. The analyses do suggest, however, that it would be difficult to argue for or against bank concentration based on broad international comparisons.

The remainder of the paper is organized as follows. Section II reviews theoretical and empirical research on bank concentration. Section III defines the data, motivates the conditioning information set, and describes the econometric methodology. Section IV presents the results and Section V concludes.

## ***II. Theories, Issues, and Evidence: A Brief Review***

This paper focuses on three components of the bank concentration literature: (1) the relationship between concentration and the efficiency and operation of the financial system, (2) the political economy of bank concentration, which studies the connections between commercial bank concentration and the selection of bank regulations and taxes, the enactment and enforcement of industrial competition regulations, and the general institutional environment, and (3) the relationship between concentration and the stability of the financial system. To motivate our empirical investigation and highlight areas needing additional research, we briefly review the literature in these three areas. Our analysis relies heavily on recent reviews of the literature by Berger, Demsetz, and Strahan (1999) and Boyd and Graham (1991, 1998).

### **A. Concentration and financial development**

Theory provides conflicting predictions regarding the relationship between commercial bank concentration and financial sector development. One view assumes that greater concentration increases market power with positive effects on the cost of banking services and bank profits. According to this view, commercial bank concentration will be negatively associated with measures of banking sector efficiency and financial development. Other theories, however, suggest that some degree of monopoly power in banking is natural and beneficial. Petersen and Rajan (1995) argue that banks with monopolistic power have greater incentives to incur the costs associated with overcoming informational barriers, which then facilitates the flow of credit to worthy enterprises. An alternative view stresses the importance of increasing returns to scale in the production of banking services. With increasing returns, greater concentration may increase bank efficiency through more efficient scale, organization,

management, scope, and product mix.<sup>3</sup> According to this view, commercial bank concentration will be positively associated with measures of banking sector efficiency and financial development.

The econometric evidence on the links between concentration and banking sector efficiency does not suggest an unambiguously positive – or negative – relationship between bank concentration and banking sector efficiency.<sup>4</sup> In terms of economies of scale, many researchers find that the cost curve facing banks is very flat for U.S. banks (Clark, 1996; Berger and Humphrey, 1991). Some estimates find that the scale-efficient size – bottom of the cost curve – is reached at only \$100 million of assets and then remains very flat (Berger, Demsetz, and Strahan, 1999). There do not appear to be exploitable economies of scale facing the U.S. banking industry. The empirical results on economies of scope and product also suggest very few cost savings from consolidating the output of different banks (Berger et al., 1987; Ferrier et al., 1993). There are also a large number of studies that examine the impact of M&A on bank costs. These studies consider changes in X-efficiency – changes in the distance from the efficient cost frontier. The studies show little or no improvements in cost efficiency from bank consolidation (Rhoades, 1993; Peristiani, 1997). As Boyd and Graham (1998, p. 133) conclude after reviewing the literature, research finds “... little evidence that consolidation of the US banking industry has been helpful over any performance dimension.” Evidence from Europe provides similar results. Goldberg and Rai (1996) do not find a robust relationship between concentration and bank efficiency in European banking. Thus, while acquiring banks tend to be more cost efficient than target banks on average (Pilloff and Santomero, 1998; Rhoades, 1998),

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<sup>3</sup> Indeed, some argue that recent advances in information technology have enhanced the scope for scale economies in banking (Radecki et al., 1997).

the evidence does not support the view of large cost savings from bank consolidation. In a cross-country, cross-industry study, Cetorelli and Gambera (2000) show that banking sector concentration exerts a depressing effect on overall economic growth, though it promotes the growth of industries that depend heavily on external finance. Thus, existing research does not produce unambiguous conclusion regarding the relationship between concentration and banking sector efficiency.

In terms of monopoly power, the econometric evidence also provides ambiguous results regarding the relationship between market concentration and market power in the banking sector. Unfortunately, the vast majority of the evidence is based on studies of the United States banking industry. There is some evidence that banks in highly concentrated local markets charge higher rates on loans, give lower rates on deposits, and are slower to reduce rates in response to Federal Reserve reductions in interest rates than banks in less concentrated markets (Berger and Hannan, 1989; Hannan and Berger, 1991, Neumark and Sharp, 1992). In contrast, Petersen and Rajan (1995) find that firms are less credit constrained and young firms have access to cheaper credit in the more concentrated banking markets of the United States. Furthermore, there is very little relationship between concentration and bank profits (Berger, 1995) and the most profitable banks are not systematically located in highly concentrated markets or markets protected by the greater entry barriers (Berger, Saunders, Scalise, and Udell, 1998). Thus, it is difficult to argue from U.S. evidence that more concentrated banking markets boost bank profitability. Similarly ambiguous findings emerge from studies of European banking (Goldberg and Rai, 1996; Lloyd-Williams, Moyneux, and Thornton, 1994). Furthermore, there are conflicting results on the impact of *increased* bank concentration -- through mergers and acquisitions (M&A) -- on deposit

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<sup>4</sup> While not directly related to bank concentration, Jayaratne and Strahan (1998) show that when individual states within the United States created a more competitive banking sector by liberalizing their branching restrictions, the

rates and profitability (Prager and Hannan, 1999; Simons and Stavins, 1998; Berger and Humphrey, 1992; Pilloff, 1996). Finally, using bank-level data for 80 countries around the world, Demirguc-Kunt and Huizinga (1999) find little evidence that bank concentration has any effect on bank profitability or margins. Thus, evidence produces generally inconclusive conclusions regarding the nature of the relationship between bank concentration and banking sector power.

In this paper, we contribute to the literature on bank concentration and banking sector efficiency and performance by examining cross-country data. We examine measures of banking sector efficiency, profits, size, and composition of foreign and state-owned banks for a maximum of 94 countries. We use measures of net interest income relative to total assets, overhead costs as a share of total assets, pre-tax bank profits, after-tax bank profits, the overall size of the financial intermediary sector as measured by credit to the private sector. We also examine the relationship between bank concentration and both the share of foreign bank assets in the domestic banking market, the share of publicly owned banks in the domestic banking market, and the level of development of domestic stock markets.

## **B. Concentration & politics: Policies, regulations, & institutions**

Political-economy factors may strongly influence financial sector policies, bank regulations, policies regarding anti-trust, and the general nature of institutions governing economic transactions. Political theories "... state, roughly, that institutions and policies are shaped by those in power to stay in power and amass resources" [LaPorta et al., 1999, p. 227]. This view is expressed in the political economy literature and in the regulatory literature [Becker, 1983; North, 1990; Olson, 1993; and Peltzman, 1976]. In an economy with very powerful

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rate of economic growth within those states accelerated.

banks, those in power that want to stay in power and amass resources may look favorably upon the desires of the banking industry.

Bank concentration's biggest impact may be through its impact on the political economy of a country. A few, large powerful financial conglomerates may successfully lobby for policies that protect their interests to the detriment of society as a whole. Concentrated banks may be able to influence commercial bank regulations, taxes, foreign bank entry, and policies toward industrial competition. Large banks may not want excessive competition in banking, nor in industry. Powerful banks may corrupt the political process and may thwart efforts to create more transparent, accurate accounting standards. Powerful banks may favor taxes on dividend income rather than taxes on personal income.

In sum, concentration may not only lead to banks that are too-big-to-fail and too-big-to-discipline, concentration may create banks that disproportionately shape society's policies, regulations, and institutions governing banking sector activities. In contrast, a highly competitive banking sector may be less likely to produce large, powerful institutions that unduly influence the policymaking process. Thus, the degree of competition in the banking industry may be fundamentally important for long-run financial and economic development.

There is some de facto evidence that political economy forces underlie the consolidation trend in the United States banking sector. Since there is not much evidence of economies of scale, efficiency gains do not seem to be driving consolidation (Shaffer, 1993; Macey and Miller, 1998). Since there is not much of evidence of excess capacity in the U.S. banking sector after accounting for off-balance sheet activities, excess capacity does not seem to be driving consolidation (Boyd and Graham, 1991; Boyd and Gertler, 1994). Similarly, since consolidation has not produced less risky banks, risk reduction does not seem to be driving consolidation.

Boyd and Graham (1991) conclude that public policies, not competitive market forces, are at the heart of the consolidation drive in the United States. In the end, banks are seeking to exploit the too-big-to-fail policy and increase their influence.

While some de facto evidence from the United States suggests political economy factors are driving consolidation, we are not aware of systematic econometric studies that directly relate bank concentration with a wide range of policy, regulatory, and institutional factors. From a policy perspective, this gap is important. While policymakers are surely concerned about banking sector efficiency, concentration has the potential to fundamentally change the policy, regulatory, and institutional environment with long-run implications for economic development in general.

This paper goes beyond de facto evidence and examines the relationship between bank concentration and (1) financial sector policies (such as deposit insurance generosity, regulatory restrictions on bank activities, and the tax system), (2) industrial competition (such as the degree of market domination, the effectiveness of anti-trust laws, and the competitive environment), and (3) the institutional environment (including measures of integrity, rule of law, tax compliance, the protection of minority shareholders, and the transparency and accuracy of the accounting system). Thus, using cross-country comparisons, we start to fill an important gap in the literature: the relationship between commercial bank concentration and the policy, regulatory, political, and institutional environment.

### **C. Concentration and banking sector fragility**

Theories suggest that greater bank concentration enhances bank stability, though counterarguments also exist. To the extent that bank concentration is associated with market power, concentrated banking systems will tend to enjoy greater profits than less concentrated systems. Greater bank profits -- in conjunction with less competition -- creates incentives for banks to behave prudently. That is, high bank franchise value due to a monopolistic banking market will tend to create a more stable financial system. Similarly, bank concentration implies a fewer number of banks. A smaller number of banks may facilitate bank supervision and monitoring by the private sector with beneficial spillover for overall banking sector stability.

A second argument for the belief that concentration will enhance stability derives from diversification (Berger, 1998). Bank consolidation will foster diversification of assets, activities, and products. This diversification will tend to promote banking sector stability to a greater degree than a system characterized by less diversified banks.

One counterargument stresses the risk-creating incentives of bank size. In terms of the political economy of bank consolidation, bigger banks may consider themselves too-big-to-fail or even too-big-to-discipline. Thus, bigger banks will have a tendency to take-on more risky positions than smaller banks with less access to the public support. Along the same lines, bigger may imply more complex as larger banking conglomerates will tend to engage in a wider-array of activities and products. This complexity may increase the difficulty of supervising and monitoring banking conglomerates with negative implications for stability. Thus, bigger banks may create a more unstable banking system.

The econometric evidence does not support the hypothesis that large banks are less risky and less likely to fail. It is true that the bulk of empirical evidence suggests that larger banks,

engaged in wider scope of activities, and providing a wide-array of financial services across a more geographically expansive area tend to enjoy greater diversification than more limited banking organizations (Berger et al., 1999; Hughes et al., 1999). Thus, holding other things equal, big banks can withstand greater stresses than smaller banks. Nonetheless, this greater diversification does not translate into greater stability. While large banks are more diversified, they are systematically more levered and choose to hold more risky assets (Boyd and Runkle, 1993; Demsetz and Strahan (1997). In sum, the evidence does not suggest a robust, reliable relationship between bank stability and bank concentration.

In this paper, we examine whether countries with more concentrated banking system are more likely to suffer major banking crises than countries with less concentrated systems. Again, the major contribution is to extend the analysis beyond the United States and assess broad cross-country relationships with a large cross-section of developing countries.

### **III. Data**

To capture the degree of concentration in the banking industry we use Concentration, which equals the ratio of total assets of the three largest banks in each country to total banking sector assets, averaged over the 1990-97 period. Bank concentration levels for individual countries are reported in the Appendix table. As Figure 1 shows, banking systems around the world tend to be quite concentrated, with a mean of 72 percent. Indeed, concentration ratios of over 95 percent are common among many African countries, such as Cameroon, Cote d'Ivoire, Togo and others. To explore if extreme values of concentration are particularly damaging to competition, efficiency and economic performance, we construct **Highly Concentrated**, which

is a dummy variable that takes the value one if Concentration is more than one standard deviation above the sample mean, and zero otherwise.

We organize the remaining data into four groups: (1) measures of financial development, (2) measures of political, regulatory and institutional environment, (3) measures of banking fragility, and (4) measures used in the conditioning information set. Below, we discuss the individual variables. Unless we note otherwise, underlying data are taken from Beck, Demirgüç-Kunt and Levine (1999). Detailed definitions and sources are given in the data appendix.

### ***A. Financial development***

As measures of bank efficiency we use **Net Interest Margin** and **Overhead Costs**.

Net Interest Margin is given by the bank net interest income as a share of total assets. Overhead Costs equals bank overhead expenditures as a share of total assets. While we recognize that many factors may influence bank interest margins and overhead costs besides the degree of efficiency in banking, we use these measures because very high margins and overheads may nevertheless signal lack of competition.

To measure bank profitability, we use **Pre-tax Bank Profit** and **After-tax Bank Profit**. Pre-tax Bank Profit is equal to before tax bank profits divided by total assets. After-tax Bank Profit is given by net profits divided by total assets.

Our preferred measure of financial intermediary development is **Private Credit**, which equals the value of credits by financial intermediaries to the private sector divided by GDP. Private Credit is a comprehensive measure of credit issuing intermediaries since it includes the credits of both deposit money and non-deposit money banks. Furthermore, it excludes credit to the public sector and cross claims of one group of intermediaries on another. It thus captures

fairly well the amount of savings that is channeled through financial intermediaries to private borrowers.

We include three measures of stock market development. **Market Capitalization** is the value of listed shares on the domestic stock market divided by GDP. It is an indicator of the size of the stock market relative to the economy. **Total Value Traded** equals the value of domestic equities traded on domestic exchanges divided by GDP. It measures stock market trading relative to the size of the economy. **Turnover** is defined as total value traded divided by the total market capitalization, and measures stock market trading relative to the size of the market. Both Total Value Traded and Turnover are indicators of liquidity of stock markets.

We also include two measures of bank ownership. **Public Ownership** is the percentage of assets of the 10 largest banks in each country owned by the government as share of the total assets of these banks. This measure reflects the state's role in directing resources of the financial system in the 1990s. It is from LaPorta, Lopez-de-Silanes and Shleifer (2000) examination of state ownership of banks. A higher share of government ownership in the banking sector allows the government to finance politically beneficial projects and control the economy wide resource allocation.

The second ownership variable, **Foreign Bank Assets** is calculated as the share of foreign bank assets in total banking sector assets. It is a measure of openness of the domestic banking system to foreign bank competition.

All financial development variables – except Public Ownership – are averaged over the 1990-97 period. Table 1 presents descriptive statistics and correlations for the financial development indicators. Most indicators of financial development are highly correlated with each other. Simple correlations indicate that concentrated banking systems tend to have lower

levels of private credit and stock market liquidity. Bank concentration is also correlated with higher levels of foreign bank penetration.

### ***B. Policies, regulations and institutional environment***

In this section we analyze three groups of variables. The first set of variables captures financial sector policies that may shape market structure in the banking industry. A second set of variables includes indicators for industrial competitiveness. Finally, a third set includes indicators of institutional environment. All these variables may influence and be influenced by the extent of bank concentration.

#### ***Financial Sector Policies:***

**Generosity of Deposit Insurance** is an indicator of moral hazard associated with deposit insurance schemes. It is a principal component indicator based on the underlying design features of deposit insurance regimes that exist in 1997, as constructed by Demirguc-Kunt and Detragiache (2000).<sup>5</sup> Generous deposit insurance may lead to less concentrated banking systems because it would allow entry by smaller banks. However, concentrated banking systems may also lobby against explicit schemes to limit competition and since they already benefit from implicit too-large-to-fail protection.

**Banking Restrictions** is a measure of degree of restrictions on banking activities. A recent study by Barth, Caprio, and Levine (2000) uses cross-sectional data from late 1990s to

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<sup>5</sup> The underlying variables take the value 0 if there is no explicit deposit insurance scheme and the following values for different design features of explicit deposit insurance: (i) lack of co-insurance, equals 2 if the deposit insurance scheme has no co-insurance, and 1 if it does, (ii) coverage of foreign currency deposits, equals 2 if foreign currency deposits are covered, and 1 if they are not, (iii) coverage of interbank deposits, equals 2 if interbank deposits are covered, and 1 if they are not, (iv) coverage limit equals explicit coverage limit divided by deposits per capita lagged one period, (v) funding equals 3 if the insurance is funded ex-ante, 2 if it is funded ex-post (callable premiums), and 1 if it is unfunded, (vi) source of funding equals 3 if the funds come from the government only, 2 if they come from both the government and banks, and 1 if they come from banks only, (vii) management equals 3 if the scheme is managed publicly, 2 if management is public-private joint, and 1 if it is private, and (viii) membership equals 2 if membership is voluntary and 1 if it is mandatory.

build an index of restrictions on three types of banking activities – securities, insurance, and real estate – and on banks’ ability to own shares of non-financial firms. Greater powers in banking may lead to larger banks and more concentrated banking systems. Similarly, powerful banks may themselves influence the policymakers to minimize restrictions on their activities.

Finally we have four taxation variables, **Personal Capital Gains Tax**, **Tax Rate on Dividend Income**, **Interest Tax Rate**, and **Personal Tax Rate**. These tax variables were collected from Cooper & Lybrand International Tax Network: International Tax Summaries. A Guide for Planning and Decisions. The numbers are averages for the years 1980,85,90 and 95. In countries where capital gains and dividend income are taxed heavily, investing in debt instruments may be more advantageous. Powerful banks may favor higher taxes on dividend and capital gains but lower taxes on interest and personal income.

Table 2 reports descriptive statistics and correlations for financial sector policies. Correlations indicate that concentrated banking systems tend to have less generous deposit insurance schemes and lower levels of restrictions on their activities, but only the correlation with banking restrictions is significant at the 5 percent significance level. Finally, although the tax variables develop plausible signs, these are not significant.

***Indicators of Industrial Competition:***

**Market Domination** is based upon a survey question in which respondents indicate the degree to which they agree with the following statement: “market domination is not common in your country.”

**Effective Anti-Trust** is based upon survey questions in which respondents indicate the degree to which they believe the anti-trust laws of a country operate effectively and fairly. Greater values signify that anti-trust laws are perceived to work more effectively.

**Business Competitiveness** is based upon a survey question in which respondents indicate the degree to which they believe the business environment is free and competitive.

All these variables are obtained from Dutz and Hayri (2000) and are available for the late 1990s. Lack of industrial competition may lead to high concentration in the banking sector, if firms and financial institutions join to create large powerful financial conglomerates. However, lack of competition in the industry could also be due to the policy influence by large, powerful banks that do not want excessive competition in banking or in industry.

Table 3 reports descriptive statistics and correlations for indicators of industrial competitiveness. While these competitiveness indicators tend to be correlated with each other, they are not significantly correlated with banking concentration.

#### *Indicators of Institutional Environment:*

**Integrity (less corruption)** is an indicator of the degree of corruption in government and society at large. It ranges from 0 to 6, with greater values signifying less corruption, or greater integrity. It is obtained from International Country Risk Guide and averaged over 1990-97.

**Rule of Law** is an indicator of the degree to which the country adheres to the rule of law. It ranges from 0 to 6 with higher values indicating greater confidence in the legal system to settle disputes. It is obtained from International Country Risk Guide and averaged over 1990-97.

**Tax Compliance** is an indicator of the degree to which society complies with tax laws. It ranges from 0 to 6, with higher scores indicating higher tax compliance. It is averaged over 1990-97 and obtained from La Porta, Lopez-de-Silanes and Shleifer (1998).

**Outsider Rights** is an index of the degree to which the legal codes of the country protect the claims of secured creditors and minority shareholders against managers and majority shareholders of companies. It is defined as the sum of Creditor, an index of the rights of secured creditors in the case of reorganization or liquidation of a company, and Anti-Director, an index of the degree to which the legal codes of the country protect minority shareholder rights. Both Creditor and Anti-Director are from La Porta, Lopez-de-Silanes and Shleifer (1998). Outsider Rights ranges from zero to 10, with higher values indicating a better protection of the rights of outside investors. The index is available for the late 1990s.

**Accounting** is a measure of accounting standards, obtained from the Center for International Financial Analysis and Research (CIFAR). This index, reaching from a maximum of 90 to a minimum of 0, measures the comprehensiveness of companies' balance sheets and income statements. The values available are for the 1990s.

Lack of corruption, adherence to laws, tax compliance, protection of outsider rights, quality of accounting standards may all affect the extent of competition in the banking system. As in the case of financial sector policies and industrial competition indicators, powerful banks may in turn influence the institutional environment they operate in and the reform efforts to change it.

Table 4 reports descriptive statistics and correlations for indicators of institutional environment. Correlations indicate that countries that score higher on the Rule of Law index

also tend to have higher levels of tax compliance and better accounting standards. None of the institutional variables are significantly correlated with bank concentration.

### ***C. Banking Fragility***

To investigate the relationship between banking sector fragility and concentration we use **Bank Crisis** variable which takes on the value 1 if a country has had a major or systemic banking crisis over the 1985-1997 period and 0 otherwise. The data are based on Caprio and Klingebiel (1999).<sup>6</sup>

As discussed earlier, the impact of concentration on bank stability is not clear. Since concentrated banking systems are expected to have larger, well-diversified and profitable banks, they are expected to be also more stable. However, larger banks may have greater risk-taking incentives compared to smaller banks since they tend to benefit from too-big-to-fail policies. This may have negative implications for stability. These arguments suggest we need to at least control for the extent of restrictions on banking activities and the generosity of the safety net when looking at the relationships between bank fragility and concentration.

Table 5 reports the summary statistics and correlations for banking crisis indicators. Correlations indicate banking crises tend to be more common in high inflation environments. The simple correlation between banking crises and concentration is negative but only significant at 10 percent.

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<sup>6</sup> We modified their indicator of systemic banking crisis in the following way: First, we added the following countries to their list since they have also experienced major banking crises: Canada (15 members of Canadian Deposit Insurance Company failed), Denmark (cumulative losses of 9 percent of loans), Hong Kong (9 out of 18 banks failed over the period), India (nonperforming loans estimated as 16 percent of total loans), Italy (58 banks accounting for 11 percent of total loans were forcibly merged), and the United States (estimated savings and loan clean-up costs of 3.2 percent of GDP). Second, we excluded Israel and Spain from the Caprio-Klingebiel list, since their crises occurred in the late 1970s and are outside our sample period.

#### ***D. Conditioning Information***

In evaluating how financial development, policies and institutional environment are related to bank concentration, we control for a number of factors in addition to overall level of development. We include **Public Bank Ownership** because banking systems that are directed by the public sector may behave differently than private banks since the government may use them to finance politically beneficial projects. We include **Foreign Bank Assets** because even in concentrated banking systems, banks that face competition from foreign banks may behave more efficiently. We also include **Trade**, which equals the ratio of exports plus imports to GDP. Trade is a measure of openness of the economy. Banking systems, concentrated or not, would be faced with greater competition and would therefore have greater incentives to become more efficient, in open economies.

#### ***IV. Results***

We organize the results into three sub-sections. In the first section we assess the impact of concentration on financial development indicators. Specifically, we regress each of the ten financial development indicators on bank concentration and different conditioning information sets. In the second section, we do the same for indicators of financial policies, regulations and institutions.

Finally, in the third section we investigate the impact of concentration on banking system fragility. We estimate a Logit probability model of banking crises. Besides bank concentration, we include different control variables such as the level development of the country, inflation rate, generosity of deposit insurance and restrictions on banking activities.

In all our regressions we have also used Highly Concentrated variable to investigate if extreme values of concentration change our results significantly. We failed to find any

significant effect of high concentration on our variables of interest. Therefore these results are not reported.

### ***A. Financial Development***

The regressions in Table 7 suggest that bank concentration is not significantly related to measures of bank efficiency, profitability or financial development. Bank concentration is never significant in the net margin, overhead costs, or profit regressions. Bank concentration is not significantly related to measures of financial intermediary or stock market development either. Bank concentration is not significant in Private Credit or Market Capitalization regressions. While there is frequently a negative relationship between bank concentration and stock market liquidity, this relationship is not robust to using different measures of liquidity or changes in the conditioning information set. Specifically, the significant relationship between Turnover and Concentration disappears once we use Total Value Traded as a measure of liquidity. Finally, we do not see a strong relationship between concentration and bank ownership. While there is a positive relationship between concentration and Foreign Bank Assets, the results do not hold after controlling for other features of the banking and economic environment, such as public ownership or openness to international trade.

### ***B. Policies, regulations and institutional environment***

The impact of bank concentration on financial sector policies, industrial competition and institutional environment are given in Tables 8, 9, and 10, respectively.

Table 8 shows that bank concentration is not robustly related to financial sector policy indicators except banking restrictions. We find that concentrated banking systems also tend not to have too many restrictions on banking activities. Although it is not clear whether lack of

restrictions leads to concentrated banking systems or powerful banks lobby to prevent such restrictions, these results hold even after we control for the level of economic development, the role of foreign banks in the economy, the extent of public ownership of banks, and openness to international trade.

Concentration often enters the other policy regressions with plausible signs. Specifically, the concentration of the banking system is negatively associated with the generosity of deposit insurance, positively associated with capital gains and dividend taxes, and negatively lined with taxes on interest and personal income. These results, however, are often insignificant and never robust.

The table 9 results indicate that there is not a strong link between bank concentration and industrial competition. Concentration often enters with a negative sign in the regressions of Market Domination, Effective Anti-trust, and Business Competitiveness, but these results are insignificant.

Finally, Table 10 reports the results on bank concentration and industrial environment. Bank concentration is generally positively related to Integrity, Rule of Law, Tax Compliance, Outsider Rights, and Accounting, but the relationship is only significant in the case of Integrity. Thus, higher levels of banking concentration are associated with lower levels of corruption in the society. This may be because countries with low levels of corruption may permit greater bank concentration since they may be less concerned about the potentially corrupting influence of concentrated banking systems. Conversely, bank concentration may have a positive effect on the level of integrity, if this is in the interest of large, powerful banks. As a robustness check, we re-

ran all the regressions in this paper after including Integrity as a conditioning variable. This did not alter the results of the paper significantly.<sup>7</sup>

### ***C. Banking sector fragility***

Table 11 reports the results on bank concentration and fragility. While bank concentration enters with a negative coefficient in Logit regressions of banking crises, this result loses significance when we control for factors such as Generosity of Deposit Insurance and Banking Restrictions. Thus, we do not find a strong link between bank concentration and bank fragility. Generosity of Deposit Insurance, on the other hand, is significantly and positively correlated with bank fragility. These results are also consistent with the findings of Demirguc-Kunt and Detragiache (2000).

## ***V. Conclusions***

This paper investigates the relationships between (i) bank concentration and the efficiency and development of the financial system, (ii) political economy of bank concentration, and (iii) the relationship between bank concentration and stability using cross-country comparisons. Our analysis does not provide support for the view that bank concentration is closely associated with banking sector efficiency, financial development, industrial competition, general institutional development, or the stability of the banking system. These findings suggest

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<sup>7</sup> The only changes are that (1) bank concentration is no longer significantly, negatively associated with regulatory restrictions on bank activities and (2) bank concentration is significantly negatively associated with the generosity of deposit insurance.

that it would be difficult to argue for or against bank concentration based on cross-country comparisons.

In the literature it is common to use bank concentration as a proxy for the level of competition in the banking sector. Some readers may interpret these results as casting doubt on the usefulness of concentration as an accurate indicator of the extent of banking competition and contestability. Future research should compile more explicit measures of policies, regulations, and laws that influence bank competition and contestability (e.g., entry restrictions on foreign and domestic banks, branching restrictions, anti-trust laws, etc.). This data would facilitate research into the direct link between policy instruments and outcomes, such as bank efficiency, financial sector development, institutional development, economic growth, and banking sector stability.

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