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Banking Systems around the Globe
Do Regulation and Ownership Affect Performance and Stability?

James R. Barth, Gerard Caprio Jr., and Ross Levine

2.1 Introduction

Financial systems in countries throughout the world range from fairly rudimentary to quite sophisticated and from extremely fragile to relatively stable. A growing number of studies provide empirical evidence that well-functioning financial systems accelerate long-run economic growth by allocating funds to more productive investments than poorly developed financial systems.[1] This convincing evidence has intensified calls for financial sector reforms that improve financial system performance and thereby promote economic development.

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1. For cross-country evidence supporting this relationship, see King and Levine (1993a,b); Levine and Zervos (1998); Beck, Levine, and Loayza (2000); and Levine, Loayza, and Beck (2000). In a similar vein, Rajan and Zingales (1998) provide cross-country, industry-level evidence. Using firm-level data, Demirgüç-Kunt and Maksimovic (1998) show that financial development increases economic growth whereas Wurgler (2000) shows the benefits of financial development for the allocation of investments across industries based upon their growth opportunities. In a related context, Jayaratne and Strahan (1996) show that liberalizing restrictions on interstate branching in the United States has led to more rapid state growth. More generally, Gertler (1988) and Levine (1997) provide literature reviews on the importance of financial systems.

Stable banking systems are an important component of well-functioning financial systems, as has been vividly demonstrated by recent developments around the globe. When banking or, more generally, financial systems temporarily break down or operate ineffectively, the ability of firms to obtain funds necessary for continuing existing projects and pursuing new endeavors is curtailed. Severe disruptions in the intermediation process can even lead to financial crises and, in some cases, undo years of economic and social progress. Since 1980 more than 130 countries have experienced banking problems that have been costly to resolve and disruptive to economic development. This troublesome situation has led to calls for banking reform by national governments and such international organizations as the World Bank and the International Monetary Fund. Apart from some fairly general proposals for reform, such as greater transparency and an international financial authority, there are relatively few proposals for specific structural, regulatory, and supervisory reforms.[2] This is understandable because there is relatively little empirical evidence to support any specific proposal.

To determine specific banking reforms that will limit bank fragility and promote well-functioning financial systems requires two steps. First, one must obtain cross-country data on bank ownership, regulation, and supervision. This enables one to establish the extent to which banks operate in different ownership, regulatory, and supervisory environments. Only by knowing the regulatory environment can one really know what a bank is or what a bank does in different countries. Surprisingly, such information is not widely available from official sources for a wide range of countries. In practical terms, however, it is the regulatory environment that actually defines what is meant by the term *bank.* Second, one must use such data to assess the relationships between different environments and bank performance or, more generally, financial performance. Only by doing this can one really know whether banks matter. In other words, such an effort enables one to identify better those bank ownership, regulatory, and supervisory practices that will foster financial stability and enhance long-run economic growth.

The purposes of this paper are (a) to collect and report cross-country data on bank regulation and ownership and (b) to evaluate the links between different regulatory/ownership practices and both financial sector performance and banking system stability. In so doing our paper helps fill the gap between the questions posed by policymakers about how to reform banking systems and the currently available evidence on the issue pro-

2. The most notable exception is the Basel Committee on Banking Supervision's proposed new capital adequacy framework, which provides for more risk classes and raises the possibility of using credit ratings to set risk weights. For more information, see Caprio and Honohan (1999).

duced by researchers. The paper in several respects substantially extends the preliminary investigation reported in Barth, Caprio, and Levine (1999). We do this by enlarging our earlier sample of forty-five countries to more than sixty countries, updating existing data, materially improving the quality of the data, adding new information on the banking environment in different countries, and testing additional hypotheses. We provide documentation showing the substantial cross-country variation in regulatory restrictions on various activities of banks, in legal restrictions on the mixing of banking and commerce, and in the structure of bank ownership. Although we examine the socioeconomic determinants of regulatory choices by governments, the focus is on examining which types of regulatory practices and ownership structures are associated with well-functioning, stable banking systems.

Motivated by a long and divisive policy debate (especially in the United States)[3] over the extent to which the activities of banks should be limited, this paper examines the following questions:

1. Do countries with regulations that impose tighter restrictions on the ability of commercial banks to engage in securities, insurance, and real estate activities have (a) less efficient but (b) more stable financial systems?
2. Do countries that restrict the mixing of banking and commerce—both in terms of banks owning nonfinancial firms and nonfinancial firms owning banks—have (a) less efficient but (b) more stable banking systems?
3. Do countries in which state-owned banks play a large role have more poorly functioning financial systems?

Those who favor restricting commercial banks to traditional deposit taking and loan making argue that inherent conflicts of interest arise when banks engage in such activities as securities underwriting, insurance underwriting, real estate investment, and owning nonfinancial firms. Expanding the array of permissible activities, moreover, may provide greater opportunities for moral hazard to distort the investment decisions of banks, especially when they operate within a deposit insurance system (Boyd, Chang, and Smith 1998). Furthermore, in an unrestricted environment, the outcome may be a few large, functionally diverse, and dominant banks that could (a) complicate monitoring by bank supervisors and market participants[4] and (b) lead to a more concentrated and less competitive

3. For reviews of the literature regarding this issue, see Kwan and Laderman (1999) and Santos (1998a,b,c). Also, see Barth, Brumbaugh, and Yago (1997); Kane (1996); Kroszner and Rajan (1994); and White (1986) for discussions of some of these issues. On 12 November 1999 laws in the United States restricting banks from engaging in securities and insurance activities were repealed (see Barth, Brumbaugh, and Wilcox 2000).

4. Camdessus (1997) describes this as: "the development of new types of financial instruments, and the organization of banks into financial conglomerates, whose scope is often hard to grasp and whose operations may be impossible for outside observers—even [sic!] banking supervisors—to monitor" (537).

nonfinancial sector. Relatively few regulatory restrictions on commercial banking activities and relatively few legal impediments to the mixing of banking and commerce may therefore produce less efficient and more fragile financial systems.

Those who favor substantial freedom with respect to the activities of commercial banks argue that universal banking creates more diversified and thereby more stable banks. Fewer regulatory restrictions may also increase the franchise value of banks and thereby augment incentives for bankers to behave more prudently, with positive implications for bank stability. Furthermore, the opportunity to engage in a wide range of activities enables banks to adapt and hence provide more efficiently the changing financial services being demanded by the nonfinancial sector. Thus, fewer regulatory restrictions on the activities of commercial banks and the mixing of banking and commerce may produce more efficient and more stable financial systems.[5] The lack of appropriate cross-country data, however, has impeded the ability to examine the relationship between commercial bank regulations and both the functioning and the stability of the financial system.

This paper attempts to rectify this situation and in so doing provides the following answers to the questions posed above. First, we do not find a reliable statistical relationship between regulatory restrictions on the ability of commercial banks to engage in securities, insurance, and real estate activities and (a) the level of banking sector development, (b) securities market and nonbank financial intermediary development, or (c) the degree of industrial competition. Indeed, based on the cross-country evidence, it would be quite difficult for someone to argue confidently that restricting commercial banking activities impedes—or facilitates—financial development, securities market development, or industrial competition. We do, however, find that regulatory restrictions on the ability of banks to engage in securities activities tend to be associated with higher interest rate margins for banks.[6] Thus, even though there may be some negative implications for bank efficiency due to restricting commercial bank activities, the main message is that there is little relationship between regulatory restrictions on banking powers and overall financial development and industrial competition.

Second, in terms of stability, we find a strong and robust link to the regulatory environment. Countries with greater regulatory restrictions on the securities activities of commercial banks have a substantially higher probability of suffering a major banking crisis. More specifically, countries with a regulatory environment that inhibits the ability of banks to engage

5. Mishkin (1999, 686), furthermore, states that the "benefits of increased diversification open up opportunities for reform of the banking system because it makes broad-based deposit insurance less necessary and weakens the political forces supporting it."

6. This may reflect the fact that in such a situation banks are limited to the extent that they can cover costs with fee income.

in the businesses of securities underwriting, brokering, dealing, and all aspects of the mutual fund business tend to have more fragile financial systems. The positive link between regulatory restrictions and major or even systemic banking crises, moreover, does not appear to be due to reverse causation.

Third, we find no beneficial effects from restricting the mixing of banking and commerce. We specifically examine (a) the ability of banks to own and control nonfinancial firms and (b) the ability of nonfinancial firms to own and control commercial banks. There is not a reliable relationship between either of these measures of mixing banking and commerce and the level of banking sector development, securities market and nonbank financial intermediary development, or the degree of industrial competition.

Fourth, restricting the mixing of banking and commerce is associated with *greater* financial fragility. Whereas restricting nonfinancial firms from owning commercial banks is unassociated with financial fragility, restricting banks from owning nonfinancial firms is positively associated with bank instability. We find that those countries that restrict banks from owning nonfinancial firms have a robustly higher probability of suffering a major banking crisis. Thus, one of the major reasons for restricting the mixing of banking and commerce—to reduce financial fragility—is not supported by the cross-country evidence presented in this paper. This finding is particularly notable in the wake of the East Asian crisis and the haste with which many have concluded that all things Asian—including close ownership links—lead to crises. Besides the fact that for decades such links did not produce crises, our research shows that concerns about neither financial sector development nor financial fragility should prompt calls for a more restrictive environment.[7]

Fifth, greater state ownership of banks tends to be associated with more poorly developed banks, nonbanks, and securities markets. In an independent study using alternative measures of bank ownership, La Porta, Lopez-de-Silanes, and Shleifer (2000) also examine the relationship between government ownership and financial development. They convincingly show that government ownership retards financial development. Thus, even though the proponents of state ownership of banks argue that it helps overcome informational problems and better directs scarce capital to highly productive projects, the data assembled here and by La Porta, Lopez-de-Silanes, and Shleifer (2000) tell a different story. On average, greater state ownership of banks tends to be associated with more poorly operating financial systems.

Besides documenting the substantial cross-country variation in commercial banking regulations and ownership, our analyses of the data highlight

7. For a view on ownership links that is relatively unfashionable today, see Lamoreaux (1994).

some negative implications of imposing regulatory restrictions on the activities of commercial banks. Specifically, regulations that restrict the ability of banks to (a) engage in securities activities and (b) own nonfinancial firms are closely associated with greater banking sector instability. The analyses, moreover, suggest no countervailing beneficial effects from restricting the mixing of banking and commerce or from restricting the activities of banks in the areas of securities, insurance, and real estate.

The research upon which this paper is based is still ongoing, so our paper should be viewed as a progress report. We are collecting considerably more information about bank structure, regulation, and especially supervision, and the sample of countries is being enlarged. The new cross-country data that we are collecting on the supervisory environment will permit us—and others—to investigate more fully the interrelated issues of regulatory and supervisory practices or policies. To date, our efforts nonetheless represent substantial progress on understanding what a bank does in different countries and whether it matters. By publishing the existing data and reporting the empirical results, we hope both to contribute to the ongoing debate over appropriate banking reforms and to facilitate further research on this important topic.

2.2 Bank Regulations and Ownership versus Financial Development and Industrial Competition

This section examines the relationship between commercial banking regulations and state ownership of banks on the one hand and the level of financial sector development and the degree of industrial sector competition on the other. The objective is to assess whether governments that restrict the activities of banks, inhibit the mixing of banking and commerce, and own a substantial fraction of the banking sector tend to have (a) more or less efficient and developed banks, (b) better or worse functioning securities markets and nonbank financial intermediaries, and (c) greater or lesser competition in the nonfinancial sector. To examine all these issues, we constructed an extensive data set.

Section 2.2.1 introduces the regulatory and ownership variables. We define the variables, briefly describe their construction, and present summary statistics. Section 2.2.2 briefly describes the various measures of financial sector development and industrial competition that are employed. Section 2.2.3 presents our regression results and a summary of our conclusions.

2.2.1 Regulatory Restrictions and Ownership

Data Collection and Definitions

We have constructed indexes on the degree to which government regulators permit commercial banks to engage in securities, insurance, and real

estate activities. We have also constructed indexes on the degree to which regulators permit commercial banks to own nonfinancial firms and vice versa. Furthermore, we have obtained information on the degree of state ownership of commercial banks. We have assembled this data and checked its accuracy through a number of different channels. Specifically, we have obtained the data used in this paper primarily from international surveys conducted independently by the Office of the Comptroller of the Currency (OCC) and the World Bank. We have confirmed the responses for as many countries as possible using information from Barth, Nolle, and Rice (2000); the Institute of International Bankers (Global Survey, various years); Euromoney (Banking Yearbook, various years); and various central bank and bank regulatory agency publications. When inconsistencies have arisen, we have—through the OCC and the World Bank—attempted to communicate with the relevant national regulatory authorities to resolve them. Although some problems undoubtedly remain, we nonetheless believe we have assembled the most accurate and comprehensive data on commercial bank regulatory policies to date.

Bank Activities. We use measures of the degree to which national regulatory authorities allow commercial banks to engage in the following three "nontraditional" activities: *Securities,* the ability of commercial banks to engage in the business of securities underwriting, brokering, dealing, and all aspects of the mutual fund industry; *Insurance,* the ability of banks to engage in insurance underwriting and selling; *Real Estate,* the ability of banks to engage in real estate investment, development, and management.

We have assessed each country's regulations concerning these activities and rated the degree of regulatory restrictiveness for each activity from 1 to 4, with larger numbers representing greater restrictiveness. The definitions of the designations are as follows:

1. Unrestricted: A full range of activities in the given category can be conducted directly in the commercial bank.
2. Permitted: A full range of activities can be conducted, but all or some must be conducted in subsidiaries.
3. Restricted: Less than a full range of activities can be conducted in the bank or subsidiaries.
4. Prohibited: The activity cannot be conducted in either the bank or subsidiaries.

Mixing Banking and Commerce. We have constructed two measures of the degree of regulatory restrictions on the mixing of banking and commerce. Again, we have rated the regulatory restrictiveness for each variable from 1 to 4. The variable definitions and the definitions of the designations are as follows:

Nonfinancial Firms Owning Banks: the ability of nonfinancial firms to own and control banks.

1. Unrestricted: A nonfinancial firm may own 100 percent of the equity in a bank.
2. Permitted: Ownership is unrestricted with prior authorization or approval.
3. Restricted: Limits are placed on ownership, such as a maximum percentage of a bank's capital or shares.
4. Prohibited: There is no equity investment in a bank.

Banks Owning Nonfinancial Firms: the ability of banks to own and control nonfinancial firms.

1. Unrestricted: A bank may own 100 percent of the equity in any nonfinancial firm.
2. Permitted: A bank may own 100 percent of the equity in a nonfinancial firm, but ownership is limited based on a bank's equity capital.
3. Restricted: A bank can only acquire less than 100 percent of the equity in a nonfinancial firm.
4. Prohibited: A bank may not acquire any equity investment in a nonfinancial firm.

State Ownership. We also have data on the degree of state ownership of banks:

Stateowned Bank Assets: State-owned bank assets as a share of total commercial bank assets.

In terms of timing, the data represent the regulatory environment in 1997. In an earlier study, we collected information on these regulations for a smaller sample of countries in 1995. Even though there were very few regulatory changes, some of our assessments changed as more information became available. We discuss the issue of regulatory change as it relates to our findings in greater detail later when we examine the linkages between the regulations and banking crises.

Summary Statistics

Table 2.1 lists the numerical values for each of the six indicators for the regulatory environment. We also compute a summary index of the first four indicators of the regulatory restrictions imposed on banks. Specifically, Restrict equals the average of Securities, Insurance, Real Estate, and Banks Owning Nonfinancial Firms. Table 2.2 presents summary statistics indicating the extensive cross-country variation in the data. For example, there were nine countries with very restrictive regulatory systems (Restrict > 3): Japan, Mexico, Rwanda, Ecuador, Barbados, Botswana, Indonesia, Zimbabwe, and Guatemala. The value for the United States is 3. There

Table 2.1 **Country Data on Bank Regulations and State Ownership of Bank Assets**

	Securities	Insurance	Real Estate	Banks Owning Nonfinancial Firms	Restrict	Nonfinancial Firms Owning Banks	State-Owned Bank Assets
Argentina	3	2	2	3	2.50	1	0.305
Australia	1	2	3	2	2.00	2	0.000
Austria	1	2	1	1	1.25	1	0.044
Barbados	3	4	3	4	3.50	2	0.195
Belgium	2	2	3	3	2.50	1	0.000
Bolivia	2	2	4	4	3.00	1	0.000
Botswana	2	4	4	4	3.50	2	0.000
Brazil	2	2	3	3	2.50	1	0.510
Canada	2	2	2	3	2.25	3	0.000
Chile	3	2	3	3	2.75	3	0.238
Colombia	2	2	2	4	2.50	1	0.19
Cyprus	2	2	4	3	2.75	3	0.034
Denmark	1	2	2	2	1.75	1	0.000
Ecuador	2	4	4		3.33		
Egypt, Arab Rep.	2	2	3	3	2.50		0.666
El Salvador	2	2	4	4	3.00	2	0.069
Fiji	2	3	4	2	2.75	3	0.085
Finland	1	3	2	1	1.75	1	0.411
France	2	2	2	2	2.00	2	0.145
The Gambia	2	4	2	4	3.00	2	0.000
Germany	1	3	2	1	1.75	1	0.429
Ghana	2	1	4	2	2.25	2	0.388
Greece	2	3	3	1	2.25	1	0.628

(*continued*)

Table 2.1 (continued)

	Securities	Insurance	Real Estate	Banks Owning Nonfinancial Firms	Restrict	Nonfinancial Firms Owning Banks	State-Owned Bank Assets
Guatemala	4	4	4	3	3.75	2	0.051
Guyana	1	3	3	3	1.75	3	0.233
Hong Kong	1	2	2	3	2.00	3	0.000
Iceland	2	2	4	3	2.75	1	0.644
India	2	4	4	2	3.00	2	0.800
Indonesia	2	4	4	4	3.50	1	0.415
Ireland	1	4	1	1	1.75	1	0.000
Israel	1	1	1	1	1.00	1	
Italy	1	2	3	3	2.25	3	0.250
Japan	3	4	3	3	3.25	3	0.000
Jordan	2	4	3	2	2.75	1	0.000
Republic of Korea	2	2	2	3	2.25	3	0.000
Lesotho	2	4	3	3	3.00	2	0.720
Luxembourg	1	3	1	1	1.50	3	0.000
Madagascar	2	4	3	3	3.00	2	0.220
Malaysia	2	2	3	2	2.25	2	0.096
Malta	1	3	3	3	2.50	4	0.475
Mexico	3	4	3	3	3.25	2	0.415
Netherlands	1	2	2	1	1.50	1	0.000
New Zealand	1	1	1	2	1.25	2	0.000
Nigeria	1	2	2	2	1.75		0.130

Norway	2	2	2	2	2.00	2	0.376
Pakistan	2	4	3	1	2.50	1	0.501
Peru	2	2	2	2	2.00	2	0.000
The Philippines	1	2	2	3	2.00	3	0.198
Portugal	1	2	3	2	2.00	1	0.170
Rwanda	1	4	4	4	3.25	1	0.000
Seychelles	2	2	2	2	2.00	2	0.364
Singapore	2	2	2	3	2.25	1	
South Africa	2	2	1	1	1.50	2	0.000
Spain	1	2	3	1	1.75	2	0.019
Sri Lanka	2	2	2	2	2.00	3	0.580
Suriname	1	1	1	3	1.50	3	0.277
Sweden	4	2	3	3	3.00	1	0.000
Switzerland	1	1	1	3	1.50	1	0.151
Tanzania	2	3	4	3	3.00	2	0.501
Thailand	2	2	2	3	2.25	3	0.290
Turkey	3	2	4	3	3.00	1	0.365
United Kingdom	1	2	1	1	1.25	1	0.000
United States	3	3	3	3	3.00	3	0.000
Uruguay	3	2	3	4	3.00		0.455
Venezuela	2	2	3	3	2.50	3	0.072
Zimbabwe	2	4	4	4	3.50	2	0.246

Table 2.2 **Summary Statistics for Regulatory and State-Ownership Variables**

	Restrict	Securities	Real Estate	Insurance	Banks Owning Nonfinancial Firms	Nonfinancial Firms Owning Banks	State-Owned Bank Assets
Mean	2.40	1.85	2.67	2.55	2.55	1.92	0.21
Median	2.38	2	3	2	3	2	0.15
Maximum	3.75	4	4	4	4	4	0.80
Minimum	1	1	1	1	1	1	0
Std. Dev.	0.67	0.75	0.98	0.95	0.97	0.86	0.23
Skewness	0.00	0.69	−0.18	0.47	−0.26	0.31	0.80
Kurtosis	2.12	3.39	2.03	2.01	2.09	1.84	2.55
Jarque-Bera	2.13	5.71	2.93	5.13	2.94	4.48	7.21
Probability	0.35	0.06	0.23	0.08	0.23	0.11	0.03
No. of observations	66	66	66	66	65	62	63

were nine countries that permitted wide latitude in terms of commercial banking activities (Restrict < 1.75): Switzerland, Suriname, South Africa, the Netherlands, Luxembourg, United Kingdom, New Zealand, Austria, and Israel. Furthermore, there is substantial representation in terms of both geographical location and income level of the sample countries. Besides the twenty-four Organization for Economic Cooperation and Development (OECD) countries, there are fourteen Latin American countries, eleven countries from Sub-Saharan Africa, and twelve from Asia, as well as five countries from northern Africa and non-OECD Europe.

At the outset, we expected to observe that governments that restricted banking activities in one area—for example, securities activities—would also restrict banking activities in other areas, like real estate activities. We therefore expected extremely large, positive correlations among the Securities, Real Estate, Insurance, Banks Owning Nonfinancial Firms, and Nonfinancial Firms Owning Banks variables. There is clearly a positive association among the different regulatory variables, but it is not extremely high. Table 2.3 shows the correlations among the six regulatory/ownership indicators. Although Securities and Real Estate are significantly correlated with three of the four other regulatory indicators at the 0.05 significance level, Insurance and Banks Owning Nonfinancial Firms are significantly correlated with only two of the four other indicators, and Nonfinancial Firms Owning Banks is not significantly correlated with any of the others. Furthermore, the correlation coefficients on the statistically significant relationships are all below 0.50. Thus, there is cross-country diversity in the individual regulatory restrictions. This suggests that it is important to examine each of the regulatory variables individually, instead of using only a single index such as Restrict to capture the regulatory environment. Thus, even though we report the results on Restrict, we focus our discussion almost entirely on the individual regulatory variables because they provide much more information.

2.2.2 Financial Sector Performance and Industrial Competition: Definitions

This section describes the paper's indicators of bank development, securities market development, and industrial competition. For each category, we considered a wide array of measures. We highlight the measure presented in the tables (see table 2A.2 for the values of the measures for our sample countries) and also mention the other measures that were studied.

Bank Development

Net interest margin equals net income divided by total assets and is the average value over the 1990–95 period (Beck, Demirgüç-Kunt, and Levine 2001). Recognizing that many factors influence interest rates besides the degree of efficiency of bank operations, we include this in our measures of

Table 2.3 **Correlations for Regulation and State-Ownership Variables**

	Restrict	Securities	Insurance	Real Estate	Banks Owning Nonfinancial Firms	Nonfinancial Firms Owning Banks	State-Owned Bank Assets
Restrict	1.00	0.70	0.64	0.81	0.72	0.05	0.18
		(0.00)	(0.00)	(0.00)	(0.00)	(0.52)	(0.17)
Securities		1.00	0.25	0.43	0.42	0.00	0.11
			(0.04)	(0.00)	(0.00)	(0.97)	(0.38)
Insurance			1.00	0.41	0.18	−0.03	0.13
				(0.00)	(0.16)	(0.85)	(0.32)
Real Estate				1.00	0.49	0.04	0.26
					(0.00)	(0.74)	(0.04)
Banks Owning Nonfinancial Firms					1.00	0.19	0.01
						(0.14)	(0.96)
Nonfinancial Firms Owning Banks						1.00	−0.09
							(0.51)
State-Owned Bank Assets							1.00

Note: Numbers in parentheses are *p*-values.

bank development because of its wide use in the literature and its empirical availability.

Private credit equals claims on the private sector by deposit money banks and other financial institutions as a share of GDP and is the average value over the 1980–95 period (Levine, Loayza, and Beck 2000). This is a general and widely used measure of financial sector development. We also used other measures such as (a) claims by deposit money banks on the private sector, (b) liquid liabilities, and (c) total assets of the commercial banking sector relative to GDP in 1997. These alternative measures do not alter any of the conclusions, however.

Bank concentration equals the share of total assets of the three largest banks and is the average value over the 1990–95 period (Beck, Demirgüç-Kunt, and Levine 2001). This variable captures the degree of concentration in the banking industry. We also used such measures as the number of banks per capita and the share of total assets of the single largest bank. These alternative measures produced similar results, however.

Securities Development

Total value traded equals the value of domestic equities traded on domestic exchanges divided by GDP, averaged over the 1980–95 period (Beck, Demirgüç-Kunt, and Levine 2001). Levine and Zervos (1998) show that stock market liquidity is important for economic growth. They further note that it is liquidity per se, not equity market capitalization, that is crucial. We also used measures of primary market activity and bond market activity. Specifically, we collected information on the (a) total amount of outstanding domestic debt securities issued by private or public domestic entities as a share of GDP, (b) total equity issues as a share of GDP, and (c) private, long-term debt issues as a share of GDP. Although these alternative measures yield similar results, they are available for far fewer countries.

Nonbank credits equals nonbank financial institution claims on the private nonfinancial sector as a share of GDP and is the average value over the 1980–95 period (Beck, Demirgüç-Kunt, and Levine 2001). To assess the robustness of our findings, we also used direct measures of the size of particular nonbank financial institutions, including insurance companies, mutual funds, and private pension funds. Again, these alternative measures produced similar findings, but they are available for far fewer countries.

Industrial Competition

Industrial competition 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" (Dutz and Hayri 1999). To examine whether commercial bank regulatory restrictiveness is

associated with industrial competition, we also examined such measures as (a) the degree of business freedom and competition, (b) the percentage of economic activity controlled by the thirty largest companies, and (c) the perceived effectiveness of antitrust policy. These alternative measures produced similar results, however.

2.2.3 Empirical Results

The objective here is to present a rudimentary, first-cut empirical evaluation of the relationship between bank regulatory restrictions, mixing banking and commerce, and state ownership of banks, on the one hand, and bank development, securities development, and industrial competition, on the other. Future work will deal more rigorously with specific hypotheses about such relationships as well as with numerous methodological issues.

To this end, we first present the simple correlations between each of the measures of the regulatory/ownership environment and the indicators of bank development, securities development, and industrial competition. We then present regression results in which we control for economic development (i.e., the level of real per capita GDP) and an index of the quality of government. More specifically, *Development* equals the logarithm of real per capita GDP in 1980 (source: Penn World Tables). *Good Government* equals the summation of three variables: (a) risk of expropriation by the government, (b) degree of corruption, and (c) the law-and-order tradition of the country, with greater values signifying less risk of expropriation, less official corruption, and a greater law-and-order tradition (source: La Porta et al., 1999).

It is important to control for other features of the environment in evaluating the relationship between the commercial bank regulatory/ownership regime with financial development and industrial competition. For instance, there may be countries in which corrupt governments that do not enforce the rule of law and tend to expropriate private property have selected policies that have led to both poor economic performance and underdeveloped financial systems. If such governments also uniformly enact certain types of commercial bank regulations, we would not want to interpret a significant correlation between bank regulations and financial development as representing an independent link unless we control for the quality of the government. We therefore use the simple measures just described to control for some natural characteristics of the policy environment in assessing whether there is an independent link between the commercial bank regulatory/ownership structure and the financial/industrial system more generally. These variables to some extent also serve as a proxy for the overall quality of bank supervision. Heteroscedasticity-consistent standard errors are reported for these regression results.

The empirical findings are startlingly underwhelming as summarized in

tables 2.4–2.10. First, it would be very difficult for someone to argue confidently that restricting the activities of commercial banks adversely affects financial development, securities market development, or industrial competition. At the same time, it would be very difficult for someone to argue confidently that easing restrictions on commercial banking activities facilitates greater financial development, securities market development, or industrial competition. Specifically, although countries with more restrictive regulations tend to have less well developed banking sectors and securities markets as well as lower levels of industrial competition, the correlations are frequently not statistically significant; nor do they retain their values when controlling for other factors in a regression context. Indeed, Securities, Insurance, and Real Estate do not enter any of the regressions significantly when one includes Private Credit, Bank Concentration, Industrial Competition, Total Value Traded, or Nonbank Credits. As discussed earlier, these conclusions are robust to a wide assortment of measures of banking sector development, industrial competition, and securities market development.

Second, it would be very difficult to argue that restricting the mixing of banking and commerce—either by restricting bank ownership of nonfinancial firms or by restricting nonfinancial firm ownership of banks—impedes or facilitates overall financial development or industrial competition. Banks Owning Nonfinancial Firms and Nonfinancial Firms Owning Banks do not enter *any* of the regressions significantly. These findings hold when using alternative measures of banking sector development, industrial competition, and securities market development.

Third, there is some evidence that restricting commercial banks from securities and real estate activities tends to raise net interest margins. Thus, restricting commercial banks from securities and real estate activities may have some negative implications for bank efficiency. Taken as a whole, however, the analysis of the data indicates little link between the restrictiveness of commercial bank regulations and the mixing of banking and commerce, on the one hand, and financial development (taken broadly) and industrial competition, on the other.

Fourth, in terms of state ownership, the empirical evidence suggests a negative relationship between the degree of state ownership of banks and financial development.[8] Countries with greater state ownership of banks tend to have less-developed banks and nonbanks. It should also be noted in this context that underdeveloped financial systems tend to exert a negative influence on long-run growth (see Levine, Loayza, and Beck 2000 and Levine 2001). Although considerably more research needs to be done

8. In this regard, Cetorelli and Gambera (2001, 23), in a study assessing the relevance of the market structure for the "finance-growth relationship," state that "it would be interesting to investigate whether it matters if banks are privately or state-owned."

Table 2.4 **Relationship Between Bank Regulatory Restrictiveness and Alternative Measures of Financial Development**

	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
			A. Correlations			
Restrict	0.365	−0.299	−0.182	−0.324	−0.249	−0.068
	(0.005)	(0.020)	(0.174)	(0.032)	(0.070)	(0.671)
			B. Regressions			
Restrict	0.007	−0.016	−0.101	−0.163	−0.022	0.067
	(0.020)	(0.832)	(0.046)	(0.422)	(0.480)	(0.188)
No. of countries	57	60	57	44	54	41
R^2	0.28	0.47	0.12	0.29	0.18	0.46

Notes: Regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. Numbers in parentheses are *p*-values. Restrict = the average of regulatory restrictions on the ability of banks to engage in (a) securities activities, (b) insurance activities, (c) real estate activities, and (d) the ownership of non-financial firms.

Table 2.5 **Relationship Between Restriction of Securities Activities of Banks and Alternative Measures of Financial Development**

	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
			A. Correlations			
Securities	0.369	−0.121	−0.199	−0.273	−0.152	0.155
	(0.005)	(0.359)	(0.137)	(0.073)	(0.274)	(0.332)
			B. Regressions			
Securities	0.007	0.010	−0.065	−0.131	−0.007	0.056
	(0.016)	(0.860)	(0.197)	(0.316)	(0.809)	(0.121)
No. of countries	57	60	57	44	54	41
R^2	0.30	0.47	0.09	0.29	0.17	0.47

Notes: Regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. Securities = the ability of banks to engage in the business of securities underwriting, brokering, dealing, and all aspects of the mutual fund business. Larger values imply greater restrictions on bank activities. 4 = prohibited; 3 = banks (and subsidiaries) restricted in activities; 2 = permitted in subsidiaries; 1 = permitted directly in the bank. Numbers in parentheses are *p*-values.

Table 2.6 **Relationship Between Restriction of Insurance Activities of Banks and Alternative Measures of Financial Development**

	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
			A. Correlations			
Insurance	−0.035	−0.194	−0.086	−0.110	−0.200	−0.031
	(0.797)	(0.138)	(0.527)	(0.477)	(0.147)	(0.845)
			B. Regressions			
Insurance	−0.003	−0.011	−0.038	−0.010	−0.023	0.026
	(0.321)	(0.843)	(0.272)	(0.926)	(0.405)	(0.382)
No. of countries	57	60	57	44	54	41
R^2	0.25	0.47	0.06	0.27	0.18	0.43

Notes: Regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. Insurance = the ability of banks to engage in the business of insurance underwriting and selling insurance products/services as principal and as agent. Larger values imply greater restrictions on bank activities. 4 = prohibited; 3 = banks (and subsidiaries) restricted in activities; 2 = permitted in subsidiaries; 1 = permitted directly in the bank. Numbers in parentheses are *p*-values.

Table 2.7 **Relationship Between Restriction of Real Estate Activities of Banks and Alternative Measures of Financial Development**

	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
			A. Correlations			
Real Estate	0.395	−0.346	−0.068	−0.236	−0.360	−0.218
	(0.002)	(0.007)	(0.617)	(0.123)	(0.008)	(0.171)
			B. Regressions			
Real Estate	0.006	−0.035	−0.045	−0.074	−0.042	0.022
	(0.021)	(0.445)	(0.181)	(0.631)	(0.105)	(0.480)
No. of countries	57	60	57	44	54	41
R^2	0.29	0.47	0.07	0.28	0.22	0.42

Notes: Regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. Real Estate = the ability of banks to engage in real estate investment, development, and management. Larger values imply greater restrictions on bank activities. 4 = prohibited; 3 = banks (and subsidiaries) restricted in activities; 2 = permitted in subsidiaries; 1 = permitted directly in the bank. Numbers in parentheses are *p*-values.

Table 2.8 **Relationship Between Restriction of Banks Owning Nonfinancial Firms and Alternative Measures of Financial Development**

	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
			A. Correlations			
Banks Owning Nonfinancial Firms	0.339	−0.209	−0.081	−0.316	0.001	−0.101
	(0.011)	(0.111)	(0.552)	(0.037)	(0.993)	(0.534)
			B. Regressions			
Banks Owning Nonfinancial Firms	0.004	0.021	−0.033	−0.102	0.027	0.049
	(0.066)	(0.629)	(0.266)	(0.411)	(0.270)	(0.131)
No. of countries	56	59	56	44	53	40
R^2	0.26	0.47	0.06	0.29	0.19	0.46

Notes: Regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. Banks Owning Nonfinancial Firms = the ability of banks to own and control nonfinancial firms. Larger values imply greater restrictions on bank activities. 4 = prohibited; 3 = less than 100% ownership; 2 = unrestricted, but ownership is limited based on bank's equity capital; 1 = 100% ownership permitted. Numbers in parentheses are *p*-values.

Table 2.9 **Relationship Between Restriction of Nonfinancial Firms Owning Banks and Alternative Measures of Financial Development**

	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
			A. Correlations			
Nonfinancial Firms Owning Banks	−0.056	0.065	−0.130	−0.193	0.029	0.132
	(0.690)	(0.996)	(0.354)	(0.216)	(0.842)	(0.429)
			B. Regressions			
Nonfinancial Firms Owning Banks	−0.003	0.072	−0.032	−0.123	0.011	0.043
	(0.364)	(0.165)	(0.412)	(0.272)	(0.701)	(0.139)
No. of countries	53	56	53	43	50	38
R^2	0.27	0.48	0.06	0.35	0.15	0.44

Notes: Regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. Nonfinancial Firms Owning Banks = the ability of nonfinancial firms to own banks. Larger values imply greater restrictions on bank activities. 1 = limits placed on ownership; 0 = no limits placed on ownership. Numbers in parentheses are *p*-values.

Table 2.10 **Relationship Between State Ownership of Bank Assets and Alternative Measures of Financial Development**

	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
			A. Correlations			
State-Owned Bank Assets	0.216	−0.345	0.095	−0.247	−0.273	−0.380
	(0.117)	(0.009)	(0.496)	(0.115)	(0.052)	(0.017)
			B. Regressions			
State-Owned Bank Assets	0.011	−0.275	0.007	−0.414	−0.129	−0.242
	(0.522)	(0.088)	(0.962)	(0.562)	(0.065)	(0.012)
No. of countries	54	57	54	42	51	39
R^2	0.24	0.48	0.05	0.28	0.18	0.49

Notes: Regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. State Ownership of Bank Assets = percentage of bank assets accounted for by state-owned banks. Numbers in parentheses are *p*-values.

before a causal interpretation can be given to these findings, it may justify some concern among policy makers in countries where state banks play a major role in credit allocation. In this sample alone it appears that about half the world's people live in countries with banking systems that are a majority state-owned (Brazil, China, Egypt, India, Pakistan, and recently Indonesia), which underscores the importance of this concern.

In sum, the lack of a close and reliable link between the regulatory environment and overall financial development and industrial competition is robust to various alterations in the conditioning information set and to redefinitions of the regulatory indicators. In the analysis, however, the regulatory variables take values ranging from 1 through 4. This particular scaling may create an interpretation problem because the difference between a 2 and a 3 may not be the same as the difference between a 3 and a 4, or a 1 and a 2. We therefore examine the sensitivity of the empirical results to this scale in three ways. First, we created a new regulatory indicator that assumed values of 1 through 3, rather than 1 through 4. This new variable equals 1 if the original indicator equals 1; the new variable equals 2 if the original indicator equals 2 or 3; and the new variable equals 3 if the original indicator equals 4. Second, we created an additional regulatory indicator for each category (Securities, Insurance, Real Estate, Banks Owning Nonfinancial Firms, and Nonfinancial Firms Owning Banks) with values of either 1 or 0. The additional regulatory indicator takes the value 1 if the original indicator was 1 or 2, and 0 otherwise. Finally, we also used separate dummy variables for each value between 1 and 4. In this case, we created four dummy variables: Securities1, Securities2, Securities3, and Securities4. Securities1 equals 1 if Securities equals 1, and 0 otherwise; Securities2 equals 1 if Securities equals 2, and 0 otherwise; and so on. We created these new variables for all the regulatory indicators. Using these alternative indicators, however, did not change this section's conclusions. The results are robust to changes in the other regressors too. Also, it is important to note that these conclusions are robust to the inclusion of regional dummy variables. Thus, the results are not simply reflecting regional differences in regulatory policies. Furthermore, we conducted the analysis using the individual components of Good Government instead of the conglomerate index. This modification also did not alter the results. Lastly, we confirmed our empirical results using indexes of bureaucratic efficiency, government red tape, and the degree to which governments repudiate contracts.

2.3 Regulatory Restrictions, Ownership, and Banking Crises

This section evaluates the relationship between banking crises and (a) regulatory restrictions on the activities of commercial banks, (b) regulatory restrictions on the mixing of banking and commerce, and (c) state

ownership of banks. Allowing banks to engage in a wide range of activities may increase bank fragility by expanding the set of external risks affecting banks and by allowing banks themselves to choose among a broader assortment of risky ventures. On the other hand, allowing banks more freedom may lower bank fragility through greater diversification of the sources of profits for banks. This paper assesses which of these two opposing forces tends to dominate. In terms of state ownership of banks, we believe the links will be more opaque. State-owned banks that encounter difficulties may receive subsidies through various channels, so that the banks are never identified as being in a crisis. Nonetheless, we conduct the analysis with the information available. After describing our definition of whether a country experienced a banking crisis or not, we present probit regressions incorporating the regulatory/ownership variables and a wide array of factors to control for other potential influences on bank fragility. We find that regulatory restrictiveness is positively linked with financial fragility. We then present evidence suggesting that this result is *not* due to reverse causation.

2.3.1 Definition of a Crisis

To investigate the relationship between the regulatory/ownership environment and financial fragility, we use two measures of whether a county's banking system suffered a crisis during the last fifteen years.

Systemic is based upon Caprio and Klingebiel's (1999) determination of whether a country experienced a systemic banking crisis. The variable takes the value 1 if there was a systemic crisis, and 0 otherwise. The authors define a systemic crisis as meaning that all or most of the banking system's capital was eroded during the period of the crisis. The assessments are made for countries from the late 1970s into early 1999.

Major equals Systemic except for two adjustments. First, the Caprio and Klingebiel (1999) indicator of systemic banking crises is expanded to include countries that experienced major, though perhaps not systemic, banking crises over the 1985–97 period. This results in the addition of Canada (fifteen members of Canadian Deposit Insurance Company failed), Denmark (cumulative losses of 9 percent of loans), Hong Kong (nine out of eighteen banks failed over the period), India (nonperforming loans estimated as 16 percent of total loans), Italy (fifty-eight banks accounting for 11 percent of total loans were forcibly merged), and the United States (estimated savings and loans clean-up costs of 3.2 percent of GDP). Second, we exclude two countries (Israel and Spain) from the Caprio/Klingebiel list of systemic banking crises because their crises occurred in the late 1970s and therefore are outside our sample period. We report the results using Major but reach similar conclusions using Systemic. The values of Major and Systemic are listed in table 2A.3.

2.3.2 Empirical Results

The empirical results indicate that countries that restrict commercial banks from engaging in securities activities and countries that restrict commercial banks from owning nonfinancial firms have a higher probability of suffering a major banking crisis. Table 2.11 summarizes these findings. Besides simple correlations, we present probit regressions that control for other characteristics of the national environment. Specifically, we control for the level of economic development (Development) and the quality of the government (Good Government) in the probit regressions. As shown, countries with greater regulatory restrictions on commercial bank securities activities and the ability of banks to own and control nonfinancial firms have a higher probability of experiencing major banking sector distress.

The positive and significant relationship between financial fragility and regulatory restrictions on the securities activities of banks and restrictions on commercial bank ownership of nonfinancial firms is robust to a number of alterations in the econometric specification. First, we obtain the same results using a logit estimation procedure. Second, we obtain similar results when controlling for the degree of private property rights protection, the degree to which regulations restrict the opening and operation of businesses, a measure of bureaucratic efficiency, the rate of economic growth, inflation, the existence of a deposit insurance scheme, and the size of the financial intermediary sector (*Private credit*). Thus, we control for the standard variables used in the large and growing empirical literature that tries to explain banking crises. The coefficients on Securities and Banks Owning Nonfinancial Firms remain significantly positive in the crisis regressions (when also including Development and Good Government). Third, as noted earlier, we obtain similar results when using Systemic instead of Major as the indicator of whether a country experienced a banking crisis or not. Fourth, we obtain similar results when using the alternative measures of Securities and Bank Ownership of Nonfinancial Firms as just discussed. Specifically, we also use the regulatory measures based on (a) values from 1 through 3, (b) values of 0 or 1, and (c) values of individual dummy variables for each of the values 1 through 4. These alternative specifications do not alter the findings. Fifth, these conclusions are robust to the inclusion of regional dummy variables; the results are not driven by regional factors. Sixth, because the degree of securities market development may influence financial fragility, we also included measures of the degree of securities market development. Specifically, we used measures of (a) equity market liquidity, (b) the issuance of equity (in the primary market) as a share of GDP, and (c) the issuance of long-term bonds (in the primary market) as a share of GDP. This modification did not alter

Table 2.11 **Relationship Between Bank Crises and Bank Regulations and Policies**

	Good Government	Restrict	Securities	Insurance	Real Estate	Banks Owning Nonfinancial Firms	State-Owned Bank Assets	Nonfinancial Firms Owning Banks	Financial Structure
				A. Correlations					
Bank Crisis	−0.301	0.393	0.377	−0.006	0.298	0.418	0.217	0.188	−0.157
	(0.019)	(0.002)	(0.003)	(0.964)	(0.020)	(0.001)	(0.102)	(0.161)	(0.267)
				B. Simple Probit Regressions					
Bank Crisis	−0.056	0.689	0.584	−0.154	0.300	0.527	0.873	0.237	−0.265
	(0.372)	(0.020)	(0.015)	(0.436)	(0.123)	(0.010)	(0.296)	(0.233)	(0.643)
No. of countries	61	61	61	61	61	60	58	57	52
Probability (LR stat)	0.052	0.009	0.006	0.089	0.039	0.005	0.105	0.124	0.014

Notes: Simple probit regressions include a constant, the logarithm of real per capita GDP, and the variable Good Government, which combines measures of expropriation risk, the law and order tradition of the country, and the level of corruption. The Good Government regression includes Development only. Probability (LR statistic) is the *p*-value for the test that the coefficients on the (nonconstant) regressors equal zero. Numbers in parentheses are *p*-values.

the results, and these securities market indicators enter the crisis regressions insignificantly. Similarly, we also tried controlling for the net interest income of banks (*Net interest margin*), the degree of banking sector concentration (*Bank concentration*), and a measure of the degree to which the financial system is primarily bank-based or market-based (*Structure*).[9] These additional variables did not enter the crises regressions significantly. Moreover, including these measures did not alter this section's major conclusion: There is a positive, significant, and robust relationship between bank fragility and regulatory restrictions on securities market activities and bank ownership of nonfinancial firms.[10]

2.3.3 Endogeneity

Endogeneity is an issue that merits further consideration. Countries that experience banking crises might have responded to them by adopting regulatory restrictions on the activities of banks. If this situation actually happened, it would be inappropriate to interpret the results in table 2.11 as suggesting that regulatory restrictions increase the probability that a crisis will occur. To control for potential simultaneity bias, we have used a two-step instrumental variable estimator. Using instrumental variables did not alter the main results: Countries in which banking systems face greater regulatory restrictions on securities activities and on owning nonfinancial firms have a higher probability of suffering a major crisis (see Barth, Caprio, and Levine 1999). However, because the instrumental variables are not very good predictors of regulatory restrictions, we decided to examine the issue of endogeneity using a more laborious—albeit less statistically rigorous—procedure.

Table 2.12 presents the results of this effort. As the table indicates, for those countries in our sample experiencing a crisis, information is provided regarding the dates of the banking crises, the scope of the problems, and the estimated costs of resolution. In addition, information is provided about whether or not there was any change in regulations with respect to securities, insurance, and real estate activities as well as to the mixing of banking and commerce during or shortly after a banking crisis occurred. For some countries and for some time periods, the required regulatory information has not yet been obtained. For the majority of our countries, however, such information was available from publications of the Institute of International Bankers, materials from the OCC and the World Bank Survey.

Banking crises generally did not induce governments to enact more

9. For a detailed discussion and analysis of bank-based versus market-based financial systems, see Allen and Gale (2000) and Levine (2000).

10. The source of the additional variables used in this analysis is Beck, Demirgüç-Kunt, and Levine (2001).

Table 2.12 Banking Crises: Dates, Costs and Bank Regulatory Responses

				Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
Argentina	1980–82[a]	More than 70 institutions were liquidated or subject to central bank intervention accounting for 16 percent of assets of commercial banks and 35 percent of total assets of finance companies.	55.3 percent of GDP.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1989–90[a]	Nonperforming assets constituted 27 percent of the aggregate portfolio and 37 percent of the portfolios of state-owned banks. Failed banks held 40 percent of financial system assets.		Yes, since 1991, allowed to act as underwriter in issuing private debt.	No	No	No	No		
	1995[a]	Suspension of eight banks and collapse of three banks. Overall through the end of 1997, 63 out of 205 banking institutions were either closed or merged.	Direct and indirect cost to public estimated at 1.6 percent of GDP.	No	No	No	No	No		

Bolivia	1986–87[a]	Five banks were liquidated. Total NPLs of banking system reached 29.8 percent in 1987; in mid-1988 reported arrears stood at 92 percent of commercial banks' net worth.		n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1994[a]	Two banks with 11 percent of banking system assets were closed in November 1994. In 1995, four out of 15 domestic banks, which accounted for 30 percent of banking system assets experienced liquidity problems and suffered from high levels of NPLs.		No	No	No	No	No		
Brazil	1990[a]	(deposit to bond conversion)		No	No	No	No	No	1	1
	1994–ongoing[a]	By end 1997, the Central Bank had intervened in, or put under the Temporary Special Administration Regime (RAET) system, 43 financial institutions. Also by end 1997 nonperforming loans of the entire banking	In 1996, negative net worth of selected state and federal funds banks estimated at 5–10 percent of GDP. Costs of individual bank recapitalization, by end 1997:	No	No	No	No	No		

(*continued*)

Table 2.12 (continued)

	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
				Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
		system had reached 15 percent.	Banco Economico, USD 2.9 billion; Bameridus, USD 3 billion; Banco do Brazil, USD 8 billion.							
Canada	1983–85[b]	Fifteen members of the Canadian Deposit Insurance Corporation, including two banks, failed.		No, but changed from prohibited to permitted in 1987.	No, but changed from prohibited to permitted in 1992.	No	No	No	0	1
Chile	1981–83[a]	Authorities intervened in four banks and four nonbank financial institutions (with 33 percent of outstanding loans) in 1981. In 1983, seven banks and one financiera accounting for 45 percent of total assets. By the end of 1983, 19 percent of loans were nonperforming.	1982–85: government spent 41.2 percent of GDP.	No, but changed from restricted to permitted in 1997/98.	No, but starting in 1997 banks were allowed to intermediate (sell) insurance through subsidiaries.	No, but starting in 1993 banks were allowed to invest in real estate through subsidiaries that specialized in (housing and office space) leasing.	No	No, but changed from unrestricted to permitted in 1993.		

Colombia	1982–87[a]	Central Bank intervened in six banks accounting for 25 percent of banking system assets.	Costs of restructuring estimated to be around 5 percent of GDP.	No	No, but changed from permitted to prohibited in 1998.	No	No, but changed from permitted to prohibited in 1994.	No	1	1
Denmark	1987–92[b]	Cumulative loan losses over the period 1990–92 were 9 percent of loans; 40 of the 60 problem banks were merged.		No	No	No	No	No	0	1
Ecuador	early 1980s[a]	Implementation of exchange program (domestic for foreign debt) to bail out banking system		n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1996–ongoing[a]	Authorities intervened in several smaller financial institutions in late 1995 to early 1996 and in the fifth largest commercial bank in 1996. Seven financial institutions, which accounted for 25–30 percent of commercial banking assets, were closed in 1998/99. In March 1999, authorities declared a one week bank holiday.		n.a.	n.a.	n.a.	n.a.	n.a.		
Egypt, Arab Rep.	early 1980s[a]	Government closed several large investment companies. Four	Nine state-owned commercial banks recorded	n.a.	n.a.	n.a.	n.a.	n.a.	1	1

(*continued*)

Table 2.12 (continued)

	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
				Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
		public sector banks were given capital assistance.	NPL ratios of 37 percent on average in 1989.							
	1991–95[b]	Four public sector banks were given capital assistance.		n.a.	n.a.	n.a.	n.a.	n.a.		
El Salvador	1989[a]	Nine state-owned commercial banks recorded NPL ratios of 37 percent on average in 1989.		n.a.	n.a.	n.a.	n.a.	n.a.	1	1
Finland	1991–94[a]	Savings banking sector badly affected; Government took control of three banks that together accounted for 31 percent of total system deposits.	Recap. costs amounted to 11 percent of GDP.	No	No	No	No	No	1	1
Ghana	1982–89[a]	Seven audited banks (out of 11) insolvent; rural banking sector affected.	Restructuring costs estimated at 6 percent of GNP.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1997–ongoing[b]	NPL levels increased sharply during 1997 from 15.5 percent of loans outstanding to 26.5 percent. Two state-owned commercial banks	One large investment bank fails. Nonperforming assets of the 27 public sector banks estimated	No	No	No	No	No		

		accounting for 33.9 percent of market share in bad shape. Three banks, accounting for 3.6 percent of market share in terms of deposits failed. Seven banks or Deposit Taking Institutions were either liquidated or taken over.	at 19.5 percent of total loans and advances as of end of March 1995. Nonperforming assets to total assets reached 10.8 percent in 1993–94. At end 1998, NPLs estimated at 16 percent of total.							
Hong Kong	1982–83[b]	Nine Deposit Taking Companies failed.		n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1983–86[b]	Seven banks or Deposit Taking Institutions were either liquidated or taken over.		n.a.	n.a.	n.a.	n.a.	n.a.		
	1998[b]	One large investment bank fails.		No	No	No	No	No		
India	1993–ongoing[b]	Nonperforming assets of the 27 public sector banks estimated at 19.5 percent of total loans and advances as of end of March 1995. Nonperforming assets to total assets reached 10.8 percent in 1993–94. At end 1998, NPLs estimated at 16 percent of total loans.		No	No	No	No	No	0	1

(*continued*)

Table 2.12 (continued)

	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
				Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
Indonesia	1994[b]	Classified assets equal to over 14 percent of banking system assets with over 70 percent in the state banks.	Recapitalization cost for five state banks expected to amount to 1.8 percent of GDP.	Yes, a regulation prohibiting banks from underwriting securities was issued in Aug. 1995. The decree however allowed banks to act as arranger, issuer, dealer, investor or buying agent.	No	No	No	No	1	1
	1997–ongoing[a]	As of March 1999, Bank of Indonesia had closed down 61 banks and nationalized 54 banks, of a total of 240. NPLs estimates for the total banking system range from 65–75 percent of total loans.	Fiscal costs estimated to range from 50–55 percent of GDP.	No	No	No	No	No		
Italy	1990–95[b]	During 1990–94, 58 banks (accounting		No	No	No	No, but changed from	No	0	1

		for 11 percent of total lending) were merged with other institutions.					prohibited to restricted in 1995.			
Japan	1990s[a]	Banks suffering from sharp decline in stock market and real estate prices; official estimate of NPLs: 40 trillion yen (US$ 469 billion) in 1995 (10 percent of GDP); unofficial estimates put NPLs at 1 trillion or 25 percent of GDP; for some of bad loans, banks have already made provisions. At the end of 1998, total banking system NPLs estimated at yen 87.5 trillion (US$ 725 billion), about 17.9 percent of GDP. In March 1999, Hakkaido Takushodu bank closed, Long Term Credit Bank nationalised; Yatsuda Trust merged with Fuji Bank, and Mitsui Trust merged with Chuo Trust.	In 1996, rescue costs estimated at over USD 100 bn. In 1998, government of Japan announced the Obuchi Plan which provides 60 trillion yen (US$ 500 billion), about 12.3 percent of GDP, in public funds for loan losses, recapitalization of banks and depositor protection.	No	No	No	No	No	1	1
Republic of Korea (*continued*)	1997–ongoing[a]	By March 1999, two out of 26 commercial	Fiscal costs of crisis estimated	No	No, but changed from	No	No	No	1	1

Table 2.12 (continued)

	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
				Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
		banks accounting for 11.8 percent of total banking system assets nationalized; 5 banks, accounting for 7.8 percent of total banking system assets closed. Seven banks accounting for 38 percent of banking system assets, placed under special supervision. Overall, banking system NPL expected to peak at 30–40 percent.	to reach 34 percent in 1999.		prohibited to permitted in 1995.					
Madagascar	1988[a]	25 percent of banking sector loans deemed irrecoverable.		No	No	No	n.a.	n.a.	1	1
Malaysia	1985–88[b]	Insolvent institutions account for 3.4 percent of financial system deposits; marginally capitalized and perhaps insolvent institutions account for another 4.4	Reported losses equivalent to 4.7 percent of GNP.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1

		percent of financial systems deposits.								
	1997–ongoing[a]	Finance company sector is being restructured and number of finance companies is to be reduced from 39 to 16 through mergers. Two finance companies were taken over by Central Bank including MBf Finance, the largest independent finance company. Two banks, deemed insolvent, acounting for 14.2 percent of financial system assets, to be merged with other banks. Overall, at end 1998, NPLs estimated between 25–35 percent of total banking system assets.	Net loss estimated at USD 14.9 bn, or 20.5 percent of GDP by 1999.	No, but changed from restricted to permitted in 1991.	No, but changed from restricted to permitted in 1991.	No	No, but changed from restricted to permitted in 1991.	No		
Mexico	1981/82 (perhaps until reprivatized 1990/91)[a]	Government took over troubled banking system.		n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1995–ongoing[a]	Out of 34 commercial banks as of 1994, nine banks	Distressed banks accounted for	No	No	No	No	No		

(*continued*)

Table 2.12 (continued)

	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
				Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
		were intervened in and 11 more banks participated in the loan/purchase recapitalization program. These nine intervened banks accounted for 18.9 percent of total financial system assets and were deemed insolvent; 1993: insolvent banks account for 20 percent of total assets and 22 percent of banking system deposits; 1995: almost half of the banks reported to be in financial distress.	3.9 percent of banking system assets.							
Nigeria	1990s[a]	1993: insolvent banks account for 20 percent of total assets and 22 percent of banking system deposits; 1995: almost half of the banks reported to be in financial distress.		No	No	No	No	No	1	1

	1997[b]	Distressed banks accounted for 3.9 percent of banking system assets.		No	No	No	No	No		
Norway	1987–93[a]	Central Bank provided special loans to six banks, suffering from post-oil recession of 1985–86 and from problem real estate loans; state took control of three largest banks (equivalent to 85 percent of banking system assets, whose loan losses had wiped out capital), partly through a Government Bank Investment Fund (Nkr 5 billion) and the state-backed Bank Insurance Fund had to increase capital to Nkr 11 billion.	Recapitalization costs amounted to 8 percent of GDP.	No	No	No	No	No	1	1
Peru	1983–90[a]	Two large banks failed. The rest of the system suffered from high levels of nonperforming loans and financial disintermediation following the nationalization of the banking system in 1987.		No	No	No	No	No	1	1

(*continued*)

Table 2.12 (continued)

	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
				Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
The Philippines	1981–87[a]	Two public banks accounting for 50 percent of banking system assets, six private banks accounting for 12 percent of banking system assets, 32 thrifts accounting for 53.2 percent of thrift banking assets and 128 rural banks.	At its peak, central bank assistance to financial institutions amounted to 19.1 bn pesos (3 percent of GDP).	n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1998–ongoing[a]	Since January 1998, one commercial bank, seven out of 88 thrifts and 40 out of 750 rural banks have been placed under receivership. Banking system NPLs reached 10.8 percent by August of 1998 and 12.4 percent by November 1998. Expected to reach 20 percent in 1999.	Net loss estimated at USD 4.0 bn, or 6.7 percent of GDP by 1999.	No	No	No	No	No		
Sri Lanka	1989–93[a]	State-owned banks comprising 70 percent of banking	Restructuring cost amounted to 25 bn rupees	n.a.	n.a.	n.a.	n.a.	n.a.	1	1

		system estimated to have nonperforming loan ratio of about 35 percent.	(5 percent of GDP).							
Sweden	1991[a]	Nordbanken and Gota Bank insolvent, accounting for 21.6 percent of total banking sytem assets. Sparbanken Foresta intervened, accounting for 24 percent of total banking system assets. Overall, five of six largest banks, accounting for over 70 percent of banking system assets experienced difficulties.	Cost of recapitalization amounted to 4 percent of GDP.	No	No	No	Yes, changed from prohibited to restricted in August 1991.	No	1	1
Tanzania	Late 1980s; 1990s[a]	1987: the main financial institutions had arrears amounting to half of their portfolio; 1995: The National Bank of Commerce which accounted for 95 percent of banking system assets, insolvent since 1990–92, possibly longer.	1987: implied losses amount to nearly 10 percent of GNP.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1
Thailand	1983–87[a]	Authorities intervened in 50 finance and security firms and 5 commercial banks or	Government cost for 50 finance companies estimated at 0.5	n.a.	n.a.	n.a.	n.a.	n.a.	1	1

(*continued*)

Table 2.12 (continued)

				Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
		about 25 percent of total financial system assets; 3 commercial banks judged insolvent (14.1 percent of commercial banking assets).	percent of GNP; government cost for subsidized loans amounted to about 0.2 percent of GDP annually.							
	1997–ongoing[a]	Up to March 1999, Bank of Thailand intervened in 70 finance companies (out of 91) which together accounted for 12.8 percent of financial system assets of 72 percent of finance company assets. It also intervened in six banks that together had a market share of 12.3 percent. At end 1998, banking sytsem NPLs had	Net losses estimated at USD 59.7 bn, or 42.3 percent of GDP in 1999.	No	No	No	No	No		

		reached 46 percent of total loans.								
Turkey	1994[b]	Three banks failed in April 1994.	Up to June 1994, authorities spent 1.1 percent of GDP.	No	No	No	No	Yes, changed from unrestricted to permitted. As of 1993, banks may only acquire shares, including bonus shares, of a nonfinancial firm up to a maximum of 15 percent of their own fund, and the total sum of investment in these companies may not exceed 60 percent of the banks' total funds.	1	1
United States	1984–91[b]	More than 1,400 savings & loans and 1,300 banks failed.	Cost of savings & loan clean up amounted to an	No	No	No	No	No	0	1

(*continued*)

Table 2.12 (continued)

	Year of Crisis	Scope of Problem	Estimate of Total Losses/Costs	Change in Regulations for Allowable Activities: Yes or No					Coding of Banking Crises	
				Securities	Insurance	Real Estate	Bank Ownership of Nonfinancial Firms	Nonfinancial Firm Ownership of Banks	Systemic	Major
			estimated USD 180 billion equivalent to 3.2 percent of GDP.							
Uruguay	1981–84[a]	Affected institutions accounted for 30 percent of financial system assets; insolvent banks accounted for 20 percent of financial system deposits.	Costs of recapitalizing banks estimated at USD 350 million (7 percent of GNP); Central Bank's quasi-fiscal losses associated with subsidized credit operations and purchase of loan portfolios amounted to 24.2 percent of GDP during 1982–85.	n.a.	n.a.	n.a.	n.a.	n.a.	1	1

Venezuela	Late 1970s[b] and 1980s	Notable bank failures: Banco Nacionale de Descuento (1978); BANDAGRO (1981); Banco de los Trabajadores de Venezuela (1982); Banco de Comercio (1985); BHCU (1985); BHCO (1985); Banco Lara (1986).	n.a.	n.a.	n.a.	n.a.	n.a.	1	1
	1994–ongoing[a]	Insolvent banks accounted for 30 percent of financial system deposits. Authorities intervened in 13 out of 47 banks which held 50 percent of deposits in 1994, and in five additional banks in 1995.	No	No	No	No	No		
Zimbabwe	1995–ongoing[a]	Two out of five commercial banks recorded high NPL ratio.	No	No	No	No	No	1	1

Sources: Authors, based on Caprio and Klingebiel (1999); *Global Survey,* Institute of International Bankers, various years; and the Office of the Comptroller of the Currency.

Note: n.a. = not available.

[a]Systemic banking crises.

[b]Nonsystemic banking crises.

restrictive regulations. Indeed, the overall indication is that there was not much change in these regulations: Of the 250 possible entries in the table, 141 showed no subsequent change at all (neither during nor immediately after the crisis), 14 showed a change in the direction of fewer restrictions (only 2 of which could be linked to a crisis), and only 3 showed greater restrictions after the crisis; in 92 cases we have no data. Thus, even in the relatively few cases in which there was a change during or after a crisis, it was in the direction of broader powers for banks, meaning that we were using fewer restrictions than actually existed. This biases the results against the conclusion that greater restrictions increase the likelihood of a crisis.

Governments generally do respond to banking crises, but the response has typically been in the direction of limiting the bank safety net or raising its cost, as in the cases of the early crises from the 1980s in Argentina and Chile, rather than attempting to restrict banks' powers. Interestingly, both countries in fact have moved in the other direction, providing added powers to banks, which is consistent with the general trend toward broader powers. More generally, any concern about the endogeneity in the crisis regressions would appear to be unwarranted.[11] Reestimating the probit regressions in table 2.11 with the data from table 2.12, moreover, does not produce any significant changes.

Thus, although the analysis does not fully resolve the endogeneity issue, the results clearly suggest that greater regulatory restrictions on the ability of commercial banks to engage in securities activities and the ability of commercial banks to own and control nonfinancial firms tend to increase the probability that a country will experience a major banking crisis.[12]

2.4 Summary and Conclusions

The purposes of this paper have been twofold. The first is to present comprehensive and detailed information on the regulatory environment and ownership structure of commercial banks in a large number of countries around the world. There is substantial variation among the more than sixty countries in our sample about what banks are allowed to do with

11. The inability to make limits on powers stick may be one reason for this trend. Bandiera and colleagues (1999) characterized financial reforms as a vector of variables pertaining to changes over long periods of time in interest rate regulation, reserve requirements, directed credit, bank ownership (moves toward privatization), liberalization of securities markets, prudential regulation, and international financial liberalization. They did not include changes in banks' powers insofar as there were so few changes. Note also that in the particular case of the United States, banks were allowed to underwrite corporate debt in 1989 and corporate equity in 1990 through subsidiaries, but subject to a revenue restriction. In 1999 there were more than forty banking organizations that had established such subsidiaries.

12. In this respect, Kwan and Laderman (1999, 24), in a review of literature pertaining to the United States, state that "On the effects of securities activities on banking organizations' safety and soundness, the bulk of empirical evidence indicated some potential for risk reduction in expanding banks' securities powers."

respect to securities, insurance, and real estate activities. A bank in one country, in other words, is not necessarily the same as a bank in another country. As a result of all the banking crises in different countries in recent years, there have been numerous calls for banking reforms. Yet, they typically fail to address the issue of exactly which regulatory environment is most appropriate for simultaneously promoting bank performance and stability. The information presented here helps one address this issue by initially recognizing the substantial cross-country variation that exists in bank regulation. This variation occurs, moreover, in countries that differ in terms of geographical location and level of economic development, among other ways. At the same time, it is found that state ownership of banks varies from a high of 80 percent to a low of 0 percent in our sample of countries.

The second purpose is to assess whether or not it matters what a bank is permitted to do with respect to securities, insurance, and real estate activities. As summarized in table 2.13, whether restrictions are placed on securities activities matters most. The tighter the restrictions placed on this activity, on average, the more inefficient banks are and the greater the likelihood of a banking crisis is. The likelihood of a banking crisis is also greater, on average, the tighter are the restrictions placed on bank ownership of nonfinancial firms. Perhaps surprisingly, not one of these restrictions produces any beneficial effects with respect to financial development, nonbank sector and stock market development, or industrial competition. Nor is it found that any of them lessen the likelihood of a banking crisis or enhance bank efficiency. At the same time, the greater the share of bank assets controlled by state-owned banks, on average, the less financial development as well as the development of the nonbank sector and the stock market will be.

It is important to emphasize that this paper is the product of an ongoing research project. Thus, as more information is collected and analyzed, the findings and conclusions reported here may be modified. This means that the paper actually represents a progress report on a timely and important public policy issue. Much more work remains. We are in the process of collecting and analyzing information on supervision. Optimal regulatory restrictions may depend importantly on the type of supervisory regime. Indeed, the choice of regulatory restrictions may be importantly influenced by the efficiency of supervision. We plan to explore these relationships in future research. The bottom line, however, is that this paper presents new cross-country data and analyses of what a bank is and whether or not it matters. For now it does indeed matter what a bank is permitted to do. The imposition of tight restrictions on some activities of banks appears not to be beneficial and, worse yet, downright harmful in some important ways.

Table 2.13 Summary of Empirical Results

	Bank Inefficiency	Financial Development	Concentration & Bank per capita	Industrial Competition	Nonbank & Stock Market	Bank Crisis
Securities restrictions	SPR					SPR
Insurance restrictions						
Real estate restrictions	SPR	SNC			SNC	SPC
Bank owning nonfinancial firms restrictions	SPC		SNC			SPR
Nonfinancial firms owning banks restrictions						
State-owned bank assets	SPC	SNC			SNR	

Notes: SPC indicates a significant positive correlation; SPR indicates significant positive relationship, controlling for GDP per capita and government quality; SNC indicates a significant negative correlation; SNR indicates a significant negative relationship, controlling for GDP per capita and government quality.

Appendix A

Bank Regulations and the Socioeconomic Environment

This appendix presents correlations between the commercial bank regulatory indicators and the degree of state ownership of banks and a variety of political, cultural, legal, and economic characteristics. These socioeconomic factors may influence bank regulations and state ownership of banks. For instance, it has been found that income diversity and ethnic diversity influence many policy decisions (see Engerman and Sokoloff 1997 and Easterly and Levine 1997). Consequently, we examine the associations between ethnic and income diversity and the commercial bank regulatory decisions of governments. Furthermore, La Porta and colleagues (1998) emphasize that common law countries tend to provide greater protection to outside investors in firms (creditors and minority shareholders). This may influence public demand for regulation. Thus, we examine the relationship between the legal environment and both regulatory regime and state ownership of banks. Also, regulatory policies reflect the outcome of political decisions. Thus, it is worth examining whether countries with good public institutions tend to select particular financial sector policies. Lastly, we include the level of economic development. Not only is it worth examining whether relatively successful countries tend to have particular regulatory/ownership patterns, but economic development may also be highly correlated with a variety of institutional and other national traits that are both associated with financial sector policies and for which we do not have direct measures. The goal here is to present some summary statistics regarding the relationship between the bank regulatory environment and the socioeconomic environment more generally. More specifically, the six indicators that we study are as follows:

1. *Development:* Real per capita GDP in 1980 (source: Penn World Tables).
2. *Good Government:* Average value of three variables: (a) risk of expropriation by the government, (b) the degree of corruption, and (c) the law-and-order tradition of the country. Each variable is based on a scale from 0 to 10, where higher values signify better government (La Porta, Lopez-de-Silanes, and Shleifer 1999).
3. *Income diversity:* Average of Gini coefficients for each country over the period 1980–95 (Deininger and Squire 1996).
4. *Ethnic diversity:* Average value of five indexes of ethnolinguistic fractionalization, with higher values denoting greater diversity. The scale extends from 0 to 1 (Easterly and Levine 1997).
5. *Common law country:* Dummy variable with a value of 1 if the coun-

try has an English, common law heritage, and 0 otherwise (La Porta, Lopez-de-Silanes, and Shleifer 1999).

6. *Legal rights of investors:* An index of the legal rights of creditors and minority shareholders (computed from La Porta, Lopez-de-Silanes, and Shleifer 1998).[13]

Table 2A.1 presents simple correlations (and *p*-values for the correlations) between the regulatory/ownership indicators and the six indicators of the national environment. A few findings worth mentioning are as follows. First, legal heritage and the legal rights of investors are not strongly associated with commercial banking regulations or state ownership of banks. Second, although ethnic diversity is not highly correlated with the regulatory/ownership environment, income diversity is strongly linked. Countries with greater income diversity tend to have more restrictions on their commercial banks with respect to (a) engaging in securities market activities and (b) owning nonfinancial firms. Third, governments in richer countries (and good governments—those with low corruption, a strong law-and-order tradition, and low risk of expropriation) tend to (a) impose fewer regulatory restrictions on their banks and (b) own a small percentage of the banking industry. The level of economic development and the quality of the government are very highly correlated (0.82).

13. We calculate this from La Porta and colleagues (1998). Specifically, for shareholder rights, we add 1 if (1) the country allows the shareholders to mail their proxy to the firm; (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10 percent (the sample median); or (6) shareholders have preemptive rights that can only be waived by a shareholder's vote. Then, we add 1 for creditor rights if (7) the country imposes restrictions, such as creditors' consent, to file for reorganization; (8) secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); (9) secured creditors are ranked first in the distribution of the proceeds that result from the disposition of assets of a bankrupt firm; and (10) the debtor does not retain the administration of its property pending the resolution of the reorganization. Thus, the legal rights of investors index can potentially assume values between 0 and 10.

Table 2A.1 **Correlations for Bank Regulations and Environment in which Banks Operate**

	Restrict	Securities	Insurance	Real Estate	Banks Owning Nonfinancial Firms	Nonfinancial Firms Owning Banks	State-Owned Bank Assets
Development	−0.440	−0.110	−0.378	−0.450	−0.342	−0.050	−0.346
	(0.000)	(0.379)	(0.002)	(0.000)	(0.005)	(0.700)	(0.005)
Good Government	−0.374	−0.224	−0.176	−0.374	−0.380	−0.161	−0.286
	(0.003)	(0.083)	(0.174)	(0.004)	(0.003)	(0.230)	(0.030)
Income diversity	0.347	0.396	0.106	0.158	0.371	0.195	0.080
	(0.010)	(0.003)	(0.447)	(0.255)	(0.006)	(0.171)	(0.571)
Ethnic diversity	0.092	−0.006	0.067	0.134	0.048	0.139	0.042
	(0.464)	(0.959)	(0.592)	(0.285)	(0.707)	(0.283)	(0.744)
Common law country	−0.060	−0.086	0.093	−0.042	−0.078	0.233	−0.042
	(0.634)	(0.493)	(0.458)	(0.735)	(0.535)	(0.068)	(0.744)
Legal rights of investors	−0.069	−0.061	0.092	−0.035	−0.193	0.141	−0.027
	(0.653)	(0.690)	(0.547)	(0.818)	(0.208)	(0.380)	(0.866)

Note: Numbers in parentheses are *p*-values.

Table 2A.2 **Data on Financial Development and the Political/Economic Environment**

	Development	Good Government	Net Interest Margin	Private Credit	Bank Concentration	Industrial Competition	Total Value Traded	Nonbank Credits
Argentina	6,506	12.7	0.082	0.15	0.57	3.05	0.017	0.01
Australia	12,520	20.4	0.019	0.81	0.67	3.04	0.144	0.34
Austria	10,509	20.8	0.019	0.87	0.72	4.03	0.040	0.04
Barbados	6,379	0.0	0.033	0.40	1.00		0.003	0.08
Belgium	11,109	20.9	0.023	0.37	0.62	3.93	0.034	
Bolivia	1,989	8.0	0.035	0.20	0.46		0.000	0.02
Botswana	1,940	16.5	0.052	0.11	0.95		0.005	
Brazil	4,303	15.2	0.120	0.25	0.68	3.31	0.064	0.09
Canada	14,133	21.7	0.018	0.77	0.58	3.90	0.153	0.28
Chile	3,892	14.9	0.045	0.50	0.49	3.62	0.038	0.06
Colombia	2,946	11.2	0.064	0.27	0.46	2.17	0.007	0.13
Cyprus	5,295	15.7	0.067	0.77	0.88		0.015	0.21
Denmark	11,342	21.7	0.049	0.42	0.75	4.76	0.064	
Ecuador	3,238	13.7	0.072	0.19	0.41		0.017	0.04
Egypt, Arab Rep.	1,645	11.1	0.012	0.28	0.65	4.19	0.004	0.04
El Salvador	2,014	8.3	0.039	0.24	0.86			0.00
Fiji	3,609	0.0		0.30				0.02
Finland	10,851	21.7	0.016	0.67	0.86	2.77	0.044	
France	11,756	20.5	0.035	0.91	0.41	3.72	0.084	0.09
The Gambia	1,017	15.0		0.16				
Germany	11,920	20.8	0.025	0.92	0.44	4.53	0.187	0.07
Ghana	976	10.3	0.071	0.03	0.94		0.004	
Greece	5,901	15.2	0.035	0.40	0.77	3.18	0.016	0.18
Guatemala	2,574	8.2	0.054	0.15	0.43		0.000	0.01
Guyana	1,927	7.9	0.044	0.30	1.00			0.08
Hong Kong	8,719	18.3	0.020	1.36	0.80	3.88	0.506	
Iceland	11,566	21.6		0.39		2.00	0.005	
India	882	13.0	0.030	0.27	0.42	2.87	0.048	0.03
Indonesia	1,281	10.8	0.041	0.26	0.43	3.29	0.018	

Ireland	6,823	19.5	0.016	0.63	0.79	4.07	0.144	0.36
Jordan	3,384	12.0	0.022	0.62	0.90	2.63	0.091	0.07
Republic of Korea	3,093	14.7	0.023	0.81	0.33	2.45	0.266	0.35
Lesotho	994	0.0		0.16	1.00			0.02
Luxembourg	11,893	22.0	0.007	0.24	0.38	3.00	0.016	
Madagascar	984	11.7	0.060	0.16	0.96			
Malaysia	3,799	16.5	0.025	0.80	0.54	3.88	0.427	0.21
Malta	4,483	14.0	0.023	0.60	0.97			0.11
Mexico	6,054	13.4	0.053	0.18	0.59	2.76	0.063	0.03
Netherlands	11,284	22.0	0.015	1.28	0.73	4.77	0.191	0.54
New Zealand	10,362	21.7	0.025	0.54	0.77	3.40	0.080	0.13
Nigeria	1,438	8.8	0.047	0.15	0.83		0.000	0.02
Norway	12,141	21.9	0.031	0.89	0.85	3.47	0.061	0.40
Pakistan	1,110	9.2	0.029	0.23	0.78		0.019	
Peru	2,875	9.9	0.072	0.10	0.72	2.94	0.014	0.03
The Philippines	1,879	8.6	0.042	0.29	0.47	2.67	0.053	0.07
Portugal	4,982	18.5	0.035	0.63	0.45	4.27	0.021	
Rwanda	757	0.0	0.044	0.08	1.00			0.01
Seychelles	2,906	0.0		0.10				
Singapore	7,053	19.4	0.021	0.95	0.73	4.16	0.446	0.16
South Africa	3,496	14.9	0.039	0.79	0.78	2.28	0.076	0.28
Spain	7,390	18.6	0.038	0.72	0.46	4.06	0.062	0.06
Sri Lanka	1,635	10.2	0.051	0.19	0.83		0.013	
Suriname	3,737	8.6		0.37				
Sweden	12,456	21.4	0.027	1.09	0.89	2.86	0.137	0.64
Switzerland	14,301	22.0	0.016	1.78	0.74	4.00	0.975	0.34
Tanzania	480	13.2						
Thailand	2,178	14.3	0.030	0.68	0.54	2.62	0.203	0.17
Turkey	2,874	13.2	0.094	0.14	0.45	3.14	0.062	0.01
United Kingdom	10,167	20.3	0.020	0.74	0.58	4.46	0.355	
United States	15,295	21.2	0.039	1.31	0.18	4.22	0.344	0.66
Uruguay	5,091	12.6	0.056	0.31	0.86		0.001	
Venezuela	7,401	13.5	0.078	0.39	0.52	2.28	0.014	0.18
Zimbabwe	1,206	11.1	0.044	0.22	0.82	2.40	0.010	0.09

Table 2A.3 **Banking Crises Around the Globe**

	Systemic	Major		Systemic	Major
Argentina	1	1	Jordan	0	0
Australia	0	0	Republic of Korea	1	1
Austria	0	0	Lesotho	0	0
Barbados	0	0	Luxembourg	0	0
Belgium	0	0	Madagascar	1	1
Bolivia	1	1	Malaysia	1	1
Botswana	0	0	Malta	0	0
Brazil	1	1	Mexico	1	1
Canada	0	1	Netherlands	0	0
Chile	1	1	New Zealand	0	0
Colombia	1	1	Nigeria	1	1
Cyprus	0	0	Norway	1	1
Denmark	0	1	Pakistan	0	0
Ecuador	1	1	Peru	1	1
Egypt, Arab Rep.	1	1	The Philippines	1	1
El Salvador	1	1	Portugal	0	0
Fiji	0	0	Rwanda	0	0
Finland	1	1	Seychelles	0	0
France	0	0	Singapore	0	0
The Gambia	0	0	South Africa	0	0
Germany	0	0	Spain	0	0
Ghana	1	1	Sri Lanka	1	1
Greece	0	0	Suriname	0	0
Guatemala	0	0	Sweden	1	1
Guyana	0	0	Switzerland	0	0
Hong Kong	0	1	Tanzania	1	1
Iceland	0	0	Thailand	1	1
India	0	1	Turkey	1	1
Indonesia	1	1	United Kingdom	0	0
Ireland	0	0	United States	0	1
Israel	0	0	Uruguay	1	1
Italy	0	1	Venezuela	1	1
Japan	1	1	Zimbabwe	1	1

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Comment Mark Gertler

Overview

There are two parts to the paper: The first develops a data set that provides cross-country measures of the stringency of legal restrictions on the mix of banking and commerce and on bank ownership structure. The second part explores the extent to which these measures help explain (a) vari-

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ous measures of financial development and real development and (b) financial crises. The most striking finding is that more restrictive ownership structures tend to raise the likelihood of a financial crisis.

Overall, I find the paper a very useful addition to the literature. The development of the data set is a particularly important contribution. The empirical results are thought provoking. I do think, however, that there are some serious identification problems that make the findings hard to interpret. But I also believe that there may be ways to address this issue, as I discuss here.

The data are of three types:

1. Qualitative indicators of restrictions on the mix of banking and commerce and on bank ownership structure. Specifically, each indicator is a grade of 1 to 4 for a variety of regulatory categories.
2. Quantitative measures of the degree of financial sophistication and real development.
3. An indicator (unity or zero) of whether or not a country experienced a banking crisis, based on the Caprio and Klingebiel (1999) rating.

The overall empirical strategy of the paper is to consider the explanatory power of variables in category 1 for variables in categories 2 and 3. The first part of the paper considers regressions of variables in 2 on variables in 1; the second considers regressions of variables in 3 on variables in 1. Following I discuss each part in turn. Because the results on financial crises are the most striking and controversial, I spend most of the time on the second part and only briefly touch on the first.

Part I: Does Regulatory Structure Affect Financial or Real Development, or Both?

The authors' answer is generally no. There appears to be little correlation between measures of regulatory tightness and financial development. In some ways this result is disappointing because it offers no clear guidance for regulatory reform—"try it; it can't hurt" is not exactly a compelling argument for regulatory reform.

However, the lack of statistical significance could in part reflect the nature of the data in conjunction with the way the econometric model is specified. As just discussed, the independent variables that measure legal restrictions are qualitative indicators. It is accordingly difficult to measure intensity (e.g., is going from category 2 to 3 the same in percent terms as going from 3 to 4?). On the other hand, the authors impose a linear relation in the estimation between the quantitative dependent variables and the qualitative independent variables. To the extent that the restriction of linearity is not correct (as is likely to be the case in general), low statistical significance could result.

Another factor is that with the current data, the authors are unable to

control for the adequacy of supervision and regulation. Having legal restrictions on the books is of little meaning if these restrictions cannot be enforced. In this regard, it would obviously be desirable to extend the data set to include a measure of the quality of regulatory enforcement.

One positive finding is that a more restrictive regulatory structure implies a higher net interest margin. This result is consistent with the argument that relaxing ownership restrictions could produce efficiency gains. Rather than reflect true efficiency gains, however, a high net interest margin could simply reflect legal deposit rate ceilings, which force down the cost of liabilities. It could be the case that countries that heavily regulate ownership structure are also more likely to restrict deposit rates. If the latter scenario is true, then the evidence does not necessarily support relaxing ownership structure. I believe, however, that there is sufficient data on deposit rate restrictions to get to the bottom of the issue.

Part II: Does Regulatory Structure Affect the Likelihood of Financial Crisis?

The authors' answer is yes, very much so. Probit regressions yield statistically and quantitatively significant effects of regulatory structure on the likelihood of a crisis for post-1980 data. The authors make a convincing case, furthermore, that the results are not due to reverse causation. That is, by and large regulations were not imposed in the wake of a crisis.

The authors' preferred explanation for the link between ownership restrictions and financial crises is that limits on the diversification of activities raised risk exposure. Although I do not necessarily disagree, note that this argument runs directly counter to the argument used to justify imposing the restrictions in the first place. The original justification for the now-defunct Glass-Steagall Act was that it would reduce risk taking by banks. Obviously, there are some theoretical issues to sort out here.

Overall, the results are impressive, but they raise a huge puzzle. In particular, variables are found to predict financial crises that bear no obvious relation to the factors emphasized in conventional descriptions of recent financial turmoil. Indeed, the entire discussion and formal analysis is orthogonal to the standard literature. The conventional theories indeed make almost no mention of ownership structure. They instead (e.g. Borio, Kennedy, and Prowse 1994) stress the following factors:

1. Financial liberalization, which leads to increased competition.
2. Increased risk taking by financial institutions due to the first factor along with failure by the regulatory authority to adjust the safety net to account for the change in competition and also along with weak supervision and enforcement of existing regulations.
3. Macro shocks; for example, asset price contractions (real estate, exchange rate, stock market, etc.) and associated recessions that have an

unduly harmful effect due to the increased risk taking by financial institutions.

Hutchinson and McDill (1999) provide formal support for the conventional theory, using a very similar methodology and, indeed, the exact same dependent variable (the Caprio and Klingebiel [1999] measure of financial crisis). In particular, they find that three factors contribute significantly to the likelihood of a crisis: (a) financial liberation; (b) explicit deposit insurance protection; and (c) macroeconomic distress, as measured by either real GDP growth or the change in real stock prices. This kind of empirical relation is exactly what the convention story suggests.

How do we reconcile the authors' findings with those of Hutchinson and McDill? The authors implicitly assume that the regulatory variables they include in their regressions are orthogonal to everything else that might affect the likelihood of a financial crisis, including the Hutchinson and McDill variables. (The orthogonality assumption is required to justify the coefficients on the regulatory variables as capturing the true effect of these variables on the likelihood of a crisis.)

There is, however, a clear geographic pattern to financial crises. In figure 2C.1, the darkly shaded countries experienced a financial crisis; the lightly shaded ones did not; and the countries not shaded do not appear in the sample. The crises are concentrated in four regions: Latin America, North America, East Asia, and Scandinavia. Europe, for the most part, and Oceania (Australia and New Zealand) escaped formal banking crises.

Furthermore, in regions dominated by crises, it is unlikely that the countries that escaped financial turmoil did so because they had fewer restrictions on ownership. Table 2C.1 lists the countries by region, along with the authors' measure of the stringency of ownership restrictions. It is clear, for example, that the countries in Latin America, East Asia, and Scandinavia that did not have crises also did not have restrictions significantly weaker than the norm for the region.

It is true, though, that the regions that largely escaped crises (Europe and Oceania) did have less restrictive systems. In other words, there is a correlation between geography and the nature of the financial system, which reconciles the authors' findings with the clear regional pattern in figure 2C.1. On the other hand, there is an identification problem because geography might be correlated with other relevant factors. For example, Europe and Oceania may simply have suffered less severe aggregate shocks than the other regions.

Evidence from Higgens and Osler (1997), however, suggests that the simple asymmetric shock hypothesis may not be correct. In particular, Europe and Australia did experience asset price contractions similar in magnitude. Thus, there is some reason to believe that the banking systems in these countries were more resilient than those in the regions experiencing

Fig. 2C.1 The regional pattern of financial crises

Table 2C.1 Regional Crises and Ownership Restrictions

South America	Central America	North America	Scandinavia	Europe
Argentina	Ecuador	Canada	Denmark (1.75)	Italy (2.25)
Bolivia	El Salvador	United States	Finland (1.75)	Turkey
Brazil	Mexico		Norway (2.00)	Belgium[a] (2.50)
Chile	Barbados[a] (3.50)		Sweden	Cyprus[a] (2.75)
Colombia	Guatemala (3.75)		Iceland[a] (2.75)	France[a] (2.00)
Peru (2.00)				Germany[a] (1.25)
Uruguay				Greece[a] (2.25)
Venezuela				Ireland[a] (1.25)
Guyana[a] (1.75)				Luxembourg[a] (1.50)
Suriname[a] (1.50)				Malta[a] (2.50)
				Netherlands[a] (1.50)
				Portugal[a] (2.00)
				Switzerland[a] (1.50)
				United Kingdom[a] (1.25)

Africa	Middle East	Asia	East Asia	Australia
Egypt	Israel[a] (1.00)	India	Hong Kong (2.00)	Australia[a] (2.00)
Ghana (2.25)	Jordan[a] (2.75)	Sri Lanka	Indonesia	New Zealand[a] (1.25)
Madagascar		Pakistan[a] (2.50)	Japan	Fiji[a] (2.75)
Tanzania (1.75)			Republic of Korea (2.25)	
Zimbabwe			Malaysia (2.25)	
The Gambia[a] (3.00)			The Philippines (2.00)	
Rwanda[a] (3.25)			Thailand (2.25)	
Seychelles[a] (2.00)			Singapore[a] (2.25)	
South Africa[a] (1.50)				

Note: Numbers in parentheses correspond to Restrict variable in table 2.1.

[a]No financial crisis.

crises. On the other hand, this alone does not prove the authors' theory, which stresses that alternative lines of business helped smooth banks' cash flow. For example, it might have been the case that banks in these regions were simply less exposed to real estate risk. Fortunately, the data exist to sort out these competing hypotheses.

In addition to sorting out these competing stories, it would be worthwhile to integrate the formal panel data analysis with other studies on financial crises (e.g., Hutchinson and McDill 1999). For example, it might be worthwhile to interact the authors' regulatory variables with other factors that appear to cause crises (e.g., liberalization and macroshocks). At a minimum, there should be regional dummies, as figure 2C.1 makes clear.

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Discussion Summary

Charles Calomiris began the general discussion by raising an empirical question about business-bank linkages. He noted that the regulatory environment is not fully captured by laws that prevent ownership of banks by firms and vice versa. He argued that in some of the crisis countries, insider lending is high because of concentration in the industrial sector that has a claim on bank lending resources. He wondered if another variable might not be appropriate—an interaction between industrial concentration and insider lending. He concluded by noting that ownership variables used in the paper do not fully capture the regulatory environment.

Raghuram Rajan began by asking about the role of changes in regulation and ownership to complement the cross-sectional evidence presented in the regressions. He asked whether the authors had examples of changes in regulation and ownership where the regulation is getting tighter. *Mark Flannery* asked about the role of foreign banks. He noted that in Singapore, for example, significant banking assets are held in foreign bank

branches instead of domestic institutions. He suggested that the authors look at restraints on real estate holdings as well. He also wondered about the endogeneity of the regulatory structure.

Andrew Powell raised the issue of entrance by foreign banks. He wondered if the entrance of foreign banks could be correlated with the restrictions. *Martin Feldstein* also questioned the role of foreign banks—in particular the scope and size of their activities.

Eric Rosengren raised the question of whether one regulatory structure should fit all. He noted that restrictions might be optimal in a volatile economic environment, and that in such an environment banks might not be able to act effectively as intermediaries. He observed that in a stable environment, a different and less-restrictive environment might be better. He noted that the regulatory environment might, in fact, be endogenous to the macroeconomic environment.

Following up on comments made by the discussant *Mark Gertler,* Stephen Cecchetti emphasized the role of deposit insurance. He noted that the authors could try to exploit any information that is available on both the amount and changes of deposit insurance coverage.

Gerard Caprio began by responding to Rosengren and agreeing that one size does not fit all. He noted that if the world is changing or international agencies are pushing in that direction, this could be a mistake. In response to Rajan, Caprio observed that most countries have moved in the other direction, going from restrictive rules to looser rules. Fewer data are available for those countries, however.

James Barth also replied, noting that evidence on foreign ownership needs to distinguish wholesale from retail operations. Foreign ownership may also be correlated with government ownership. He also noted that, in part, the wealth variable captures family involvement. He also noted that along the same lines it would be helpful to look at government-directed lending.

Finally, *Ross Levine* noted that additional research on deposit insurance is currently underway (in particular, at a large World Bank research project). He observed that the inclusion of the deposit insurance variable available does not seem to affect the paper's findings. He also observed that, as expected, there is an increase in the probability of a crisis with more and explicit deposit insurance. Finally, he noted that data for foreign bank ownership and the regulation of foreign participation have also been included and that these variables do not seem to affect the ownership or securities results presented.