Bank Regulation and Supervision: What Works Best?

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First Draft: December 2000

This Draft: April 24, 2001

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Abstract

This paper draws on our new database on bank regulation and supervision in 107 countries to assess different governmental approaches to bank regulation and supervision and to evaluate the efficacy of specific regulatory and supervisory policies. First, we assess two broad and competing theories of government regulation: the *helping-hand* approach, according to which governments regulate to correct market failures, and the *grabbing-hand* approach, according to which governments regulate to support political constituencies. The grabbing-hand theory predicts that countries with powerful official supervisors, limits on bank activities, high levels of government ownership of banks, and restrictions on entry will tend to have higher levels of corruption *without* a corresponding improvement in bank performance or stability. This view therefore predicts that governments focusing more on empowering private-sector control of bank behavior are more likely to promote bank performance and stability than governments taking a more intrusive approach to regulation and supervision.

Second, this paper uses the extensive cross-country database to assess the implications for banking-sector development and fragility of: regulations on bank activities and the mixing of banking and commerce; regulations on domestic and foreign bank entry; regulations on capital adequacy; deposit insurance system design features; supervisory power, independence, resources, loan classification stringency, provisioning standards, diversification guidelines, and prompt corrective action powers; regulations on information disclosure and fostering private-sector monitoring of banks; and government ownership of banks.

The findings, generally more consistent with the grabbing-hand view, suggest that regulatory and supervisory practices that (1) force accurate information disclosure, (2) empower private-sector corporate control of banks, and (3) foster incentives for private agents to exert corporate control work best to promote bank performance and stability. The results raise a cautionary flag to strategies that place excessive reliance on direct, government oversight of and restrictions on banks.

I. Introduction

Poorly functioning banking systems impede economic progress, exacerbate poverty, and destabilize economies. Specifically, a substantial literature documents that well-functioning banks accelerate economic growth,[1] while Dollar and Kraay (2000) show that growth alleviates poverty. Furthermore, there have been an unprecedented number of disruptive banking crises in recent decades [see, for example, World Bank (2000) and Boyd, Kwak, and Smith (2000)].

The staggering scope of these crises, coupled with evidence on the beneficial effects of banking systems on economic growth, have generated calls for reforms in bank regulation and supervision. The Basel Committee on Bank Supervision, International Monetary Fund, and World Bank all now promote an extensive list of "best practices" for the regulation and supervision of banks. There is a strong sense that if only policymakers in countries around the world would implement particular regulatory and supervisory practices, then bank "safety and soundness" would improve, thereby promoting growth and stability everywhere.

There is no evidence that the best practices currently being advocated by international agencies are best, or even better than alternative standards, however. There is no evidence that successful practices in the United States, for example, will succeed in countries with different institutional and political environments. There is no evidence, moreover, that each regulatory and supervisory practice can be considered as part of an extensive checklist of desirable best practices in which more checks are better than less as opposed to considering regulation and supervision as reflecting broad views about the role of government in society.

We draw upon our new database [Barth, Caprio, and Levine (2001b)] on bank regulation and supervision in 107 countries to examine these issues. Specially, we: (1) assess different governmental approaches to bank regulation and supervision, and (2) evaluate the efficacy of specific regulatory and supervisory policies. First, we assess two broad and competing theories of government regulation. Pigou's (1938) classic treatment of regulation holds that monopoly power, externalities, and informational asymmetries create a constructive role for the strong

[1] See King and Levine (1993a,b), Levine and Zervos (1998), Demirguc-Kunt and Maksimovic (1998), Rajan and Zingales (1998), Levine, Loayza, and Beck (2000), Wurgler (2000), and the literature review by Levine (1997).

helping hand of government to help offset market failures and thus enhance social welfare. Applied to the banking sector, this view of government considers rigorous official supervision of banks, strict official capital standards, limits on bank activities, restrictions on bank entry, and a deposit insurance scheme as appropriate policies to alleviate market failures so as to improve resource allocation.

Everyone does not share this helping hand view of regulation, however. Shleifer and Vishny (1998), for instance, argue that governments frequently do not implement regulations to ameliorate market failures. Instead, governments implement regulations in a *grabbing-hand* manner that supports political constituencies [Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2001)]. Accordingly, the grabbing-hand theory predicts that countries with powerful official supervisors, stringent capital regulations, limits on bank activities, and restrictions on entry will tend to have higher levels of corruption *without* any corresponding improvement in bank performance or stability. This view therefore predicts that governments focusing more on empowering private-sector control of banks are more likely to reduce corruption and promote bank development than governments taking a more hands-on approach to regulation.

Helping-hand proponents, in contrast, express concerns that governments focusing on empowering the private sector will not act aggressively enough in taking direct actions to ease market failures. The helping-hand view takes as given both that there are market failures and that the government can ameliorate these failures. The grabbing-hand alternative is based on the assumption that government failure is at least as important as market failures. We empirically evaluate these different perspectives on bank regulation and supervision.

Second, this is the first paper to use extensive cross-country data to examine a wide array of very specific regulatory/supervisory debates. In particular, we assess the implications for banking-sector development, performance and fragility of:

- Regulations on bank activities and the mixing of banking and commerce
- Regulations on domestic and foreign bank entry
- Regulations on capital adequacy
- Deposit insurance system design features

- Supervisory power, independence, resources, loan classification stringency, provisioning standards, diversification guidelines, among others
- Regulations on information disclosure and fostering private-sector monitoring of banks
- Government ownership of banks

Economic theory provides conflicting views as to what should be done with respect to each of these specific policy issues. We review the theoretical debate on each of these issues below, and frame these debates in terms of the helping-hand versus grabbing-hand theories. For instance, according to the helping-hand view, prohibitive informational barriers may curtail private-sector monitoring of complex, financial conglomerates and thereby enable banks to take socially undesirable levels of risk. Furthermore, such conglomerates may exert monopoly power and impede competition in many financial products. Thus, it may be socially desirable for governments to develop powerful supervisory agencies to monitor banks and even to limit bank dominance of the financial sector by restricting their ability to engage in securities, insurance, and real estate activities. The grabbing-hand view, however, sees great risks in creating restrictive regulations and powerful supervisors even in the presence of market failures. According to this view, powerful regulators will be more concerned about advancing their own interests than overcoming market failures. After discussing each debate, our paper provides the first cross-country assessment of what works best while comprehensively controlling for the full range of regulatory and supervisory features influencing bank performance and fragility.

Methodologically, this paper examines an extensive array of regulatory and supervisory information for a broad cross-section of countries at all levels of development and in all parts of the world. The list of issues we examine is so extensive that some may question the expansive approach taken here, preferring a more focused examination of each issue. Indeed, a more narrow study may be more consistent with specific theoretical models that treat one - or a part of one - of the issues considered here.

There are two crucial advantages to pursuing a broad, methodological approach, however. First, the salient issues in bank regulation and supervision are so interrelated that one must examine an extensive array of factors simultaneously to identify that combination of regulatory and supervisory characteristics that produce successful banking systems. It is perilous, for example, to examine the impact of official supervisory practices without information on the

effectiveness of private-sector monitoring, and vice versa. It is inappropriate, as another example, to examine the relationship between restrictions on bank securities activities and bank fragility without considering the effectiveness of official supervision, and vice versa. And it is misguided, as a final example, to examine the importance of a wide array of regulatory and supervisory policies without accounting for the degree of government ownership of banks. Second, we pursue a comprehensive approach to examining bank regulation and supervision because it allows us to assess the general and competing views of regulation - the helping-hand versus grabbing-hand approaches - using a wide array of quite different bank regulatory and supervisory policies.

The paper is organized as follows. Section II discusses the theoretical and policy debates regarding each of the issues noted above. There is no simple one-to-one mapping each and every theoretical debate and the helping-hand/grabbing-hand breakdown. All bank regulatory and supervisory issues do not fall neatly and unambiguously into these two categories. Nonetheless, this somewhat 'black and white' view of regulation and supervision helps frame a very complex and inter-related set of theoretical and policy issues. Section III discusses the data. Section IV presents regression results and Section V contains conclusions.

II. The Debates and Current Evidence

This section discusses seven policy issues. For each issue, we: (1) stress the theoretical and policy disagreements, (2) frame much of the disagreement in terms of the helping-hand/grabbing-hand debate, and (3) emphasize that the specific issues are so inter-related that it is difficult to analyze separate regulatory/supervisory policies in isolation from one another. This discussion also motivates the use of various interaction terms in our empirical analyses.

II.A. Regulations on bank activities and banking-commerce links

There are five main theoretical reasons for restricting the degree to which banks can engage in securities, insurance, and real estate activities, or own nonfinancial firms. Indeed, it is these types of regulations that help define what observers mean by the term "bank." First, conflicts of interest may arise when banks engage in such diverse activities as securities underwriting, insurance underwriting, and real estate investment. Banks, for example, may

attempt to "dump" securities on or shift risk to ill-informed investors so as to assist firms with outstanding loans [Edwards (1979), John, John, and Saunders (1994) and Saunders (1985)]. Second, to the extent that moral hazard encourages riskier behavior by banks, they will have more opportunities to increase risk if allowed to engage in a broader range of activities [Boyd, Chang, and Smith (1998)]. Third, broad financial activities and the mixing of banking and commerce may lead to the formation of extremely large and complex entities that are extraordinarily difficult to monitor. Indeed, the former head of the International Monetary Fund, Michel Camdessus (1997) remarked that we are witnessing "... 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 bank supervisors - to monitor." Fourth, ever larger institutions may become so politically and economically powerful that they become "too big to discipline," as noted by Ed Kane. Finally, large financial conglomerates may reduce competition and hence efficiency in the financial sector. According to these arguments, a helping-hand from the government can ease market failures and thereby enhance bank performance and stability by restricting activities.

There are alternative theoretical reasons for permitting banks to engage in a broad range of activities, however. First, fewer regulatory restrictions on the activities of banks permit the exploitation of economies of scale and scope in gathering and processing information about firms, managing different types of risks for customers, advertising and distributing financial services, enforcing contracts, and building reputational capital with clients [Barth, Brumbaugh, and Wilcox (2000) and Claessens and Klingebiel (2000)]. Second, fewer regulatory restrictions may increase the franchise value of banks and thereby augment incentives for banks to behave prudently. Third, broader activities may diversify income streams and thereby create more stable banks. Finally, the grabbing-hand view holds that governments do not restrict bank activities to ease market failures. Instead, according to this view, regulatory restrictions promote government power, create a bigger role for corruption through the granting of exceptions to the rules, and thereby hinder bank performance and stability.[2]

[2] To be sure, well-motivated authorities who believe that greater restrictiveness will either enhance bank development or reduce the likelihood of banking crises could promote such restrictions with the best of intentions. However, as will be shown below, the data do not support such beliefs.

While existing empirical studies provide mixed results regarding these theoretical debates, most of the literature suggests there are positive benefits from permitting broad-banking powers. For instance, expanded banking powers are associated with a lower cost of capital and less stringent cash-flow constraints [Berger and Udell (1996), DeLong (1991) and Ramirez (1995, 1999)]. Vennet (1999), moreover, finds that unrestricted banks have higher levels of operational efficiency than banks with more restricted powers. In terms of diversification, Eisenbeis and Wall (1984) and Kwan and Laderman (1999) argue that since profits from providing different financial services are not very highly correlated, there are diversification benefits from allowing broader powers. Furthermore, broad or universal banks did not systematically abuse their powers in the pre-Glass-Steagall days of the United States [Ang and Richardson (1994), Kroszner and Rajan (1994), Puri (1996), and Ramirez (1995)] or fail more frequently [White (1986)].

In an earlier study, we found that greater regulatory restrictions are associated with: (1) a higher probability of a country suffering a major banking crisis, and (2) lower banking-sector efficiency [Barth, Caprio, and Levine (2001a)]. We found no countervailing positive effects from restricting banking-sector activities. Regulatory restrictions, for example, were not closely associated with less concentration and more competition in either the banking or industrial sector, and also were not closely linked with securities-market development.[3]

This paper improves on past research in four significant ways. First, regarding banking powers, we now have data for substantially (50%) more countries than earlier. Second, and more importantly, we assess whether the positive link that was found between regulatory restrictions and banking crises simply reflects the effects of important omitted variables: namely, the (other parts of the) regulatory and the supervisory system. Countries with more effective supervisory systems may impose fewer regulatory restrictions. If this were found to be the case, the positive relationship between regulatory restrictions and crises we initially found might simply reflect the fact that countries with weaker supervisory systems compensate by imposing more restrictions on bank activities. Third, we similarly assess whether our initial finding of a positive link between regulatory restrictions and crises reflects another omitted variable: namely, the deposit

[3]Thus well-motivated, helping-hand regulators who read this study could espouse an easing of restrictions!

insurance regime. Countries with 'good' deposit insurance systems - those that do not severely distort incentives toward greater risk-taking behavior by banks—may impose fewer regulatory restrictions on the activities of banks. If so, the positive relationship between regulatory restrictions and crises may simply mean that countries imposing more regulatory restrictions do so to compensate for inappropriate deposit-insurance scheme features. Fourth, we assess the helping-hand/grabbing-hand views: we test whether regulatory restrictions on bank activities are associated with more government corruption and worse bank performance and stability.

II.B. Regulations on domestic and foreign bank entry

Economic theory provides conflicting views on the need for and the effect of regulations on entry into the banking sector. The helping-hand view suggests the government can play a positive role in screening entry. Since banks play such an important role in an economy, widespread failures would reverberate throughout an economy with devastating effects. By effectively screening bank entry, governments can promote bank stability. Also, some researchers stress the naturally monopolistic role of banks. Petersen and Rajan (1995), in particular, demonstrate that banks with monopolistic power have stronger incentives to incur the necessary costs associated with overcoming informational barriers, which then facilitates the flow of credit to more worthy enterprises. Furthermore, banks with monopolistic power may possess considerable franchise value, which enhances prudent risk-taking behavior [Keeley (1990)].[4] Thus, there may be a helping-hand role for the government in limiting destabilizing competition. In addition, regulators may need to limit entry in accordance with the ability of official agencies to supervise banks. Specifically, since it is costly to monitor banks and since there are externalities associated with monitoring banks, many private agents will free-ride, resulting in a socially sub-optimal level of monitoring. Consequently, official supervisors play a crucial and necessary role in overseeing banks, according to the helping-hand view.

The grabbing-hand view provides a quite different perspective on regulating entry. While there may exist valid economic reasons for regulating entry, this view stresses the negative impact of such limits on corruption and economic efficiency. According to the grabbing-hand

[4] In contrast, Pagano (1993) shows that departures from perfect competition in credit markets create inefficiencies that raise the cost of capital for firms and retard growth. Also, competition may stimulate both static

view, politicians and regulators use entry restrictions to reward friendly constituents, extract campaign support, and collect bribes [Shleifer and Vishny (1993) and Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2001)]. Furthermore, an open, competitive banking sector may be less likely to produce powerful institutions that unduly influence policymakers in ways that adversely affect bank performance and stability.

Numerous empirical studies exist on banking-market structure, but they overwhelmingly examine only the United States. Many of these studies find that competition matters for static and dynamic efficiency improvements [see the reviews by Berger and Humphrey (1997) and Claessens and Klingebiel (2000)]. Jayaratne and Strahan (1998) provide evidence that when individual states within the United States created a more competitive (and diversified) banking sector by liberalizing their branching restrictions, the rate of economic growth within those states accelerated. Further, emphasizing the beneficial effects of competition, Shaffer (1993) finds evidence from an analysis of cross-sectional data for the United States that household income grows faster in markets where the banking sector is less concentrated. In contrast, Petersen and Rajan (1995) find that firms are less credit constrained and younger firms have access to cheaper credit in the more concentrated banking markets of the United States (It must be noted, however, that the United States has a remarkably large number of banks.) In a cross-country study, Demirguc-Kunt, Levine, and Min (1999) find that foreign entry-and in particular the threat of foreign entry-improves bank performance. In a cross-country, cross-industry study, Cetorelli and Gambera (2000) show that greater banking-sector concentration exerts a depressing effect on overall economic growth, though it promotes the growth of industries that depend heavily on external finance.

Besides helping to distinguish between the helping-hand and grabbing-hand views of government regulation, this paper importantly contributes to the literature on bank competition in three ways. First, we assess whether countries with greater restrictions on the entry of foreign and domestic banks have less efficient and more fragile banking systems. This fills a lacuna because existing studies do not use direct measures of entry policies.[5] Second, while not

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and dynamic efficiency improvements in the banking sector [see the review by Claessens and Klingebiel (2000)].

[5] In examining competition, it is important to distinguish between the degree of concentration and the degree of competition. Indeed, one may simultaneously observe increasing concentration and increasing competition [see,

emphasized in the formal theoretical literature, the impact of competition may depend on the degree of regulatory restrictions on bank activities and the mixing of banking and commerce, the quantity and quality of bank supervision, the features of any deposit insurance scheme, capital adequacy requirements, the degree of equity market development, and the extent to which government-owned banks play a dominant role in the banking sector. Given the richness of our dataset, we can now explore whether the relationships between competition and banking-sector development, efficiency, and stability depend on these specific factors. Third, the dataset covers a much broader and diverse group of countries than any previous analysis of the relationship between competition and bank performance and fragility.

II.C. Regulations on capital adequacy

Traditional approaches to bank regulation emphasize the positive features of capital adequacy requirements [Dewatripont and Tirole (1994)]. Capital, or net worth, serves as a buffer against losses and hence failure. Furthermore, with limited liability, the proclivity for bank owners to shift toward higher risk activities decreases with the amount of capital at risk relative to assets [Lamoreaux (1994)]. With deposit insurance (implicit or explicit), official capital adequacy regulations play a crucial role in aligning the incentives of bank owners with depositors and other creditors [Benston (1992), Berger, Herring and Szego (1995), Kaufman (1991), Stevens (2000), Furlong and Keeley (1989) and Keeley and Furlong (1990)].

Researchers, however, disagree over whether the imposition of capital requirements actually reduces risk-taking incentives. Moreover, it is extraordinarily difficult - if not impossible - for regulators and supervisors to set capital standards that mimic those that would be demanded by well-informed, undistorted private-market participants. For instance, Kahane (1977), Koehn and Santomero (1980), Lam and Chen (1985), Kim and Santomero (1988), Flannery (1989), Genotte and Pyle (1991), Rochet (1992), Besanko and Katanas (1996), and Blum (1999) somewhat perversely contend that actual capital requirements may increase risk-taking behavior. In a more guarded assessment, Thakor (1996) demonstrates the conditions under which risk-

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for example, Shaffer (1993) and Berger, Demsetz, and Strahan (1999)]. Yet, entry policies may matter more than actual entry in creating a competitive environment [Boot and Thakor (1997, 2000)]. While this is frequently acknowledged, the absence of data on bank-entry policies means that many studies simply use measures of bank concentration as a proxy for the competitive environment.

based capital requirements increase credit rationing, with negative implications for economic growth. Also, Thakor and Wilson (1995, p.708) argue that higher capital requirements may induce borrowers to shift to capital markets and in the process impair capital allocation, while Gorton and Winton (1999) show that raising capital requirements can increase the cost of capital. Thus, the theoretical - and the associated policy - issue of whether capital requirements curtail or promote bank performance and stability remains unresolved.

This paper fills the empirical void on the effect of capital requirements by examining the relationship between capital requirements and bank performance and fragility in a cross-section of 107 countries [for a discussion of studies of the United States, see Berger, Herring and Szego (1995)]. At a time when the existing formal capital requirements are widely viewed as being arbitrary and inadequate [see, for example, Greenspan (1998) and Caprio and Honohan (1999)], it seems especially timely and important to examine whether they even matter. Moreover, as emphasized above, we do not consider the impact of capital regulations on bank performance and fragility in isolation. The degree to which capital requirements affect bank performance and fragility, for example, is likely to depend upon the specific features of any deposit insurance scheme [see, for example, Chen and Mazumdar (1994) and Mullins and Pyle (1994)]. The dataset exploited here permits us to assess the impact of capital regulations while simultaneously controlling for other important features of the policy environment.

Before concluding this subsection, we note that capital regulatory policies do not fit easily into the helping-hand/grabbing-hand taxonomy. Capital regulations may be designed to align incentives, and also reflect the ‘government knows best’ orientation of the helping-hand view. On the other hand, onerous capital regulations may reflect excessive government involvement, according to the grabbing-hand view, unless the capital regulations are part of a regulatory package that empowers private-sector oversight of banks.

II.D. Deposit insurance design

Countries often adopt deposit insurance schemes to provide protection for unsophisticated and small depositors, who face coordination and free-rider problems.[6] If too many depositors attempt to withdraw their funds at once, an illiquid but solvent bank can fail. Moreover, monitoring banks is expensive and there is an externality associated with monitoring to curtail risk-taking behavior. Therefore, depositors will have a tendency to free ride, so that there is a socially suboptimal level of monitoring. To ameliorate these problems, a helping-hand proponent would favor deposit insurance to protect payment and credit systems from contagious bank runs *plus* tight official oversight to augment private-sector monitoring of banks.

Potential gains from a deposit insurance scheme come at a cost, however. Even in the 1930s, there were concerns that deposit insurance would encourage excessive risk-taking behavior [Barth (1991)]. Indeed, this argument helped defeat the 150 legislative attempts to institute formal deposit guarantees prior to the establishment of one in 1933 in the United States. The moral-hazard problem, which is aggravated by deposit insurance, continues to be a concern today. Thus, even those subscribing to the helping-hand view may argue that the adverse-incentive costs of deposit insurance outweigh the benefits. Yet, many believe that official regulation and supervision can control the moral-hazard problem, including an appropriately designed insurance system that encompasses coverage limits, scope of coverage (or the extent of uninsured liabilities), coinsurance, funding, premia structure (flat fee or risk-based), who manages the funds and how they are motivated, and membership requirements.[7]

Recent research takes some important steps in measuring the effects of the design of deposit insurance schemes [Demirguc-Kunt and Detragiache (2000), Demirguc-Kunt and Huizinga (2000) and Kane (2000)].[8] Without the benefit of data on the overall regulatory

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[6] After the adoption of a national deposit insurance system in the United States in 1934, in other countries explicit systems grew slowly for the first 30 years, with only 6 being established. But then adoptions accelerated: 22 formal systems existed by the 50th anniversary of the U.S. system, 68 systems were in place by the close of 1999, and many other countries are planning on adopting an explicit deposit insurance scheme.

[7] Just as Dewatripont and Tirole (1994) show in the case of risk-based capital requirements, with risk-based deposit insurance premia it is possible theoretically that a higher premia will induce greater risk-taking behavior. Once the capital requirement or premia is fixed, bankers can respond by taking greater risk in an attempt to earn their 'required' return. This anomaly depends on limited-liability, as rational bankers would only take this bet if they can shift losses from greater risk taking to a third party.

[8] Briefly, they find that certain design features, such as high coverage limits and scope, having a funded

framework, however, these analyses could not control for specific regulatory and supervisory features. This paper contributes to this pressing and ongoing debate by examining whether and how the impact of various deposit insurance features depend on the regulatory framework and supervisory capacity.

II.E. Supervision

The helping-hand view of government suggests an important, powerful role for official regulators and supervisors. The line of reasoning essentially is as follows. First, banks are costly and difficult to monitor. Private agents may not have the ability or incentive to supervise banks and will attempt to free-ride. Thus, there will be too little monitoring of banks, which implies sub-optimal performance and stability. Official supervisors can ameliorate this market failure. Second, because of informational asymmetries, some argue that banks are prone to contagious and socially, costly bank runs. According to the helping-hand view, government supervision in such a situation can serve a socially efficient role. Third, since many countries choose to adopt a deposit insurance scheme, this situation: (1) creates incentives for excessive risk-taking behavior by banks, and (2) reduces the incentives for depositors to monitor banks. Thus, strong, official supervision will help prevent banks from engaging in excessive risk-taking behavior and thus improve bank performance and stability.

The grabbing-hand view highlights the potential negative implications of powerful government regulators and supervisors. As noted above, governments with powerful supervisory agencies may use this power to benefit favored constituents, attract campaign donations, and extract bribes. Powerful regulators/supervisors, according to this view, will be less focused on overcoming market failures and more concerned with currying political support and implementing their own narrow objectives. Thus, the grabbing-hand view predicts that powerful supervision and regulation will be positively related to corruption and will not improve either bank performance or stability.

In practice, policymakers and international institutions debate and make recommendations on a wide variety of bank regulatory and supervisory practices. In the area of

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scheme, and exclusively public-sector participation and management all contribute to a greater likelihood of a crisis

supervisory resources and powers, countries assign very different priorities to bank supervision. We have collected data on the number of supervisors, average tenure of supervisors, legal power of the supervisory agency, and independence of the supervisory agency. We assess whether the impact of official supervisory resources, powers, and independence depends on: (a) the extent of private-sector monitoring, (b) regulatory restrictions on bank activities, and (c) the degree of moral hazard created by deposit insurance schemes.

In terms of loan classification and provisioning standards, countries have very different policies concerning the amount of time before a loan is classified in arrears, rules concerning the percentage applied to problem loans for which provisioning must be made, and the extent to which provisioning passes through the income statement. This paper assesses the links between classification and provisioning policies and bank development, performance, and stability.

Countries also have different rules concerning diversification requirements and restrictions on international lending that may hinder meaningful diversification. Simple portfolio diversification theory suggests that greater diversification is an effective way to reduce risk and thus fragility. It is also a simple device to inhibit banks from assuming excessively concentrated risks. Diversification guidelines and the ability to make loans abroad may be particularly important in small economies. This research will provide the first comprehensive and detailed cross-country empirical evidence on the importance or implications of making alternative choices among many different combinations of regulatory and supervisory practices.

II.F. Regulations on easing private sector monitoring of banks

Rather than directly regulating capital levels or asset allocation, many supervisory agencies focus on encouraging private monitoring of banks. For instance, supervisory agencies may require banks to obtain certified audits and/or ratings from international-rating agencies. Some countries make bank directors legally liable if information is erroneous or misleading. Some supervisory agencies compel banks to produce accurate, comprehensive and consolidated information on the full range of bank activities and risk-management procedures. Furthermore, some countries credibly impose a “no deposit insurance” policy to stimulate private monitoring

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and, in weak institutional environments, less bank development.

of banks.

Many economists over the years have advocated greater reliance on the private sector and expressed severe misgivings with official supervision of banks. The grabbing-hand view holds that banks will pressure politicians who, in turn, can unduly influence supervisors and regulators. Furthermore, in some countries, supervisors are not well compensated and hence quickly move into banking, resulting in a situation in which supervisors may face mixed incentives when it comes to strict adherence to the rules. Also, since supervisors do not have their own wealth invested in banks, they have different incentives than private creditors when it comes to monitoring and disciplining banks.

Others, however, question placing excessive trust in private-sector monitoring, especially in countries with poorly-developed capital markets, accounting standards, and legal systems. Viewed from a helping-hand perspective, countries with weak institutional environments will benefit more from official supervisors and regulators containing excessive risk-taking behavior of banks and thereby instilling more confidence in depositors than would exist with private-sector monitoring. This view argues that, in weak institutional settings, increased reliance on private monitoring leads to exploitation of small savers and hence much less bank development.

This paper examines the relationship between regulatory and supervisory policies designed to promote private-sector monitoring and bank development and stability, while controlling for a full range of regulatory characteristics. We also assess whether private monitoring is particularly effective in countries with better-developed institutions.

II.G. Government ownership of banks

Economists hold sharply different views about the impact of government ownership of banks on financial and economic development [LaPorta, Lopez-de-Silanes, and Shleifer (2001)]. The helping-hand view argues that government ownership of banks facilitates the mobilization of savings and the allocation of those savings toward strategic projects with long-term beneficial effects on an economy. According to this view, governments have adequate information and sufficient incentives to ensure socially desirable investments. Consequently, government ownership of banks helps economies overcome private, capital-market failures, exploit

externalities, and invest in strategic sectors. Lewis (1950), Myrdal (1968), and Gerschenkron (1962) specifically advocate government ownership of banks to promote economic and financial development, especially in underdeveloped countries.

The grabbing-hand view of government ownership, in contrast, argues that governments do not have sufficient incentives to ensure socially desirable investments [Kornai (1979), and Shleifer and Vishny (1993,1994)]. Government ownership tends to politicize resource allocation, soften budget constraints, and otherwise hinder economic efficiency. Thus, government ownership of banks facilitates the financing of politically attractive projects, but not necessarily economically efficient projects.

In an influential study, LaPorta, Lopez-de-Silanes, and Shleifer (2000) piece together data on government ownership of banks from an assortment of sources. They find that countries with higher initial levels of government ownership of banks tend to have both slower subsequent rates of financial-system development and slower economic growth. In a related paper, Barth, Caprio, and Levine (2001a) use data on bank ownership from Bankscope. We find that greater government ownership is generally associated with less efficient and less well-developed financial systems. The data used in these papers, however, do not cover all banks operating in an economy and the degree of coverage varies across countries.

Besides using our analysis of government banks to assess the helping-hand/grabbing-hand views, we make two specific improvements on existing studies of government-owned banks. First, we use data collected from each country's bank regulatory agency. Thus, the data covers all banks and the definition of "government owned" is consistent across countries. Second, we control for differences in the regulatory, supervisory, and institutional environment in assessing the links between government ownership and bank development, performance, and stability. For instance, we examine whether government ownership is better than private ownership with a weak regulatory environment.

III. Data

III.A. The Dataset

We designed and implemented a survey funded by the World Bank to collect information on bank regulations and supervisory practices for more than 100 countries [see Barth, Caprio, and Levine (2001b), where the origin of and collection process for the survey data are described in greater detail]. The completion of the survey entailed numerous steps: collecting initial survey responses, reconciling different responses from different officials in the same country, cross-checking the data with a survey by the Office of the Comptroller of the Currency (OCC), which included some overlap in the information requested, further reconciling any inconsistencies, and checking our data with information collected by the Institute of International Bankers, and the Financial Stability Forum's Working Group on Deposit Insurance, which provided input on the accuracy of responses for some deposit insurance systems. Thus, in numerous cases, we repeatedly communicated with the authorities to obtain accurate information.

We collected the regulatory and supervisory data primarily in 1999, with some responses in late 1998 and others in early 2000.[9] In some cases, we group the responses to individual questions into aggregate indexes that we define below. The data are available on the World Bank's website.[10]

III.B. Variable Definitions

Since Table 1 provides information on the data, sources, and specific survey questions used to construct the variables for this paper, we only briefly define them here in the text.

1. *Bank Activity Regulatory Variables*. We measure the degree to which the national regulatory authorities in our sample countries allow banks to engage in the following three fee-based rather than more traditional interest-spread-based activities:

    a. **Securities Activities:** the ability of banks to engage in the business of securities underwriting, brokering, dealing, and all aspects of the mutual fund industry.

[9] Of the 107 responses received, 13 were received in November 1998, 65 were received in 1999, and 29 in 2000, with 19 of the latter received in either January or February.

[10] www.worldbank.org/research/interest/intrstweb.htm

b. **Insurance Activities:** the ability of banks to engage in insurance underwriting and selling.

c. **Real Estate Activities:** the ability of banks to engage in real estate investment, development, and management.

2. *Mixing Banking / Commerce Regulatory Variables.* We construct two measures of the degree of regulatory restrictiveness on the mixing of banking and commerce.

   a. **Banks Owning Nonfinancial Firms** measures restrictions on the ability of banks to own and control nonfinancial firms.

   b. **Nonfinancial Firms Owning Banks** measures restrictions on the ability of nonfinancial firms to own and control banks

   In addition, we also construct an overall bank restrictiveness variable. It is:

   Restrictions on Bank Activities: the summation of restrictions on securities, insurance, and real estate activities plus restrictions on the ability of banks to own and control nonfinancial firms.

3. *Competition Regulatory Variables*. We construct two variables to capture the ability of existing or new banks to enter the banking business.

   a. **Limitations on Foreign Bank Entry/Ownership:** whether there are any limitations placed on the ownership of domestic banks by foreign banks and whether there are any limitations placed on the ability of foreign banks to enter the domestic banking industry. If there are any limitations or restrictions, this variable is assigned a value of 1 and a value of 0 otherwise.

   b. **Entry into Banking Requirements:** measures the extent to which there are specific legal submissions required to obtain a license to operate as a bank. These might be "prudent" requirements, or excessive regulatory barriers, so it remains an empirical issue as to their effects.

4. *Capital Regulatory Variables*. We include three different measures of capital regulatory stringency.

   a. **Overall Capital Stringency** measures the extent of regulatory requirements regarding the amount of capital that banks must have relative to specific guidelines. We consider several guidelines to determine the degree to which the leverage potential for capital is limited.

   b. **Initial Capital Stringency** measures the extent to which the source of funds that count as regulatory capital can include assets other than cash or government securities, borrowed funds, and whether the sources of capital are verified by the regulatory or supervisory authorities.

   c. **Capital Regulatory Index** is simply the sum of the previous two measures of capital

stringency. It ranges in value from 0 to 9, with a higher value indicating greater stringency.

5. *Official Supervisory Action Variables.* We use a variety of variables to capture the degree of official supervisory oversight of banks.

   a. **Official Supervisory Power** measures the extent to which official supervisory authorities have the authority to take specific actions to prevent and correct problems.[11]

   We also essentially decompose this variable into three constituent parts. The resulting three variables are as follows:

   (1) **Prompt Corrective Power** measures the extent to which the law establishes pre-determined levels of bank solvency deterioration that forces automatic enforcement actions such as intervention, and the extent to which supervisors have the requisite, suitable powers to do so.

   (2) **Restructuring Power** measures the extent to which supervisory authorities have the power to restructure and reorganize troubled banks.

   (3) **Declaring Insolvency Power** measures the extent to which supervisory authorities have the power to declare a deeply troubled bank insolvent.

   b. **Supervisory Forbearance Discretion** measures the degree to which supervisory authorities may engage in forbearance when confronted with violations of laws or regulations or with other imprudent behavior on the part of banks.

   c. **Loan Classification Stringency** measures the degree to which loans that are in arrears must be classified as sub-standard, doubtful, or loss.

   d. **Provisioning Stringency** measures the degree to which a bank must provision as a loan is classified first as sub-standard, then as doubtful, and lastly as loss.

   e. **Diversification Index** measures whether regulations support geographical asset diversification. It is based on two variables:

   (1) **Diversification Guidelines:** whether there are there explicit, verifiable, and quantifiable guidelines for asset diversification.

   (2) **No Foreign Loans:** whether banks are prohibited from making loans abroad.

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[11] Note that we have slightly changed the definition of the Official Supervisory Power index from our earlier paper, Barth, Caprio, and Levine (2001b). Specifically, in this paper we do not add on the value 1 for countries in which there are mechanisms of cease and desist-type orders, whose infraction leads to the automatic imposition of civil and penal sanctions on the banks' directors and managers. This supervisory feature seems more of a Prompt Corrective Power characteristic rather than a supervisory power trait. This supervisory feature (Question 11.1 in the survey) therefore is included in the Prompt Corrective Power index. All of the results reported below, however, are not altered by this change.

6. *Official Supervisory Resource Variable*. We attempt to measure the "quantity and quality" of bank supervision with the following variables:

   a. **Supervisor Tenure:** This variable is the average years of tenure of professional bank supervisors.

   We also include a variable to capture the extent to which the supervisory authority acts autonomously. This variable is:

   b. **Independence of Supervisory Authority:** This variable measures the degree to which the supervisory authority is independent.

7. *Private Monitoring Variables*. We measure the degree to which private-sector monitoring of banks influences bank performance and fragility by using four different indicators.

   a. **Certified Audit Required:** This variable captures whether an outside licensed audit is required of the financial statements issued by a bank. Such an audit would presumably indicate the presence or absence of an independent assessment of the accuracy of financial information released to the public.

   b. **Percent of 10 Biggest Banks Rated by International Rating Agencies:** The percentage of the top 10 banks that are rated by international credit-rating agencies. The greater the percentage, the more the public may be aware of the overall condition of the banking industry as viewed by an independent third party.

   c. **No Explicit Deposit Insurance Scheme:** this variable takes a value of 1 if there is an explicit deposit insurance scheme, and 0 otherwise. A lower value would indicate more private monitoring.

   d. **Private Monitoring Index:** the sum of (a), (b) [which equals 1 if the percentage is 100; 0 otherwise], (c), and (d). In addition, three other measures are included in the index based on 'yes or no' answers. Specifically, a 1 is assigned if off-balance sheet items are disclosed to the public; if banks must disclose risk management procedures to the public; and if subordinated debt is allowable (required) as a part of regulatory capital. This variable therefore ranges from 0 to 7, with higher values indicating more private oversight.

8. *Deposit Insurance Scheme Variables.* We use the following three different variables to capture the effect of the deposit insurance regime:

   a. **Deposit Insurer Power:** This variable is based on the assignment of 1 (yes) or 0 (no) values to three questions assessing whether the deposit insurance authority has the authority: (1) to make the decision to intervene in a bank, (2) to take legal action against bank directors or officials, or (3) has ever taken any legal action against bank directors or officers. The sum of the assigned values ranges from 0 to 3, with higher values indicating more power.

   b. **Deposit Insurance Funds-to-Total Bank Assets:** the size of the deposit insurance fund relative to total bank assets. In the case of the U.S. savings and loan debacle

during the 1980s, the insurance agency itself reported insolvency. This severely limited its ability to effectively resolve failed savings and loan institutions in a timely manner. In weak institutional environments, it could also actually increase the looting of institutions [Barth (1991)].

c. **Moral Hazard Index:** based on Demirguc-Kunt and Detragiache (2000), who used principal components to capture the presence and design features of explicit deposit insurance systems, with the latter including: no coinsurance, foreign currency deposits covered, interbank deposits covered, type of funding, source of funding, management, membership, and the level of explicit coverage The higher the value, the greater is moral hazard.

9. *Market Structure Indicators*

   a. **Bank Concentration:** the fraction of deposits held by the five largest banks.

   b. **Foreign-Owned Banks:** the fraction of the banking system's assets that are 50% or more foreign owned.

   c. **Government-Owned Banks:** the fraction of the banking system's assets that are 50% or more government owned.

   d. **Fraction of Entry Applications Denied**: fraction of applications denied.

      (1) **Foreign Denials:** fraction of foreign applications denied.

      (2) **Domestic Denials:** fraction of domestic applications denied.

10. *Outcomes*. To measure bank development, performance and fragility we use the following indicators:

    a. **Bank Development:** 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 1997-99 period.

    b. **Net Interest Margin:** equals net interest income divided by total assets and is the average value over the 1997-99 period.

    c. **Overhead Costs:** equals total bank overhead costs as a share of total banks assets over the 1997-99 period.

    d. **Nonperforming Loans:** nonperforming loans as a share of total loans, 1999.

    e. **Crisis:** whether a country suffered a major banking crisis according to the Caprio-Klingebiel (1999) classification of banking crises.

III.C. Summary Statistics

There is great cross-country, cross-regional, and cross-income group diversity in bank regulatory and supervisory practices. For instance, based upon our database, many countries -

such as Australia, Austria, Germany, India, Russia, the United Kingdom, and Zambia impose no restrictions on the ability of banks to engage in securities activities (Securities Activities). In contrast, Cambodia, China, and Vietnam prohibit banks or their subsidiaries from conducting securities activities. Also, some countries during the year prior to the survey had no new banks, including Chile, Egypt, Korea, and Gambia (Number of New Banks). Other countries had more than 25 new banks, such as the United States, Italy, India, Switzerland, Netherlands, Japan, Germany, and Romania. Barth, Caprio, and Levine (2001b) present a much richer depiction of such cross-country differences.

Table 2 contains some key correlations. Several interesting results emerge. First, the percentage of the banking system owned by the government (Government-Owned Banks) is positively linked with tighter regulatory activity restrictions (Restrictions on Bank Activities) and negatively linked with regulatory variables that promote private monitoring of banks (Private Monitoring Index). Second, countries with very generous deposit insurance regimes (Moral Hazard Index) tend to have more stringent capital requirements (Capital Regulatory Index). Third, countries that deny a higher percentage of bank applications (Entry Applications Denied) have weaker capital regulations, tighter restrictions on bank activities, weaker regulations promoting private monitoring of banks, and a higher percentage of banking assets owned by the government.

IV. Regression Results[12]

IV.A. Corruption and bank regulation and supervision

The helping-hand and grabbing-hand views of regulation make quite different predictions about: (a) the relationship between bank regulation/supervision and government corruption, and (b) the relationship between bank regulation/supervision and bank performance. As noted earlier, the helping-hand view holds that market failures provide an important role for governments to regulate bank entry, restrict the activities of banks, strictly supervise and regulate bank behavior,

[12] This paper has a very large number of Appendix tables to assess the robustness of the findings. These tables are available on request but are not included here to keep the paper to a manageable length. We do refer to the sensitivity analyses in the text, however.

grant deposit insurance, and perhaps own banks to direct credit to a strategic sector. According to this view, these types of regulatory/supervisory policies can ameliorate market failures and enhance bank performance and stability.

The grabbing-hand view, in contrast, argues that strong government regulation and supervision of banks will not ease market failures and improve bank performance and stability. According to this view, government limits on bank entry, restrictions on bank activities, and government ownership of banks will be associated with higher levels of corruption but with no compensating improvement in bank performance and stability. In this preliminary subsection, we run a series of simple regressions to shed some initial light on the helping-hand versus grabbing-hand debate.

Table 3 presents regressions on the relationship between government integrity and the regulation and supervision of banks. The dependent variable in all 15 regressions of Panel A is an index of government integrity (Corrupt), with bigger values signifying less corruption.[13] Following Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2001), we include the log of real GNP per capita in 1995 [ln (GNP/capita)] for two reasons: (1) to control for the overall level of institutional development in an economy, and (2) to proxy for the existence of market failures in each country and hence hold constant the need for "socially desirable regulation."

The results in Table 3 Panel A are more consistent with the grabbing-hand view of regulation than the helping-hand view. Greater denial of entry applications, more regulatory restrictions on bank activities, greater official supervisory power, more prompt corrective power, prohibitions on banks making loans abroad, and greater government ownership of banks are all negatively linked with government integrity. While tighter capital regulations are negatively associated with corruption, the evidence is broadly consistent with the grabbing-hand view.

We extend the analyses in a number of ways to assess whether particular political and institutional settings reduce the positive association between strong official supervision and corruption. For example, we include an interaction term for the openness of the political system.

[13] Corrupt ranges from 0 to 6, with greater values signifying less corruption, or greater integrity. It is obtained from the International Country Risk Guide and is averaged over the 1990-99 period.

The political openness measure is from Beck, Demirguc-Kunt, and Levine (2001b) and is an overall index of the extent of electoral checks and balances on decision makers, the competitiveness of legislative elections, the influence of special interest groups, and the extent to which the voting system favors narrow groups. The results in Panel B in Table 3 indicate that countries with more open political systems ameliorate the corrupting effects of official supervisory power: higher official supervisory power is negatively associated with government integrity, but this effect is reduced in more open political systems.[14] Furthermore, we examine whether countries with (a) greater supervisory independence and/or (b) multiple regulatory agencies reduce the corrupting effects of strong and restrictive regulation and supervision. We find that neither greater supervisory independence nor the existence of multiple regulators ameliorate the positive association between corruption and greater denial of entry applications, more regulatory restrictions on bank activities, greater official supervisory power, prohibitions on banks making loans abroad, and greater government ownership of banks.[15] In sum, regulatory restrictions and supervisory power are positively linked with corruption, though this relationship weakens somewhat in countries with exceptionally open political systems.

The results in Tables 4 and 5 do not support the helping-hand theory. This theory predicts that to alleviate market failures and improve bank performance and stability governments may need to restrict foreign-bank ownership, limit bank entry, restrict bank activities, rigorously supervise banks, and perhaps direct credit through government-owned banks. Tables 4 and 5 are the same as Table 3 except the dependent variable is, respectively, (a) Bank Development and (b) Crisis, where we use logit estimation in the Crisis regressions. As shown, bank development and stability do not improve with tighter entry regulations, more restrictions on bank activities, greater power of the supervisory agency, or a higher degree of government ownership of banks.

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[14] Political openness, however, does not mitigate the pernicious effects of many of the other regulatory and supervisory variables in Table 3 Panel A (Appendix C, Table 1). Also, when political openness is entered alone in the corruption regression along with the logarithm of real GNP per capita, political openness is positively linked with government integrity.

[15] We also examine the openness of the media, both print and broadcast. Based on the data assembled in Djankov, McLiesh, Nenova, and Shleifer (2001), we test whether countries where the government does not repress the media and countries where the media is privately owned suffer less corruption from regulation and supervision of banks. Although we confirm Djankov et. al.'s (2001) findings that corruption is positively correlated with government ownership of the media and government repression, we also confirm our Table 3 results and we do not find that an open media produces the same ameliorating influence induced by an open political system.

These simple regressions do not lend support to the helping-hand view.

Instead, the results in Tables 4 and 5 highlight the success of governments that empower the private sector, limit the adverse incentive effects from generous deposit insurance, and allow banks to engage in a wide array of activities. This finding is more consistent with the grabbing-hand view. More specifically, the results suggest that an overall approach to bank regulation that stresses private-sector incentives is associated with greater banking-system success than an overall approach to bank regulation that emphasizes official government oversight and regulation of bank activities.

As a robustness check, we use instrumental variable (IV) procedures to control for potential simultaneity bias and measurement error in Tables 3-5. The IV results produce an even stronger pattern of results (See, Tables 1-6 in Appendix D). Corruption is positively linked with restrictions on foreign bank entry/ownership, greater denial of entry applications, more regulatory restrictions on bank activities, greater official supervisory power, prohibitions on banks making loans abroad, and greater government ownership of banks. Yet, these "helping hand" policies do not boost performance. Instead, the IV results confirm that financial-sector policies boost private sector monitoring, force accurate information disclosure, limit the generosity of deposit insurance, and permit banks to engage in a broad range of activities promote bank performance and stability. We now explore what works best in greater detail.

IV.B. Bank performance and regulation / supervision

Tables 6-8 present our basic regression results. There are two types of regressions. First, we use ordinary least squares regressions to study the links between bank performance and bank regulation and supervision. Second, we use logit regressions to study the links between banking crises and bank regulation and supervision. In the performance regressions, we regress each of the outcome variables (Bank Development, Net Interest Margin, Overhead Costs, and Nonperforming Loans) on each of the supervisory/regulatory variables while controlling for other features of the regulatory and supervisory environment. In the crises regressions, we use logit regressions and investigate the connections between each regulatory and supervisory indicator and the likelihood of experiencing a banking crisis while controlling for other features of the policy environment. In many cases, we experiment with interaction terms to examine

whether the impact of one regulatory or supervisory policy depends on other features of the institutional and policy environment.

As noted above, we do consider causality issues in our analyses, but must nevertheless qualify our investigation. Specifically, in the performance regressions, we measure the dependent and independent variables over the same period. Furthermore, when using IV procedures, we obtain the same results in the performance regressions. However, dealing with simultaneity biases in the crises regressions is more problematic. The regulatory and supervisory variables are measured over the 1998-2000 period, but many of the crises occurred throughout the 1990s and some even in the 1980s. In earlier work, we did show that restrictions on bank activities have not changed much over the last two decades [Barth, Caprio, and Levine (2001a)]. We have not, however, constructed a time-series database on the full range of bank regulatory and supervisory policies used in this paper.

We organize the discussion in this subsection around each of the specific policy issues discussed in Section II. Furthermore, in each case, we focus on only one or two key regulatory/supervisory variables. For example, when discussing banking powers, we focus our attention on Restrictions on Bank Activities, which is an aggregate measure of regulatory restrictions on bank activities. Nevertheless, we have examined each of the components comprising this variable. More generally, we present regression results based on the major variables contained in our extensive database on regulatory and supervisory policies.

1. Regulations on bank activities and banking-commerce links

The empirical results in Table 6 indicate that restricting banking activities is negatively associated with bank development (Bank Development) and efficiency (Net Interest Margin). The variable, Restrictions on Bank Activities, is an aggregate index of the extent to which regulations restrict banks from conducting securities, insurance, and real estate activities and from owning nonfinancial firms. The negative link between this regulatory variable and bank performance holds while controlling for the stringency of capital regulations, official supervisory power, the private monitoring index, regulations on the entry of new banks, and the overall level of real GNP per capita. Furthermore, the strong negative link between regulatory restrictions on bank activities and bank development holds after controlling for government ownership of

banks. Bank development is a particularly important indicator to examine because Levine, Loayza, and Beck (2000) find that this variable exerts a positive impact on economic growth. Also, we use instrumental variables (legal origin, national religious composition, ethnic diversity, etc.) from Beck, Demirguc-Kunt, and Levine (2001b) and again confirm that restricting bank activities is negatively associated with bank development and efficiency.

We also examine the effects of the individual components of the aggregate Restrictions on Bank Activities variable and the variable measuring restrictions on nonfinancial firm ownership of banks (see Table 1, Appendix A). The results indicate that restricting banks from engaging in securities activities is strongly associated with less bank development and poor bank efficiency, as measured by net interest margin and overhead costs relative to total assets.

The results also provide qualified support for the view that restricting bank activities tends to increase the likelihood of suffering a major crisis (Table 7). Specifically, in the full sample, we find no link between the likelihood of a crisis and restricting bank activities, including banks owning nonfinancial firms (Regression 1). But the ability of banks to stabilize income flows by diversifying activities may only work in countries with some basic level of securities market development. When restricting the sample to countries where the International Finance Corporation (of the World Bank) has been able to collect at least some data on stock market transactions, we find that greater restrictions overall (Restrictions on Bank Activities) are indeed positively associated with the likelihood of suffering a crisis (Regression 2). We also examine the full sample crises regressions for the individual components of this variable as well as for the sample restricted to those countries with measured equity market activity. We find that tighter restrictions on banks owning nonfinancial firms are positively associated with crises. In all of these regressions, we control for a wide - and varying - array of regulatory and supervisory variables and also the level of income per capita, inflation, and the degree of moral hazard produced by the deposit insurance regime, among other variables (Tables 1-3, Appendix B). We find that diversification of income sources through nontraditional bank activities tends to be positively associated with bank stability, especially in economies with active nonbank-financial markets.

Regarding interaction terms, we assessed whether other regulatory/supervisory policies and institutional factors affect the impact of regulatory restrictions on bank activities on bank

performance and stability. For example, Boyd, Chang, and Smith (1998) show that restricting bank activities may reduce financial fragility in the presence of a generous deposit insurance regime. Thus, we entered an interaction term into the regressions in Table 6 and those in Table 7 that equals Restrictions on Bank Activities * Moral Hazard Index, where Moral Hazard Index is the Demirguc-Kunt and Detragiache (2000) measure of deposit insurance generosity. The conclusions do not change. Restrictions on Bank Activities retains its negative association with bank performance, and its positive association with the likelihood of a crisis and the interaction term are not significant.[16] Thus, the evidence is consistent with the view that there are large diversification benefits from allowing banks to engage in an assortment of activities.

2. Regulations on domestic and foreign bank entry

Table 6 indicates that tighter restrictions on entry into banking tend to increase the net interest margin and overhead costs. Consistent with recent work by Levine (1999) and Demirguc-Kunt and Levine (2000) that use different datasets, we find that restrictions on competition influence bank performance, but bank concentration per se is not robustly associated with efficiency and bank development (Table 8, Appendix A).

Table 7 indicates that the likelihood of a major banking crisis is positively associated with greater limitations on foreign-bank participation (Limitations on Foreign Bank Entry/Ownership). Consistent with Demirguc-Kunt, Levine, and Min (1999), we find that foreign-bank ownership per se is not critically linked to the likelihood of a crisis (Table 8, Appendix B). Rather, it is limitations on foreign-bank entry and ownership that are positively associated with bank fragility.

We examine whether restricting bank entry produces positive effects in particular institutional environments. Specifically, we assess whether there are positive benefits in terms of bank performance and stability to restricting bank entry - both domestic and foreign bank entry -

[16] We also experimented with an interaction term that equals Restrictions on Bank Activities * Corrupt. The reason is that some may argue that in corrupt environments it is important to limit the range of permissible bank activities. Our results do not support this suspicion. We continue to find a negative association between Restrictions on Bank Activities and both bank performance and stability when including Restrictions on Bank Activities*Corrupt, with this interaction term entering insignificantly.

under corrupt regimes or with weak official supervision.[17] We find no evidence that restricting bank entry enhances performance or stability under these institutional settings.

3. Regulations on capital adequacy

There is not a robust relationship between capital regulatory restrictiveness and bank development, net interest margins, or overhead costs, as shown in Table 6. However, when controlling for other features of the regulatory and supervisory environment, capital regulatory restrictiveness is generally negatively associated with the level of nonperforming loans. There are specifications where capital regulations are positively associated with bank development. However, the stringency of capital regulations is positively correlated with the level of economic development and restrictions on bank activities. When both of these variables are omitted from the regression, we find a positive link between capital regulatory stringency and bank performance. This finding further supports our earlier point that it is crucial not to focus too narrowly on a particular regulatory policy without controlling more broadly for other potentially relevant factors.

In terms of bank fragility, there is not a robust link between capital regulations and crises when controlling for other characteristics of the regulatory and supervisory environment (Table 7 and Table 5, Appendix B). These results hold even when omitting the log of real GNP per capita and regulatory restriction on banks, both of which are highly correlated with capital regulatory stringency. There are specifications in which capital regulatory stringency enters with a negative coefficient and it sometimes enters with a t-statistic greater than two. Nevertheless, alterations in the conditioning information set suggest that this relationship is fragile, insofar as small changes in the other regressors importantly influence the confidence interval around the capital stringency variable.

We also examine whether more stringent capital regulations produce positive effects in particular policy environments. In particular, strict capital adequacy regulations may be

[17] Specifically, we examine the following interaction terms (Entry into Banking Regulations)*(Corrupt), (Entry into Banking Regulations)*(Official Supervisory Power), (Limitations on Foreign Bank Entry/Ownership)*(Entry into Banking Regulations), and (Limitations on Foreign Bank Entry/Ownership)*(Official Supervisory Power). Furthermore, we also examine the political openness and media openness variables discussed above and obtain similar results.

particularly important in countries with very generous deposit insurance regimes. As we show below, we find no evidence for the proposition that official regulatory restrictions ameliorate the risk-taking incentives produced by generous deposit insurance.

While consistent with some of the theoretical models discussed earlier, this finding contradicts conventional wisdom and the current focus of policy advice being advanced by international agencies. These results do not suggest that bank capital is unimportant for bank fragility. They do, however, suggest that there is not a strong relationship between the stringency of official capital requirements and the likelihood of a crisis after controlling for other features of the regulatory and supervisory regime.

4. Deposit insurance design

Although we do not find a strong link between the generosity of the deposit insurance system (moral hazard index) and bank development (see Tables 4 and 6; also Table 4, Appendix A). This is different from the findings in Cull et. al. (2000). But, they use a different estimation procedure and a different dataset.

We find a very strong and robust link between the generosity of the deposit insurance system and bank fragility (Table 7). This is consistent with recent work by Demirguc-Kunt and Detragiache (2000). Countries with more generous deposit insurance schemes have a much higher likelihood of suffering a major banking crisis (Table 6, Appendix B). This result is consistent with the view the deposit insurance not only substantially aggravates moral hazard but also produces deleterious effects on bank fragility. The results, moreover, suggest that the adverse incentive effects from deposit insurance overwhelm any stabilizing effects.

Regarding interaction effects, we carefully assess whether other policy actions ameliorate the negative effects of generous deposit insurance. For instance, the helping-hand view holds that the moral hazard effects of deposit insurance can be counteracted by rigorous official oversight of banks and tight capital regulations. Others disagree, having less faith in official monitoring of banks and greater faith in private-sector monitoring of banks. Table 8 presents further evidence that is inconsistent with the helping-hand view. Official supervisory power and tighter capital regulations do not mitigate the negative impact of generous deposit insurance on bank fragility.

However, countries with better developed private property rights - as proxied by greater adherence to the rule of law (Rule of Law) – and countries with more open political systems (Political Openness) mitigate the adverse impact of moral hazard on bank development.[18]

5. Supervision

In contrast to the helping-hand view of government, the main message that emerges from our study encompassing a large number of official supervisory policies is that we were not able to identify a strong connection between bank performance and official supervision (see Tables 4 and 6 ; also Table 5, Appendix A). Specifically, the overall official supervisory power indicator is not related to bank development or bank efficiency or the level of nonperforming loans. Declaring insolvency power is also unrelated to development or efficiency. The prompt corrective power indicator is negatively related to bank development (but these results are not robust to changes in the conditioning information set or when controlling for endogeneity). There is some weak evidence that supervisory forbearance discretion is positively related to bank efficiency (but this is not robust either). There is, moreover, a positive link between supervisory tenure and bank development. Supervisory independence, loan classification stringency, liquidity requirements, diversification guidelines, and restrictions on making loans abroad are not related to bank development or efficiency or the level of nonperforming loans. In sum, those features of official "core" supervision are not strongly linked to bank development, bank efficiency, and the level of nonperforming loans in a predictable, convincing manner (Table 5, Appendix A).

In terms of banking crises, the same basic message emerges with only one exception (Table 7; also Table 9, Appendix B) Official supervisory power, declaring insolvency power, loan classification stringency, and supervisor are all unrelated to the likelihood of a crisis. In turn, prompt corrective power and provisioning stringency are positively (though insignificantly) related to the likelihood of a crisis, which suggests a reverse causality argument. Indeed, when

[18] The Rule of Law is an indicator of the degree to which the country adheres to the rule of law. It ranges from 0 to 6 with higher values indicating greater confidence in the legal system to settler disputes. It is obtained from the International Country Risk Guide and is averaged over 1990-1999. The Political Openness measure is from Beck, Demirguc-Kunt, and Levine (2001b) and is an overall index of the extent of electoral checks and balances on decision makers, the competitiveness of legislative elections, the influence of special interest groups, and the extent to which the voting system favors narrow groups.

using instrumental variables these relationships turn negative though remain insignificant.

The one exception involves the diversification index (which aggregates diversification guidelines and the absence of restrictions on making loans abroad). There is a negative relationship between the diversification index and the likelihood of suffering a major crisis in small economies. Specifically, we include the diversification index plus an interaction term. The interaction term equals the diversification index multiplied by national GNP in 1995. As shown in Table 7, diversification is negatively associated with the likelihood of a crisis but diversification guidelines have less of a stabilizing effect in bigger countries.

6. Regulations on easing private-sector monitoring of banks

Private monitoring is strongly positively linked with bank development and negatively associated with the level of nonperforming loans when we do not control for government ownership of banks (see Tables 4 and 6; also Tables 6-7, Appendix A). Unsurprisingly, the private-monitoring index is highly correlated with government ownership of the banking industry. There is so much collinearity that private monitoring does not enter the bank development and nonperforming loan regressions significantly when controlling for government ownership. Nevertheless, even though it is difficult to disentangle private ownership from private monitoring, the results suggest that there is generally stronger bank performance in countries in which the private sector plays a strong role in owning and monitoring banks.

In terms of crises, there is not much of a link between private-sector monitoring and the likelihood of a banking crisis when controlling for other variables (Tables 5 and 7; also Table 7, Appendix B). Since capital regulations are a possible vehicle for encouraging prudent behavior by owners, we decided to exclude the capital regulation index from the crises regressions. Eliminating the capital regulation index does not change the results, however.

Again, the results emphasize that those economies facilitating private-sector monitoring of banks have better performing banks than countries less focused on empowering private-sector corporate control of banks. Taken together with the results of official supervisory power, the results are less consistent with theories emphasizing direct government oversight and more consistent with theories emphasizing private-sector corporate control.

7. Government ownership of banks

In terms of the direct relationship between government ownership of banks and bank performance, the Table 6 results indicate that government ownership is generally positively related to the level of nonperforming loans in an economy but not robustly linked with the other performance indicators (also Table 8, Appendix B). Controlling for government ownership sometimes changes the inferences that we draw on other regulatory and supervisory indicators, however.

While we frequently find a positive link between government ownership and the likelihood of a crisis (Table 8 in Appendix B), this relationship breaks down with small changes in the conditioning information set (Tables 7 and 8). These results do not confirm those in Caprio and Martinez (2000), who find that government ownership of banks significantly increases bank fragility. However, we have only examined the cross-country relationship between government ownership and crises. In contrast, they use a cross-country, time-series panel. Unfortunately, we do not have time-series observations on the regulatory and supervisory variables.

V. Conclusions

Based on our survey of regulatory and supervisory policies in 107 countries, this paper makes two contributions to the literature. First, we assess two broad theories of bank regulation and supervision. The helping-hand view holds that governments implement rigorous, official oversight of bank activities to alleviate market failures and thereby enhance bank performance and stability. In contrast, the grabbing-hand view holds that countries that implement rigorous, official oversight of banks produce higher levels of government corruption *without* a corresponding improvement in bank performance or stability. Second, this is the first paper to examine an extensive list of specific regulatory/supervisory policy debates for a broad, cross-section of countries. Since the central issues in bank regulation and supervision are interrelated, our comprehensive dataset makes it possible to conduct a unified assessment of bank regulation and supervision.

The results are generally inconsistent with the helping-hand view of regulation and more consistent with the grabbing-hand view of government. In contrast to the helping-hand view,

tighter entry regulations, restrictions on bank activities, powerful supervisory agencies, deposit insurance, and government ownership of the banking industry are not positively associated with bank performance or stability. Indeed, the findings are more consistent with the grabbing-hand view. Regulatory barriers to bank entry, regulatory restrictions on bank activities, greater supervisory power, and government ownership of banks are positively associated with government corruption. This is consistent with the grabbing-hand argument that strong government regulation and supervision will not focus on easing market failures and improving bank performance and stability.

The evidence suggests that regulatory and supervisory strategies that focus on empowering the private sector and limiting the adverse incentive effects from generous deposit insurance work best to promote bank performance and stability. Countries without excessively generous official deposit insurance regimes have greater bank development and less bank fragility. Countries that impose fewer regulatory restrictions on bank activities enjoy greater bank performance and a lower probability of suffering a major banking crisis. Countries that do not impose severe limits on foreign-bank entry enjoy greater banking-sector stability. Countries with policies that promote private monitoring of banks in conjunction with some minimal level of private-property rights protection have greater bank performance. Thus, the results are consistent with the view that legal and regulatory reforms that promote and facilitate private monitoring of financial institutions offer a useful financial reform strategy.

The paper also assesses particular regulatory and supervisory practices. First, restricting bank activities is negatively associated with bank performance and stability, as compared to when banks can diversify into other financial activities. While theory provides conflicting predictions about the implications of restricting the range of bank activities, the results are consistent with the view that broad banking powers allow banks to diversify income sources and enhance stability. This finding, moreover, is not due to reverse causality [(Barth, Caprio, and Levine (2001a)]. Furthermore, since we control for official supervisory procedures, capital regulations, regulations on competition, government ownership of banks, and the moral hazard engendered by generous deposit insurance schemes, the negative relationship between restricting bank activities and bank performance and stability does not seem to be due to an obvious omitted variable. Furthermore, we find no evidence that restricting bank activities produces positive

results in economies that offer more generous deposit insurance.

Second, fewer barriers to foreign-bank participation enhance bank stability. This must be qualified, however. GNP per capita is so highly correlated with foreign-bank entry restrictions that we do not identify a strong link between crises and restrictions on foreign-bank participation when controlling for overall economic development. Critically, it is not the actual level of foreign presence or the actual level of bank concentration that are closely linked with bank stability and performance. Rather, it is the contestability of the market that is positively linked with bank stability.

Third, the stringency of capital adequacy regulations is not very closely linked with bank performance or stability. Yet, traditional perspectives on bank regulation and recent efforts by international agencies focus on capital adequacy guidelines. Our findings are consistent with recent studies that offer a more cautious assessment of the beneficial effects of capital regulations.

Fourth, generous deposit insurance schemes are very strongly and negatively linked with bank performance and stability. While many believe that effective regulation and supervision can mitigate the moral hazard produced by generous deposit insurance, the evidence runs contrary to this belief.

Fifth, with but one exception, we do not find a strong connection between a large number of official supervisory indicators and bank performance and stability. Thus, measures of supervisory power, resources, independence, loan classification stringency, provisioning stringency, etc., are not robustly linked with bank performance or stability. Again, these results are counter to the strategy of many international agencies that focus on empowering official supervisory oversight of bank practices.[19] The one exception involves diversification. There is a negative relationship between the diversification index (which aggregates diversification guidelines and the absence of restrictions on making loans abroad) and the likelihood of suffering a major crisis, especially in small economies. The old adage, “don’t put all your eggs in

[19] It may well be that official supervision only matters at an incredibly detailed level - more detailed than that captured even in our extensive survey. However, the implication of this argument would be that only an incredibly detailed improvement of supervision would have an effect, and in the meantime some of the simple lessons found in

one basket," remains relevant for modern banking policy.

Sixth, in countries with some basic level of private-property rights protection, regulations that encourage and facilitate private monitoring of banks tend to boost bank performance. While recent efforts frequently focus on official supervision, our initial findings provide some support for the argument that regulatory and supervisory authorities that encourage and facilitate private monitoring of banks will enjoy better bank performance than official agencies that put less of an emphasis on private monitoring.

Finally, government ownership of banks is negatively associated with good outcomes. Government ownership is positively linked with corruption. Furthermore, the degree of government ownership is positively associated with many of the policies listed above that go hand-in-hand with poor bank performance and fragility. There is no evidence, even in under-developed economies, that government-owned banks overcome market failures and channel credit to productive ends.

These findings specifically and importantly focus attention on: (1) creating regulatory and supervisory practices that produce accurate information disclosure, (2) empowering private-sector corporate control of banks, and (3) fostering incentives for private agents to exert corporate control. Our results do not suggest that official regulation and supervision are unimportant. Indeed, the paper stresses that regulations and supervisory practices that force accurate information disclosure and limit the moral hazard incentives of poorly designed deposit insurance critically boost bank performance and stability. Yet, this paper's results emphasize that a strategic approach to bank regulation that stresses private-sector monitoring of banks tends to be associated with greater banking-system success than strategies that place excessive emphasis on direct official government oversight of and restrictions on banks. One may, of course, argue that we do not have sufficiently detailed information on regulatory and supervisory policies in general and on the transparency and accountability of the supervisory process in particular to evaluate fully cross-country differences in regulatory and supervisory regimes. While the results strongly emphasize the importance of private-sector monitoring, we too believe that even more refined information on regulatory and supervisory practices would be useful for further analyses.

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this paper might help improve banking sector development and performance.

Indeed, we hope that our efforts stimulate others to collect such information and investigate further the impact of regulation and supervision on bank performance and stability.

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Appendix Tables

This paper has an extraordinarily large number of Appendix Tables that test the sensitivity of the results. We do not include them here to keep the text to a manageable length. They are available on request.

We discuss the sensitivity analyses in the text.

Table 1
Information on Bank Regulatory, Supervisory and Deposit Insurance Variables

Variable	Definition	Source and Quantification	World Bank Guide Questions
1. Bank Activity Regulatory Variables			
(a) Securities Activities	The extent to which banks may engage in underwriting, brokering and dealing in securities, and all aspects of the mutual fund industry.	OCC and WBG 4.1 (higher values, more restrictive) Unrestricted = 1 = full range of activities can be conducted directly in the bank; Permitted = 2 = full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3 = less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4 = the activity cannot be conducted in either the bank or subsidiaries.	4.1 What is the level of regulatory restrictiveness for bank participation in securities activities (the ability of banks to engage in the business of securities underwriting, brokering, dealing, and all aspects of the mutual fund industry)?
(b) Insurance Activities	The extent to which banks may engage in insurance underwriting and selling.	OCC and WBG 4.2 (higher values, more restrictive) Unrestricted = 1 = full range of activities can be conducted directly in the bank; Permitted = 2 = full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3 = less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4 = the activity cannot be conducted in either the bank or subsidiaries.	4.2 What is the level of regulatory restrictiveness for bank participation in insurance activities (the ability of banks to engage in insurance underwriting and selling)?
(c) Real Estate Activities	The extent to which banks may engage in real estate investment, development and management.	OCC and WBG 4.3 (higher values, more restrictive) Unrestricted = 1 = full range of activities can be conducted directly in the bank; Permitted = 2 = full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3 = less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4 = the activity cannot be conducted in either the bank or subsidiaries.	4.3 What is the level of regulatory restrictiveness for bank participation in real estate activities (the ability of banks to engage in real estate investment, development, and management)?
2. Mixing Banking / Commerce Regulatory Variables			
(a) Bank Owning Nonfinancial Firms	The extent to which banks may own and control nonfinancial firms.	OCC and WBG 4.4 (higher values, more restrictive) Unrestricted = 1 = a bank may own 100 percent of the equity in any nonfinancial firm; Permitted = 2 = a bank may own 100 percent of the equity of a nonfinancial firm, but ownership is limited based on a bank's equity capital; Restricted = 3 = a bank can only acquire less than 100 percent of the equity in a nonfinancial firm; and Prohibited = 4 = a bank may not acquire any equity investment in a nonfinancial firm.	4.4 What is the level of regulatory restrictiveness for bank ownership of nonfinancial firms?
(b) Nonfinancial Firms Owning Banks	The extent to which nonfinancial firms may own and control banks.	OCC and WBG 2.3 (higher values, more restrictive) Unrestricted = 1 = a nonfinancial firm may own 100 percent of the equity in a bank; Permitted = 2 = unrestricted with prior authorization or approval; Restricted = 3 = limits are placed on ownership, such as a maximum percentage of a bank's capital or shares; and Prohibited = 4 = no equity investment in a bank.	2.3 What is the level of regulatory restrictiveness of ownership by nonfinancial firms of banks?

Table 1
Information on Bank Regulatory, Supervisory and Deposit Insurance Variables

Variable	Definition	Source and Quantification	World Bank Guide Questions
3. Competition Regulatory Variables			
(a) Limitations on Foreign Bank Entry/Ownership	Whether foreign banks may own domestic banks and whether foreign banks may enter a country's banking industry.	OCC Yes = 1; No = 0	
(b) Entry into Banking Requirements	Whether various types of legal submissions are required to obtain a banking license.	WBG 1.8.1 -1.8.8 Yes = 1; No = 0 Sum of these assigned values, with higher values indicating greater stringency.	1.8 Which of the following are legally required to be submitted before issuance of the banking license? 1.8.1 Draft by-laws? Yes / No 1.8.2 Intended organization chart? Yes / No 1.8.3 Financial projections for first three years? Yes / No 1.8.4 Financial information on main potential shareholders? Yes / No 1.8.5 Background/experience of future directors? Yes / No 1.8.6 Background/experience of future managers? Yes / No 1.8.7 Sources of funds to be disbursed in the capitalization of new banks? Yes / No 1.8.8 Market differentiation intended for the new bank? Yes / No
4. Capital Regulatory Variables			
(a) Overall Capital Stringency	Whether the capital requirement reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined.	WBG 3.1.1 + 3.3 + 3.9.1 + 3.9.2 + 3.9.3 + (1 if 3.6 < 0.75) Yes = 1; No = 0 Sum of these assigned values, with higher values indicating greater stringency.	3.1.1 Is the minimum capital-asset ratio requirement risk weighted in line with the Basel guidelines? Yes / No 3.3 Does the minimum ratio vary as a function of market risk? Yes / No 3.9.1 Are market value of loan losses not realized in accounting books deducted? Yes / No 3.9.2 Are unrealized losses in securities portfolios deducted? Yes / No 3.9.3 Are unrealized foreign exchange losses deducted? Yes / No 3.6 What fraction of revaluation gains is allowed as part of capital?
(b) Initial Capital Stringency	Whether certain funds may be used to initially capitalize a bank and whether they are officially verified.	WBG 1.5 - 1.7 Yes = 1; No = 0 Sum of these assigned values, with higher values indicating greater stringency.	1.5 Are the sources of funds to be used as capital verified by the regulatory/supervisory authorities? Yes / No 1.5.1 Are law enforcement authorities consulted in this process? Yes / No 1.6 Can the initial disbursement or subsequent injections of capital be done with assets other than cash or government securities? Yes / No 1.7 Can initial disbursement of capital be done with borrowed funds? Yes / No
(c) Capital Regulatory Index	The sum of (a) and (b).	(a) + (b) Higher values indicate greater stringency.	
5. Official Supervisory Action Variables			

Table 1
Information on Bank Regulatory, Supervisory and Deposit Insurance Variables

Variable	Definition	Source and Quantification	World Bank Guide Questions
(a) Official Supervisory Power	Whether the supervisory authorities have the authority to take specific actions to prevent and correct problems.	WBG 5.5 + 5.6 + 5.7 + 6.1 + 8.6 + 10.4 + 11.1 + 11.2 + 11.3.1 + 11.3.2 +11.3.3 + 11.6 + 11.7 + 11.9.1 + 11.9.2 + 11.9.3 Yes = 1; No = 0 Sum of these assigned values, with higher values indicating greater power.	5.5 Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? Yes / No 5.6 Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers inflict activities, fraud, or insider abuse? Yes / No 5.7 Can supervisors take legal action against external auditors for negligence? Yes / No 6.1 Can the supervisory authority force a bank to change its internal organizational structure? Yes / No 8.6 Can the deposit insurance agency/fund take legal action against bank directors or other bank officials? Yes / No 10.4 Are off-balance sheet items disclosed to supervisors? Yes / No 11.1 Are there any mechanisms of cease and desist-type orders, whose infraction leads to the automatic imposition of civil and penal sanctions on the banks directors and managers? Yes / No 11.2 Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses? Yes / No 11.3 Can the supervisory agency suspend the directors' decision to 11.3.1 Dividends? Yes / No 11.3.2 Bonuses? Yes / No 11.3.3 Management fees? Yes / No 11.6 Can the supervisory agency legally declare such that this declaration supersed
(1) Prompt Corrective Power	Whether the law establishes predetermined levels of bank solvency deterioration that force automatic actions, such as intervention.	WBG 11.8 * (11.1 + 11.2 + 11.3.1 + 11.3.2 + 11.3.3 + 6.1) Yes = 1; No = 0 Sum of the assigned values for the items in parenthesis multiplied by 1 if there is a legally pre-determined level of solvency deterioration forcing automatic actions and by 0 if not.	11.8 Does the Law establish pre-determined levels of solvency deterioration which forces automatic actions (like intervention)? Yes / No 11.1 Are there any mechanisms of cease and desist-type orders, whose infraction leads to the automatic imposition of civil and penal sanctions on the bank's directors and managers? Yes / No 11.2 Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses? Yes / No 11.3 Can the supervisory agency suspend the directors' decision to distribute: 11.3.1 Dividends? Yes / No 11.3.2 Bonuses? Yes / No 11.3.3 Management fees? Yes / No 6.1 Can the supervisory authority force a bank to change its internal organizational structure? Yes / No
(2) Restructuring Power	Whether the supervisory authorities have the power to restructure and reorganize a troubled bank.	WBG 11.9.1 + 11.9.2 + 11.9.3 Yes = 1; No = 0 Sum of these assigned values, with higher values indicating power	11.9 Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency do the following: 11.9.1 Supersede shareholder rights? Yes / No 11.9.2 Remove and replace management? Yes / No 11.9.3 Remove and replace directors? Yes / No
(3) Declaring Insolvency Power	Whether the supervisory authorities have the power to declare a deeply troubled bank insolvent.	WBG 11.6 + 11.7 Yes = 1; No = 0 Sum of these assigned values, with higher values indicating greater power.	11.6 Can the supervisory agency legally declare-such that this declaration supersedes the rights of bank shareholders-that a bank is insolvent? Yes / No 11.7 Does the Banking Law give authority to the supervisory agency to intervene-that is, suspend some or all ownership rights-a problem bank? Yes / No
(b) Supervisory Forbearance Discretion	Whether the supervisory authorities may engage in forbearance when confronted with violations of laws and regulations or other imprudent behavior.	WBG 11.9.4 + (12.10 - 1) * (-1) + (11.8 -1) * (-1) + (12.11 - 1) * (-1) Yes = 1; No = 0 Sum of these assigned values such that higher values indicate greater discretion.	11.9.4 Can the supervisory agency or any other government agency forbear certain prudential regulations? Yes / No 11.8 Does the Law establish pre-determined levels of solvency deterioration which forces automatic actions (like intervention)? Yes / No 12.10 If an infraction of any prudential regulation is found by a supervisor, must it be reported? Yes / No 12.11 Are there mandatory actions in these cases? Yes / No

Table 1
Information on Bank Regulatory, Supervisory and Deposit Insurance Variables

Variable	Definition	Source and Quantification	World Bank Guide Questions
(c) Loan Classification Stringency	The classification of loans in arrears as sub-standard, doubtful and loss.	WBG 9.2.1 + 9.2.3 (days) If there is a loan classification system, the actual minimum number of days beyond which a loan in arrears must be classified as sub-standard, then doubtful, and finally loss are summed. Higher values indicate less stringency.	9.2 Classification of loans in arrears based on their quality: after how many days is a loan in arrears classified as: 9.2.1 Sub-standard ? 9.2.2 Doubtful? 9.2.3 Loss?
(d) Provisioning Stringency	The minimum required provisions as loans become sub-standard, doubtful and loss.	WBG 9.3.1 - 9.3.3 (percent) The sum of the minimum required provisioning percentages when a loan is successively classified as substandard, doubtful, and loss. If a range is provided, the minimum percentage is used. Higher values indicate greater stringency.	9.3 What are the minimum required provision as loans become: 9.3.1 Sub-standard? 9.3.2 Doubtful? 9.3.3 Loss?
(e) Diversification Index	Whether there are explicit, verifiable, quantifiable guidelines for asset diversification, and banks are allowed to make loans abroad.	WBG 7.1 + (7.2 - 1) * (-1) Yes = 1; No = 0 Sum of these assigned values, with higher values indicating more diversification.	7.1 Are there explicit, verifiable, and quantifiable guidelines regarding asset diversification? Yes / No 7.2 Are banks prohibited from making loans abroad? Yes / No
6. Official Supervisory Resource Variables			
(a) Supervisor Tenure	The average tenure of a professional bank supervisor.	WBG 12.9.1 (years)	12.8 What is the average tenure of current supervisors (i.e., what is the average number of years current supervisors have been supervisors)?
(b) Independence of Supervisory Authority	The degree to which the supervisory authority is independent.	WBG 12.2, 12.2.1 and 12.2.2 1 = low independence; 2 = medium independence; 3 = high independence	12.2 To whom are the supervisory bodies responsible or accountable? 12.2.1 How is the head of the supervisory agency (and other directors) appointed? 12.2.2 How is the the head of the supervisory agency (and other directors) removed?
7. Private Monitoring Variables			
(a) Certified Audit Required	Whether there is a compulsory external audit by a licensed or certified auditor.	WBG 5.1 * 5.3 (Yes = 1; No = 0)	5.1 Is an external audit a compulsory obligation for banks? Yes / No 5.3 Are auditors licensed or certified? Yes / No
(b) Percent of 10 Biggest Banks Rated by International Rating Agencies	The percentage of the top ten banks that are rated by international credit rating agencies.	WBG 10.7.1 (percent)	10.7.1 What percent of the top ten banks are rated by international credit rating agencies (e.g., Moody's, Standard and Poor)?
(c) No Explicit Deposit Insurance Scheme	Whether there is an explicit deposit insurance scheme and, if not, whether depositors were fully compensated the last time a bank failed.	WBG 1 if 8.1 = 0 and 8.4 = 0; 0 otherwise Yes =1; No =0 Higher values indicate more private supervision	8.1 Is there an explicit deposit insurance protection system? Yes / No 8.4 Were depositors wholly compensated (to the extent of legal protection) the last time a bank failed? Yes / No
(d) Private Monitoring Index	Whether (a) occurs, (b) equals 100%, (c) occurs, (d) occurs, off-balance sheet items are disclosed to the public, banks must disclose risk management procedures to the public, and subordinated debt is allowable (required) as a part of regulatory capital.	WBG (c) + (a) + [1 if (b) equals 100% ; 0 otherwise] + 10.4.1 + 10.5 + 3.5 + (d) Yes = 1; No = 0 Sum of assigned values, with higher values indicating more private supervision.	10.4.1 Are off-balance sheet items disclosed to the public? Yes / No 10.5 Must banks disclose their risk management procedures to the public? Yes / No 3.5 Is subordinated debt allowable (required) as part of capital? Yes / No
8. Deposit Insurance Scheme Variables			
(a) Deposit Insurer Power	Whether the deposit insurance authority has the authority to make the decision to intervene in a bank, take legal action against bank directors or officials, and has ever taken any legal action against bank directors or officers.	WBG 8.1.5 + 8.6 + 8.7 Yes = 1; No = 0 Sum of assigned values, with higher values indicating more power.	8.1.5 Does the deposit insurance authority make the decision to intervene a bank? Yes / No 8.6 Can the deposit insurance agency/fund take legal action against bank directors or other bank officials? Yes / No 8.7 Has the deposit insurance agency/fund ever taken legal action against bank directors or other bank officials? Yes / No
(b) Deposit Insurance Funds-to-Total Bank Assets	The size of the deposit insurance fund relative to total bank assets.	WBG 8.1.2 (pure number)	8.1.2 What is the ratio of accumulated funds to total bank assets?
(c) Moral Hazard Index	The degree to which moral hazard exists.	Demirguc-Kunt and Detragiache (2000) Higher values indicate more moral hazard.	

Table 1
Information on Bank Regulatory, Supervisory and Deposit Insurance Variables

Variable	Definition	Source and Quantification	World Bank Guide Questions
9. Market Structure Indicators			
(a) Bank Concentration	The degree of concentration of deposits in the 5 largest banks.	WBG 2.6 (pure number)	2.6 Of deposit-taking institutions in your country, what fraction of deposits is held by the five (5) largest banks?
(b) Foreign-Owned Banks	The extent to which the banking system's assets are foreign owned.	WBG 3.8 (percent)	3.8 What fraction of the banking system's assets is in banks that are 50% or more foreign owned?
(c) Government-Owned Banks	The extent to which the banking system's assets are government owned.	WBG 3.7 (percent)	3.7 What fraction of the banking system's assets is in banks that are 50% or more government owned?
(d) Fraction of Entry Applications Denied	The degree to which applications to enter banking are denied.	WBG (1.9.1 + 1.10.1) / (1.9 + 1.10) (pure number)	1.9 In the past five years, how many applications for commercial banking licenses have been received from domestic entities? 1.9.1 How many of those applications have been denied? 1.10 In the past five years, how many applications for commercial banking licenses have been received from foreign entities? 1.10.1 How many of those applications have been denied?
(1) Foreign Denials	The degree to which foreign applications to enter banking are denied.	WBG 1.9.1 / 1.9 (pure number)	1.9 In the past five years, how many applications for commercial banking licenses have been received from domestic entities? 1.9.1 How many of those applications have been denied?
(2) Domestic Denials	The degree to which domestic applications to enter banking are denied.	WBG 1.10.1 / 1.10 (pure number)	1.10 In the past five years, how many applications for commercial banking licenses have been received from foreign entities? 1.10.1 How many of those applications have been denied?

Note: WBG denotes World Bank Guide, which is available at www.worldbank.org/research/interest/intrstweb.htm.

Table 2
Correlations among Selected Regulatory and Supervisory Variables

	Entry into Banking Require-ments	Entry Applications Denied (%)	Capital Regulatory Index	Restrictions on Bank Activities	Private Monitoring Index	Moral Hazard Index	Official Supervisory Power	Prompt Corrective Power	Diversification Guidelines	No Foreign Loans	Government-Owned Banks (%)	Foreign-Owned Banks (%)	Ln(GNP/ Capita)
Entry into Banking Requirements	1	-0.099 (0.417)	0.095 (0.365)	0.087 (0.402)	-0.160 (0.122)	-0.181 (0.200)	0.146 (0.159)	0.156 (0.130)	0.076 (0.466)	0.012 (0.908)	-0.142 (0.194)	0.137 (0.228)	-0.059 (0.570)
Entry Applications Denied (%)		1	-0.518 (0.000)	0.417 (0.000)	-0.249 (0.037)	-0.162 (0.317)	0.004 (0.974)	0.008 (0.945)	-0.108 (0.373)	0.312 (0.009)	0.389 (0.001)	0.116 (0.371)	0.131 (0.282)
Capital Regulatory Index			1	-0.312 (0.002)	0.152 (0.143)	0.390 (0.005)	-0.014 (0.893)	0.012 (0.912)	0.154 (0.138)	-0.049 (0.638)	-0.160 (0.146)	0.017 (0.885)	0.224 (0.031)
Restrictions on Bank Activities				1	-0.119 (0.251)	-0.199 (0.149)	0.088 (0.400)	0.125 (0.231)	-0.152 (0.144)	0.223 (0.032)	0.292 (0.007)	0.088 (0.444)	-0.093 (0.360)
Private Monitoring Index					1	-0.208 (0.140)	0.185 (0.073)	0.152 (0.143)	0.124 (0.232)	-0.121 (0.245)	-0.390 (0.000)	-0.072 (0.528)	-0.099 (0.341)
Moral Hazard Index						1	0.071 (0.617)	0.223 (0.112)	0.026 (0.852)	-0.184 (0.193)	-0.030 (0.840)	-0.186 (0.237)	0.023 (0.864)
Official Supervisory Power							1	0.479 (0.000)	0.258 (0.012)	-0.012 (0.909)	-0.071 (0.520)	0.100 (0.382)	-0.036 (0.734)
Prompt Corrective Power								1	0.256 (0.012)	0.040 (0.699)	-0.092 (0.401)	-0.030 (0.796)	-0.022 (0.830)
Diversification Guidelines									1	-0.117 (0.260)	-0.131 (0.233)	0.009 (0.935)	0.021 (0.843)
No Foreign Loans										1	0.286 (0.008)	-0.036 (0.753)	-0.010 (0.925)
Government-Owned Banks (%)											1	-0.275 (0.014)	-0.056 (0.616)
Foreign-Owned Banks (%)												1	0.000 (0.999)
Ln(GNP/Capita)													1

Note: P-values in parentheses under the correlation coefficients.

Table 3

Government Integrity, Regulation, and Supervision

Dependent Variable: Integrity of the Political System (bigger values imply less corruption)

Panel A: Government Integrity

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Entry into Banking Requirements	-0.096														
	(0.508)														
Limitations on Foreign Bank Entry/Ownership		-0.250													
		(0.456)													
Entry Applications Denied (%)			-3.005												
			(0.000)												
Capital Regulatory Index				0.315											
				(0.007)											
Restrictions on Bank Activities					-0.307										
					(0.000)										
Private Monitoring Index						0.202									
						(0.098)									
Moral Hazard Index							0.090								
							(0.269)								
Official Supervisory Power								-0.131							
								(0.050)							
Prompt Corrective Power									-0.144						
									(0.073)						
Diversification Guidelines										0.733					
										(0.053)					
No Foreign Loans											-1.707				
											(0.000)				
Government-Owned Banks (%)												-2.920			
												(0.001)			
Foreign-Owned Banks (%)													0.284		
													(0.734)		
Supervisory Independence														0.419	
														(0.045)	
Multiple Supervisory Agencies															0.416
															(0.294)
Ln(GNP/Capita)	0.135	0.109	0.121	0.010	0.015	0.176	0.206	0.117	0.118	0.136	0.135	0.099	0.125	0.138	0.142
	0.2872	(0.416)	(0.386)	(0.941)	(0.887)	(0.153)	(0.109)	(0.330)	(0.359)	(0.276)	(0.231)	(0.406)	(0.367)	(0.277)	(0.266)
Constant	3.399	3.315	3.378	1.988	6.629	0.980	2.198	4.226	3.099	2.422	2.962	3.427	2.443	1.883	2.642
	(0.023)	(0.006)	(0.007)	(0.027)	(0.000)	(0.466)	(0.042)	(0.001)	(0.005)	(0.016)	(0.002)	(0.001)	(0.033)	(0.073)	(0.011)
R-square	0.030	0.034	0.279	0.130	0.276	0.065	0.075	0.075	0.074	0.081	0.191	0.179	0.018	0.079	0.031
N	61	48	45	60	67	62	53	61	61	61	61	55	49	60	62

Panel B: The Mitigating Effects of Open Political Systems

	Constant	Official Supervisory Power	Political Openness	[Official Supervisory Power]*[Political Openness]	Ln(GNP/Capita)	R-Square	N
Government Integrity =	5.659	-0.159	-0.235	0.096	-0.067	0.41	56
	(0.000)	(0.013)	(0.606)	(0.013)	(0.569)		

Note: P-values in parentheses under the estimated coefficients.

Table 4
Bank Development, Regulation, and Supervision
Dependent Variable: Bank Development

	1	2	3	4	5	6	7	8	9	10	11	12	13
Entry into Banking Requirements	-0.035												
	(0.236)												
Limitations on Foreign Bank Entry/Ownership		-0.019											
		(0.727)											
Entry Applications Denied (%)			-0.457										
			(0.000)										
Capital Regulatory Index				0.056									
				(0.013)									
Restrictions on Bank Activities					-0.061								
					(0.000)								
Private Monitoring Index						0.070							
						(0.001)							
Moral Hazard Index							0.011						
							(0.567)						
Official Supervisory Power								-0.006					
								(0.684)					
Prompt Corrective Power									-0.026				
									(0.082)				
Diversification Guidelines										0.110			
										(0.187)			
No Foreign Loans											-0.131		
											(0.263)		
Government-Owned Banks (%)												-0.500	
												(0.000)	
Foreign-Owned Banks (%)													-0.161
													(0.278)
Ln(GNP/Capita)	0.011	0.030	0.000	-0.008	-0.002	0.021	0.043	0.012	0.011	0.013	0.017	0.005	0.019
	(0.666)	(0.246)	(0.997)	(0.758)	(0.917)	(0.383)	(0.150)	(0.638)	(0.672)	(0.629)	(0.528)	(0.854)	(0.410)
Constant	0.615	0.241	0.539	0.222	1.068	-0.186	0.175	0.419	0.417	0.308	0.340	0.502	0.294
	(0.021)	(0.263)	(0.032)	(0.274)	(0.000)	(0.418)	(0.466)	(0.172)	(0.067)	(0.160)	(0.108)	(0.020)	(0.106)
R-square	0.014	0.020	0.138	0.071	0.184	0.102	0.041	0.005	0.033	0.024	0.020	0.101	0.026
N	88	66	64	87	94	89	56	88	88	88	87	79	73

Note: P-values in parentheses under the estimated coefficients.

Table 5
Banking Crises, Regulation, and Supervision
Dependent Variable: Crisis

	1	2	3	4	5	6	7	8	9	10	11	12	13
Entry into Banking Requirements	-0.437												
	(0.055)												
Limitations on Foreign Bank Entry/Ownership		0.988											
		(0.010)											
Entry Applications Denied (%)			0.136										
			(0.861)										
Capital Regulatory Index				-0.203									
				(0.156)									
Restrictions on Bank Activities (1)					0.398								
					(0.003)								
Private Monitoring Index						0.014							
						(0.910)							
Moral Hazard Index							0.474						
							(0.000)						
Official Supervisory Power								-0.023					
								(0.777)					
Prompt Corrective Power									0.140				
									(0.114)				
Diversification Guidelines										-0.874			
										(0.048)			
No Foreign Loans											0.813		
											(0.221)		
Government-Owned Banks (%)												2.081	
												(0.052)	
Foreign-Owned Banks (%)													-1.467
													(0.047)
Ln(GNP/Capita)	-0.190	-0.108	-0.085	-0.203	-0.136	-0.163	-0.291	-0.163	-0.161	-0.163	-0.144	-0.108	-0.133
	(0.177)	(0.498)	(0.596)	(0.156)	(0.443)	(0.235)	(0.188)	(0.233)	(0.244)	(0.243)	(0.288)	(0.469)	(0.399)
Constant	4.826	0.348	0.565	1.283	-2.100	1.272	2.514	1.641	1.083	1.729	1.149	0.541	1.593
	(0.017)	(0.794)	(0.663)	(0.276)	(0.335)	(0.395)	(0.173)	(0.264)	(0.342)	(0.132)	(0.299)	(0.660)	(0.233)
N	94	70	69	93	62	95	56	94	94	94	93	84	78

Note: P-values in parentheses under the estimated coefficients.
Note (1): The sample for the Restrictions on Bank Activities regression is restricted to countries with some equity market activity

Table 6

Bank Development and Performance Regressions

Dependent Variable	Constant	Capital Regulatory Index	Private Monitoring Index	Official Supervisory Power	Entry into Banking Requirements	Government-Owned Banks	Restrictions on Bank Activities	Ln(GNP/Capita)	N	R-Square
Bank Development	0.700	0.010	0.057	-0.009	0.000		-0.058	-0.003	86	0.289
	(0.070)	(0.648)	(0.010)	(0.474)	(0.989)		(0.001)	(0.903)		
Net Interest Margin	0.037	-0.002	-0.003	0.000	0.004		0.002	-0.002	81	0.200
	(0.197)	(0.202)	(0.106)	(0.926)	(0.029)		(0.060)	(0.321)		
Overhead Costs	0.046	0.001	-0.003	0.000	0.003		0.000	-0.002	80	0.114
	(0.067)	(0.725)	(0.030)	(0.876)	(0.045)		(0.856)	(0.307)		
Nonperforming Loans	0.203	-0.020	-0.020	0.003	0.005		-0.004	0.013	75	0.202
	(0.084)	(0.048)	(0.018)	(0.567)	(0.642)		(0.574)	(0.104)		

Dependent Variable	Constant	Capital Regulatory Index	Private Monitoring Index	Official Supervisory Power	Entry into Banking Requirements	Government-Owned Banks	Restrictions on Bank Activities	Ln(GNP/Capita)	N	R-Square
Bank Development	0.974	0.011	0.038	-0.004	-0.006	-0.116	-0.067	-0.011	77	0.350
	(0.025)	(0.622)	(0.218)	(0.811)	(0.859)	(0.520)	(0.000)	(0.573)		
Net Interest Margin	0.048	-0.001	-0.004	0.000	0.004	0.010	0.003	-0.003	71	0.253
	(0.197)	(0.500)	(0.127)	(0.961)	(0.029)	(0.531)	(0.042)	(0.194)		
Overhead Costs	0.024	0.001	-0.003	0.000	0.005	0.029	0.000	-0.002	70	0.209
	(0.444)	(0.479)	(0.176)	(0.909)	(0.014)	(0.083)	(0.951)	(0.315)		
Nonperforming Loans	0.049	-0.019	-0.007	0.000	0.014	0.193	-0.008	0.016	70	0.288
	(0.717)	(0.053)	(0.431)	(0.931)	(0.162)	(0.001)	(0.226)	(0.038)		

Note: P-values in parentheses under the estimated coefficients.

Table 7
Banking Crises Regressions

	1	2	3	4	5
N	83	50 (1)	44	53	42
Restrictions on Bank Activities	0.063	0.511	0.410	0.452	0.575
	(0.527)	(0.017)	(0.072)	(0.034)	(0.038)
Entry into Banking Requirements	-0.262	-0.115	-0.147	-0.337	-0.775
	(0.244)	(0.650)	(0.665)	(0.263)	(0.055)
Capital Regulatory Index	0.123	-0.087	-0.413	0.081	0.404
	(0.428)	(0.725)	(0.258)	(0.765)	(0.245)
Private Monitoring Index	0.270	0.285		0.059	0.092
	(0.142)	(0.329)		(0.839)	(0.830)
Official Supervisory Index	-0.076	-0.125	-0.063		-0.242
	(0.466)	(0.401)	(0.743)		(0.203)
Government-Owned Banks	2.765	7.010	0.912	0.144	-0.306
	(0.020)	(0.016)	(0.687)	(0.946)	(0.932)
Ln (GNP/Capita)			0.077	0.038	0.377
			(0.840)	(0.899)	(0.453)
Inflation			0.040	0.059	0.150
			(0.185)	(0.021)	(0.024)
Moral Hazard Index			0.806		
			(0.000)		
Diversification Index				-13.231	
				(0.034)	
Diversification Index*Ln (GNP)				0.493	
				(0.040)	
Limitations on Foreign Bank Entry/Ownership					1.658
					(0.016)

Note: Each column gives complete logit results.
P-values in parentheses under the estimated coefficients. Based on QML (Huber/White) standard errors.
Note (1): The sample for this regression is restricted to countries with some equity market activity

Table 8
Moral Hazard Index and Bank Crises: Interaction Terms
Dependent Variable: Major Banking Crisis

	1	2	3	4	5
Constant	-1.062	-2.960	0.168	-0.774	-1.023
Restrictions on Bank Activities	0.410 *	0.639 **	0.410 *	0.404 *	0.397 *
Entry into Banking Requirements	-0.147	-0.038	0.023	-0.168	-0.151
Capital Regulatory Index	-0.413	-0.910 *	-0.609 *	-0.404	-0.385
Official Supervisory Index	-0.063	-0.219	-0.027	-0.099	-0.079
Government-Owned Banks	0.912	4.910	1.991	0.758	0.886
Ln (GNP/Capita)	0.077	0.346	0.063	0.099	0.070
Inflation	0.040	0.040	0.030	0.044	0.042
Moral Hazard Index	0.81 **	1.448 **	2.239 **	1.297 *	0.461
Moral Hazard Index*Political Openness		-0.384 *			
Political Openness		0.527			
Moral Hazard Index*Rule of Law			-0.298 **		
Rule of Law			-0.209		
Moral Hazard Index*Official Supervisory Power				-0.049	
Moral Hazard Index*Capital Regulatory Index					0.064
N	44	40	42	44	44

Note: ** indicates significant at the 0.05 level, while * indicates significant at the 0.10 level.
Estimated using a logit and with QML (Huber/White)
standard errors.