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## Role of Capital Regulation

Over the past 25 years, banking regulation in the United States and to some extent in other G-10 countries has been characterized by two noteworthy trends. First, capital adequacy requirements have become the most important type of regulation designed to protect bank safety and soundness. Basel I both reflected and accelerated this growing emphasis on capital adequacy. Second, there has been a shift away from a bank regulatory system that rests principally on generally applicable rules toward a “supervisory” approach that emphasizes particularized review of the activities of a specific bank. Especially with respect to large, complex banking institutions, this regulatory technique relies increasingly on assuring the sophistication and integrity of a bank’s own risk management systems (DeFerrari and Palmer 2001).<sup>1</sup>

For a time these trends were in some conflict with one another, as Basel I applied the same minimal capital requirements to all banks.<sup>2</sup>

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1. Then-chairman of the Federal Reserve Board Alan Greenspan summed up this trend in remarks on banking regulation to the Independent Community Bankers of America National Convention, March 11, 2005: “Over the past 15 years or so, supervision has focused on ensuring that bank management has in place policies and procedures that will contain such risk and that management adheres to those policies and procedures. Supervision has become increasingly less invasive and increasingly more systems- and policy-oriented. These changes have been induced by evolving technology, increased complexity, and lessons learned from significant banking crises, not to mention constructive criticism from the banking community.”

2. Still, within a few years after Basel I took effect, influential regulators were already urging a shift away from traditional bank regulation. In 1994, Fed Chairman Greenspan said that banks and other financial institutions would have to be increasingly “self-regulated largely

Now, however, the two trends have converged in the advanced internal ratings-based (A-IRB) approach of Basel II. The new accord increases the centrality of capital regulation but does so principally by promoting the adoption of highly developed risk assessment capabilities by the banks themselves. That an international arrangement should so influence bank regulation in the United States and other G-10 countries is remarkable. Yet the very centrality of the A-IRB approach to bank regulation in the coming years means that any limitations of that approach could have serious repercussions. As a prelude to examination of the two Basel frameworks on minimum capital requirements, this chapter provides an introduction to the rationale for regulating bank capital levels and a brief account of how capital requirements assumed rapidly increasing importance in the years prior to Basel I.

## Rationale for Capital Regulation

Policymakers and commentators often begin a discussion of bank capital adequacy requirements by citing their role in providing a buffer against bank losses, protecting creditors in the event a bank nonetheless fails, and creating a disincentive to excessive risk taking or shirking by bank owners and managers.<sup>3</sup> The first two effects exist almost by definition, though they are no less important for that; the important issue is *how much* of a buffer and protection are provided. A firm with no capital will become insolvent upon an unexpected loss, potentially leading to bankruptcy proceedings and consequent losses to some or all creditors. A capital buffer, on the other hand, reduces the chances that the firm will fail. This is obviously important to creditors. Where the firm is a bank, it is also important to society to the degree that failure will result in the loss of economically valuable relationships, investments, or knowledge.

The justifying principle that capital requirements contain risk taking is of more recent vintage.<sup>4</sup> In fact, it is questioned from time to time by

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because government regulators cannot do that job." See John Gapper, "Fed Chief Sees Need for Self-Regulation," *Financial Times*, June 9, 1994, 1.

3. Policymakers and commentators frequently list half a dozen or more purposes of capital. Some, such as providing a ready source of financing for new activities, are undoubtedly important but of only marginal importance to the subject of capital regulation. Others, such as protecting a government deposit insurance fund or counteracting the inefficiencies in capital allocation resulting from the government safety net, are derivative of, or at least closely related to, one of the basic functions noted in the text.

4. Discussions of bank capital regulation dating from the 1960s and 1970s generally omit any mention of the risk-confining role of capital requirements. However, by the time of adoption of Basel I in 1988, the rationale was not only well developed, but emphasized (Bank for International Settlements 1989).

various academics who have devised models suggesting that capital requirements may under some circumstances *increase* risk taking (Kim and Santomero 1988).<sup>5</sup> Still, regulators and many academics now seem to accept the proposition that well-conceived capital requirements will generally discourage undue risk-taking (Santos 2001).<sup>6</sup> In any case, as explained more fully below, the role of capital in containing risky business behavior has become a key element of prevailing explanations of why private creditors are concerned with capital levels of the firms to which they lend.

Of course, the magnitude of these salutary effects depends on the level of the capital required, the establishment of which requires a trade-off between these stabilizing effects and the opportunity costs of restricting use of the capital. But this exercise is necessary only after the decision to regulate capital. Why should capital standards be imposed in the first place? This question is best answered by following the lead of Berger, Herring, and Szego (1995), who first specify why market actors demand that their counterparties hold certain capital levels and then consider why the resulting market-generated demands may produce socially suboptimal levels in banks, as opposed to other corporations.

In the absence of a dependable third-party guarantee, lenders want assurance that a borrower will be sufficiently solvent and liquid to repay its debt in accordance with the contractual terms of the loan, bond, or other extension of credit. Owners and, at least presumptively, managers of the enterprise have an incentive to use debt capital for projects that have the potential for very high profits. Of course, projects that may yield big returns are also more likely to be risky and to result in losses that will threaten the ability of the borrower to repay its loans. The incentive for risk taking increases as a firm approaches insolvency: the limited liability of the shareholders means the owners have increasingly

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5. As, indeed, there continue to be academic challenges to the benefits of capital regulation more generally. See, for example, Allen and Gale (2003).

6. There may nonetheless be circumstances where capital requirements might encourage risk-taking by banks. For example, Blum (1999) has argued that an increase in capital requirements can lead to short-term increases in risk taking by banks attempting to increase their equity base before the tighter regulation takes effect. Calem and Rob (1999) find a U-shaped relationship between capital position and risk taking, in which severely undercapitalized banks take the most risk. As capital rises, the bank takes less risk, but as capital reaches higher levels, it will resume taking on more risk. Calem and Rob (1999, 336) conclude “that a minimum capital standard has a favorable effect on risk of failure to the extent that banks are required to be well removed from the range of maximal risk taking,” but that significant reductions in the probability of insolvency for banks out of that range can be achieved only with stringent capital standards. Jeitschko and Jeung (2005) explain how relevant actors—deposit insurers, shareholders, and managers—have varying proclivities toward bank assumption of risk in differing circumstances. Thus the risk-assumption behavior of a bank will depend in part on which actor is exercising the most influence.

little to lose through a high-risk strategy. If things turn out well, the risky ventures will have saved the company and increased the equity of the owners. If things do not turn out well, the firm goes bankrupt, leaving the owners not much worse off. Because creditors generally do not share in the profits of an enterprise, and thus do not gain when a risky venture pays off, their preference is that their debtor be managed relatively conservatively.

A related problem is that, all else being equal, a debtor has an incentive to leverage its enterprise as much as possible so that potentially high profits from its ventures will be spread over a narrower equity base. A creditor, on the other hand, wishes to maximize the chances that the enterprise will have adequate resources to service *all* its debt, and thus wants limits on the total amount of debt assumed by the borrower.<sup>7</sup> The potential for opportunistic behavior by debtors will cause lenders to charge a higher risk premium unless their concerns can be allayed through devices such as covenants, priorities, and limits on total debt. A capital cushion can be understood as just one such device, but a particularly useful one, insofar as it helps guard against all kinds of opportunistic behavior, not just those kinds anticipated *ex ante* by the lender.

A debtor's capital also provides a buffer against economic reversals that do not result from its opportunistic behavior but from bad business judgments or bad luck. In the case of banks, the potential for both bad judgment and bad luck to affect asset values is obvious. Loan officers may fail to accurately gauge the creditworthiness of their borrowers, or unexpected exogenous shocks may diminish the value of whole categories of bank assets. A company whose assets just equal its liabilities is vulnerable to insolvency whenever an asset declines in value for any reason. A company perceived as vulnerable to insolvency will have a more difficult time retaining employees, maintaining relationships with suppliers and customers, and otherwise protecting the value of its franchise as an ongoing business. Hence bankruptcy becomes more likely (Berger, Herring, and Szego 1995). An insolvent company's assets will usually depreciate even further for the same reasons, as well as because of the transactions costs that bankruptcy entails. Again, in the absence of protective devices, lenders will respond to the anticipated risk of their debtor's insolvency by demanding a higher premium for their credit.

The possibility for opportunistic behavior and vulnerability to insolvency can significantly raise the cost of debt capital to borrowers. The un-

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7. More precisely, a specific creditor will be concerned both that the debtor be able to service all its debt so as to avoid the insolvency costs discussed below and that, if insolvency should nonetheless occur, there will be sufficient assets to pay off all the debt having the same bankruptcy priority as the creditor's. For creditors holding subordinated debt of a borrower, the two considerations essentially merge.

certainties detailed above may be particularly acute in lending to financial institutions, whose assets are notoriously difficult for outsiders to evaluate. Thus the asymmetry of information between corporate insiders and lenders that exists in any situation is compounded in the case of banks. One would, accordingly, expect even higher risk premiums to be charged. A bank wishing to access credit can reduce the risks of lending to it by maintaining the value of its assets above the sum of its liabilities. The difference between these two amounts is, of course, the company's net worth, a concept roughly equivalent to that of a company's "core" capital. Any company, including a bank, should seek to optimize its capital structure by increasing its capital until the point at which the cost of additional equity is greater than the anticipated benefit in reduced risk premia on its borrowings (assuming, of course, that the company has projects that will yield sufficient returns to justify the costs of obtaining additional capital).<sup>8</sup> Thus, while lenders may be unwilling to advance credit at *any* price to a company with zero or negative capital, generally the market does not so much "demand" that borrowers maintain certain capital levels as it does price credit based on the amount of capital actually maintained by the borrower.<sup>9</sup>

The salutary effects of a capital cushion on the cost of debt apply to *all* corporations, not just banks. However, governments generally do not impose capital requirements, except on companies in the financial sector, where special circumstances are thought to necessitate this form of regulation. Although the conventional justifications for capital requirements vary among industries within the financial sector, they rest on some combination of information problems, moral hazard, and systemic risk.<sup>10</sup>

The rationale for bank capital requirements begins with the fact that as deposit insurer or lender of last resort, or both, the government is

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8. Berger, Herring, and Szego (1995) also factor in the impact of the tax advantage of debt capital and the divergence of interests between shareholders and managers on a firm's optimal capital structure.

9. A different, though not incompatible, rationale for creditors to demand certain capital levels is developed by Rochet (2004), who suggests that bank owners and managers will, as the bank's equity shrinks, lose their incentive to monitor the performance of the bank's own assets—that is, the loans it has made—since they no longer have anything to lose. Capital requirements assure that they retain the monitoring incentive. This is a particularly interesting theoretical justification for capital requirements insofar as it builds on one important economic explanation for the existence of banks—their ability to monitor users of debt capital more effectively than either nonspecialists or markets possessed only of publicly available information.

10. Traditionally, capital requirements for securities firms are a kind of sophisticated consumer protection device that assures full and quick repayment of all counterparties in the event of the firm's insolvency. The celebrated 1998 bankruptcy of Long-Term Capital Management (an unregulated hedge fund rather than a securities firm regulated by the Securities and Exchange Commission) led to some concern over the impact of a large security holder's insolvency on markets generally, as well as on its counterparties. The existence of systemic-type risks attendant to a securities firm failure, while contested by others, was

potentially the largest creditor of a bank. It thus shares the interests of other creditors in avoiding the costs of financial distress and preventing the exploitation of opportunistic behavior by shareholders and management of the bank. However, the government's extensions of credit differ significantly from those of private lenders. As to the lender-of-last-resort function, actual extensions of credit are rare. When they do occur, the central bank (or other lenders of last resort) should theoretically be able to set the terms for its lending. In practice, the lender-of-last-resort function is most likely to be exercised in exigent circumstances that include the possibility of contagion in other parts of the banking system should the troubled bank fail. Thus the central bank may believe it has little practical choice, in either financial or political terms, but to provide the credit needed to keep the bank afloat. At least for those banks considered too big to fail, the government's lender-of-last-resort role can be understood as providing a vaguely specified, but still significant, guarantee of the bank's obligations.

With respect to deposit insurance, the government is an explicit guarantor of the bank's debt to insured depositors. Precisely for this reason, an insured depositor will generally not care whether the bank is adequately capitalized. The depositor's relative indifference to the bank's condition essentially negates the possibility of runs and panics, of course. But the resulting moral hazard also expands the scope for opportunistic bank behavior and exposes the government insurer to loss, because depositors will neither demand levels of capital commensurate with the bank's ability to pay its deposits nor monitor the bank's financial condition.

Two features of deposit insurance systems further complicate the situation. First, the guarantee automatically attaches to new deposits. That is, the government has no opportunity to decide whether to extend its guarantee as new deposits are made. Second, despite a strong theoretical case for establishing a premium schedule for deposit insurance that closely tracks the riskiness of the bank, actual deposit insurance systems only weakly reflect the actual risk that the bank will not be able to repay its depositors in a full and timely fashion.<sup>11</sup> The government's credit exposure to its banks is thus created more or less automatically, without the particularized evaluation of the bank's capital and risk profiles that a pri-

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obviously believed by the Federal Reserve when it acted to support Bear Stearns in March 2008. Capital requirements for insurance companies are generally secondary to provisioning requirements. Here, too, though, the principal rationale is one of consumer protection; policyholders are assumed to have neither an adequate incentive to expend the resources necessary to monitor the financial condition of the insurance company nor, even if they did, the ability to discern the actual value of the company's often opaque assets. Comparisons of the rationales and operation of capital requirements in the securities, insurance, and banking industries are presented in Basel Committee on Banking Supervision Joint Forum (2001).

11. Comparing estimates of actuarially fair deposit insurance prices with actual premiums, Laeven (2002) concludes that deposit insurance premiums are generally underpriced. Cull, Senbet, and Sorge (2004) conclude that, even in countries with risk-adjusted premia,

vate lender is assumed to make in setting the terms on which it will offer credit. The government's recourse is to regulate the bank's safety and soundness on an ongoing basis. Historically, of course, safety and soundness regulation has taken many forms. As explained in the next part of this chapter, though, capital adequacy regulation is increasingly central to safety and soundness regulation. This trend has created a closer conceptual link between one important rationale for bank regulation and the dominant regulatory paradigm.<sup>12</sup>

Although the justification for capital regulation begins with the government's credit exposure to commercial banks, it may not end there. Note first that the preceding account highlighted the effect of the government safety net on the perceptions and incentives of a bank's private counterparties. If the result is a belief that the bank will be bailed out by the government should it face serious liquidity or solvency problems, then private market actors may not demand that the bank hold as much capital as the terms of their credit exposures would otherwise require in order to yield an appropriate risk-adjusted return. In that event, the government's capital requirements might have to compensate for the moral hazard created with respect to all of a bank's creditors.<sup>13</sup>

An additional rationale is that the government can use capital regulation to reduce the chances of bank failures that cause significant negative externalities. Most obvious is the potential for systemic risk. A bank failure could endanger another bank that has extended credit to the first bank through the interbank lending market or is expecting funds from the

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there is no effective deterrence of risk taking. These studies appear to confirm theoretical arguments, such as that of Chan, Greenbaum, and Thakor (1992), which suggested the impossibility of implementing incentive-compatible, fairly priced insurance. Freixas and Rochet (1995) conclude that fair pricing *is* feasible but that it is not desirable from a welfare perspective.

12. There is another interesting parallel in US law between the protective devices adopted by private creditors and the regulatory techniques used by government. The Federal Deposit Insurance Corporation Improvement Act of 1991 added to US banking regulation an elaborate mechanism for "prompt corrective action" by banks to bring capital levels that have fallen below requirements back up to the regulatory minimum. Although intended principally as a device to force early intervention by bank supervisors suspected of regulatory forbearance during the savings and loan debacle of the 1980s, the prompt corrective action mechanism is roughly analogous to action by bondholders or other lenders under covenants contained in their indentures or loan agreements. Acharya and Dreyfus (1989) had previously suggested that governments should price deposit insurance in the same way that private creditors would establish closure rules and covenants in their lending agreements. Similarly, Rochet (2004) suggests that his proposal for regulators to close a bank when subordinated debt prices fall below a certain level is analogous to the action a private lender would take in accordance with relevant covenants.

13. In fact, as discussed in chapter 5, nearly all banks in G-10 countries hold capital substantially in excess of current regulatory requirements. Commentators dispute, and speculate over, the reasons for this practice.

first bank for the accounts of its customers through the payments system. Since the social costs of widespread financial instability would be substantial and would not be borne solely by the shareholders and creditors of the bank whose failure triggered the crisis, the government might justify requiring higher levels of capital as an effort to align the social benefits and costs of the bank's operations more closely.

Although some academics have questioned the significance of systemic risk, particularly as credit exposure in the payments system has been progressively reduced,<sup>14</sup> bank regulators all appear to believe that it is real, if indeterminate.<sup>15</sup> Nonetheless, regulators generally seem not to invoke this justification for capital requirements, at least not explicitly.<sup>16</sup> To the contrary, former Federal Reserve Chairman Alan Greenspan expressly disclaimed any such justification. In his view, stated while he was chairman, the "management of systemic risk is properly the job of the central banks" and "banks should not be required to hold capital against the possibility of overall financial breakdown" (Greenspan 1998, at 167). Not all regulators have taken so clear a position, but the extensive official Basel Committee commentary on the Basel II process has not cited prevention of systemic risk as either a rationale for the existence of capital adequacy requirements or as a factor in setting them. As discussed below, systemic concerns should perhaps not be dismissed so readily in framing capital adequacy requirements, but as a factual matter they are not invoked in official justifications for Basel II.

Another negative externalities argument is that bank failures can lead to the dissipation of information on borrower creditworthiness that is costly to develop. This argument builds on an important economic explanation for the existence of financial intermediaries: that they develop information on potential borrowers and borrower projects that allows them to distinguish good loans from ill-advised ones. The costliness and often proprietary character of this information lead banks to keep much of it nonpublic, other than the signal of creditworthiness that the extension of the loan itself conveys. Banks also develop expertise in monitoring particular borrowers to protect their loans. The resulting information and ex-

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14. For examples of such skepticism, see Scott (2005) and Benston and Kaufman (1995).

15. Indeed, the anxiety of regulators over the potential for systemic risk was dramatically illustrated in March 2008, when the Federal Reserve Bank of New York provided certain financial guarantees to facilitate the sale of Bear Stearns to JPMorgan Chase. Bear Stearns was not a commercial bank, and thus, under conventional understandings, would have had no access to the Fed's discount window or similar sources of financial assistance. The Federal Reserve Bank of New York's action, taken in the midst of the subprime crisis, has far-reaching implications for the scope and reach of financial regulation.

16. Sometimes, though, it is invoked indirectly. See, for example, the remarks of Howard Davies, then chairman of the UK Financial Services Authority, at the Basel Capital Accord Conference, London, April 10, 2001.

expertise may be lost when banks fail. In extreme circumstances, the result may be negative macroeconomic effects (Bernanke 1983).

Short of genuine systemic risk, then, bank failures can still create social costs that are not internalized to the bank and its stakeholders. Of course, whether the bank information and expertise are actually lost depends on the mode of resolving bank failures. If the bank is simply liquidated, such a consequence will follow. More often, though, bank failures result in acquisition by a stronger bank of at least the performing assets of the insolvent bank. To the degree the acquiring bank also takes on the loan officers and records of the failed bank, these informational assets should be preserved (though in practice some fraction of borrower relationships is usually lost). Even if the informational consequences are significant, then, it is possible that the more efficient way to deal with them may be through the resolution process, rather than by requiring higher capital levels to prevent insolvency.<sup>17</sup>

The merits of the theoretical case for capital adequacy regulation cannot in themselves justify the pivotal role it has come to play in contemporary banking law and international cooperative arrangements. For purposes of fashioning a sound regulatory system, the question of *how much* capital banks should be required to hold is as important as the question of whether they should be subject to capital requirements at all. Answering this question involves both identifying the principle for making this calculation and determining whether that principle can be implemented in a workably feasible fashion that can bear the reliance now being placed on it by banking supervisors throughout the world. Succeeding chapters will consider certain practical and administrative considerations in some detail. The remainder of this section first deals with the conceptual issue of a principle for deriving the required levels of capital and then examines the overarching practical question of how to measure the risk assumed by banks.

At first glance, the standard for regulatory capital levels looks relatively easy to set, at least as a conceptual matter. As Santomero and Watson (1977) suggested well before the Basel I process was even under way, the government should establish minimum capital requirements that equalize

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17. Bank regulators have, in part for this reason, traditionally favored resolution of bank failures through merger or acquisition of most of the failed bank's assets, even at a higher cost to the public than would have been incurred under a simple liquidation. In the United States, such a preference is technically no longer permitted. As part of the Federal Deposit Insurance Corporation Improvement Act of 1991, one piece of reform legislation following the 1980s savings and loan debacle, Congress enacted the "least cost alternative" rule, under which the FDIC may not opt for a resolution that costs taxpayers more than would a basic deposit payout. This provision is codified in Title 12 of the United States Code §1823(c)(4). Because relatively few banks have failed in recent years, there is not an adequate basis on which to judge whether more failed banks will end up being essentially liquidated. Although experience to date is limited, most failures still result in at least partial asset acquisitions by other banks.

the marginal returns from bank capital requirements (i.e., the social benefit of reduced risk of costly bank failures) and the marginal cost of capitalization (i.e., the social cost of the reduced financial intermediation resulting from higher capital requirements). Writing in the context of a public policy debate over the decline in bank capital, Santomero and Watson pointed out that bankers tended to overlook the noninternalized costs of bank failure, while regulators tended to overlook the opportunity costs of higher bank capital levels.

If the regulator regards systemic risk or other negative externalities associated with bank failures to be both significant and appropriately addressed through capital requirements, then required capital levels should be set such that the present value of the expected return from an additional dollar of lending would just exceed the reduction that would be achieved in the risk of all losses attendant to bank failure (also discounted to present value) by adding that dollar to the bank's capital. On the other hand, if the regulator is convinced by the academic skeptics of systemic risk or, like Greenspan, believes systemic risk is best insured directly by the central bank as lender of last resort, then the marginal social cost/benefit calculus should be similar to that of the marginal costs and benefits to private actors.<sup>18</sup> Indeed, Greenspan has said that "a reasonable principle for setting regulatory soundness standards is to act much as the market would if there were no safety net and all market participants were fully informed" (Greenspan 1998, at 167).<sup>19</sup> From the lender's perspective, the capital "demanded" is that which provides a buffer against insolvency at the level of probability associated with a competitive return on its investment at the contractual price of the capital (i.e., the interest rate). Thus, for example, if a bank held capital sufficient to reduce the probability of insolvency within a year to less than 0.1 percent, the approximate level associated with an "A" rating from Standard & Poor's, then credit to the bank would be priced as an A-rated bond would be.

The difficulties in calculating the amount by which additional capital in a particular bank would reduce systemic risk are self-evident. This alone might argue for Greenspan's standard. Whether or not an additional amount is to be added to reduce the possibility of the negative externali-

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18. Of course, social costs of bank failure other than those associated with systemic risk might be regarded as relevant by some regulators. They are omitted from the formula in the text because they are likely to be less significant in most instances than systemic risk and because, as suggested earlier, some of these costs might be better addressed in the procedures for resolving failed banks rather than through capital requirements.

19. As will be discussed more fully below, the Greenspan standard is not necessarily a theoretically sound one. Nor does it necessarily reflect official thinking at all times or of all supervisory agencies. In its comprehensive review of the banking system following the savings and loan crisis of the 1980s, the Treasury Department indicated that judgments about systemic risk were an essential part of capital regulation (US Department of the Treasury 1991).

ties associated with a systemic banking crisis, the regulatory standard would have to require *at least* the amount of capital that an uninsured private market actor would demand were it faced with the credit exposure borne by the government. Counterfactual analysis is always problematic, of course. Yet even in theory, the Greenspan standard does not provide a basis for setting capital levels as readily as one might have thought.

As already observed, the government's credit exposure to its banks is unlike that of private market actors. The latter extend funds to a firm in exchange for a promise to repay those funds, with an agreed amount of interest, at some later date. As noted earlier, the "demand" of a private creditor that the firm hold a particular amount of capital is really only a condition for charging a lower risk premium or, in some instances, for being willing to lend money at *any* rate. In seeking a competitive, risk-adjusted return, the private lender sets the interest rate it charges in light of what the firm's capital position suggests about the risk of nonpayment. However, the credit exposure of the government insurer of deposits is not a loan but a guarantee that a bank will repay depositors their principal and accrued interest should the bank fail. Hence the government cannot simply mimic the behavior of private lenders who take the capital position of the bank into account in extending credit with, or counterfactually, without, the safety net in place. The Greenspan standard of "acting much as the market would" must instead be applied by reference to what a private guarantor or insurer would do.

A private insurer would presumably price its service so as to provide it with funds that, when invested, would yield sufficient returns both to cover losses from insured events and to produce a competitive rate of return on the insuring company's own capital. Because government insurers of deposits do not—for a combination of technical, policy, and political reasons—set premiums in this way, capital requirements serve at least in part as a surrogate for a risk-sensitive premium structure. By this reasoning, a capital requirement mimicking private market behavior would require banks to hold capital at a level that reduced the probability of losses to the insurance fund such that returns on investment of the premiums actually charged would cover those losses and provide a reasonable rate of return.

Needless to say, no regulator sets capital requirements this way.<sup>20</sup> Governments are not in the business of insuring deposits in order to earn a competitive return on their investments. The government is the appropriate

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20. Note also that, were a government to set capital requirements based solely on its interests as a guarantor of bank deposit liabilities, it would have to require different capital levels of banks with identical portfolios of assets but different ratios of deposits to total liabilities. Although the first-best preference of a guarantor is that the insured firm not fail at all—a point that argues for similar capital levels for similarly risky banks—the second-best preference of a guarantor is that the insured firm have sufficient assets at insolvency to pay off higher-priority debt such as deposits.

insurer of deposits largely because private insurers lack the information necessary for them to price the insurance efficiently. The risks of an “extreme” event, in the form of a banking crisis resulting in massive losses to a deposit insurance fund, defy the sort of probabilistic quantification based on experience that insurers conduct to anticipate losses from insured events. In the face of this uncertainty, an insurer cannot calculate the resources it may need and thus cannot price efficiently. If it charges very high premia, the insurance will be little used and vulnerable to severe adverse selection effects. But if the pricing is such as to produce the level of insured deposits that exist in G-10 countries today, a banking crisis would likely bankrupt an insurer, except of course an insurer that is also the government lender of last resort. If depositors are aware that the insurer may be unable to pay off all deposit losses, they may revert to the depositor behavior associated with bank panics and runs in the absence of insurance. In either case, the outcome will be problematic. Hence the strong case for government involvement in the deposit insurance system, notwithstanding the moral hazard distortions attendant to it.

Thus, as with safety and soundness regulation more generally, a government’s decision on required capital levels necessarily involves a trade-off between the cost of capital to firms and individuals, on the one hand, and the possibility of disruptive bank failures, on the other. This trade-off may be implicit or explicit. The point, though, is that setting a target probability of bank insolvency within a year at, for example, less than 0.1 percent cannot be justified on the grounds that this is the level at which a firm earns an “A” rating from Standard & Poor’s. Instead, it must be defended on the grounds that it produces the optimal social trade-off between the cost of capital and the economic risks of bank failure.<sup>21</sup> The kinds of data relevant to such a calculation obviously include the probability density functions of bank insolvencies, but they do not determine the outcome, as, in theory, they determine the interest rate to be charged on credit privately extended to the bank.<sup>22</sup>

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21. There can certainly be private participation in a deposit insurance system, as, for example, in Germany. The nominally insured amount of deposits is much lower in Germany than in most other G-10 countries. Moreover, public authorities are involved in the management of the system. Most importantly, of course, the safety net does not disappear just because a deposit insurance system is nominally private. The lender-of-last-resort and discretionary powers of government authorities provide a critical backstop to deposit insurance schemes, whether public or private. In Germany, there are guarantees applicable to certain financial institutions, as well as deposits. Thus, even if a country were to have a fully privatized system of deposit insurance, in all probability the private insurer and the banks would understand that the government would provide assistance in a full-blown crisis. The pricing of deposit insurance would clearly be affected by the shared perception that the government would step in during an extreme tail event.

22. As mentioned earlier, the magnitude—and perhaps existence—of systemic risk is questioned by some academics. However, for purposes of setting a conceptual standard for capital

All this has three implications for capital regulation. First, it undermines conceptually the Greenspan standard of doing what market actors would do in dealing with the bank in the absence of a safety net. Second, it suggests that regulators cannot, in setting capital regulations, avoid taking at least implicit positions on the relative seriousness of systemic risk and the socially optimal trade-off between capital costs and bank failures.<sup>23</sup> These factors are very hard to quantify. But that fact just emphasizes that no financial model, whatever its sophistication, can provide an unassailable formula for capital requirements. Third, precisely because of the difficulties in making such determinations, *minimum* regulatory capital requirements should not be confused with *optimal* capital levels.<sup>24</sup>

The foregoing mention of probability functions of bank insolvencies returns us to the second issue identified at the beginning of this section—the measurement of risks that have been, or might be, assumed by banks. The trade-off between bank stability and reduced financial intermediation can only be assessed if one knows how much stability (i.e., reduction in chances of bank insolvency) one will buy with a particular capital requirement. While regulators have been generally vague or evasive on the first question of how much stability they want to achieve (and why), they have become progressively more focused on accurate assessments of what it will take to achieve a given level of stability. In fact, Basel II is almost entirely an effort to more accurately calibrate the risks faced by banks.

A bank is exposed to various risks that could spell serious trouble for its continued solvency. The taxonomy of bank risks is extensive and can vary among analysts. Most obvious and, traditionally at least, most important is the credit risk that its borrowers will not repay their loans in a full and timely fashion. Market risk, the potential for decline in the market value of assets, becomes more significant as a higher proportion of a bank's assets is traded rather than lent, whether in a universal bank or as a result of a commercial bank's business in financial instruments such as derivatives. The concept of operational risk has been characterized in

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requirements, the actual extent of systemic risk is considerably less important than what relevant market actors *believe* about both the extent of systemic risk and the likely response of government officials confronted with one or more large bank insolvencies. The generally lower capital levels of large banks may, for example, reflect market beliefs that these banks are considered too big to fail by the government and will thus be kept liquid and solvent during periods of stress.

23. This fact has been recognized by regulators in the past. Consider, for example, the following observation in a study by the US Department of the Treasury (1991, at II-17): "The question of the appropriate level for minimum capital ratios for insured depositories is essentially the question of what is the maximum level of depository system risk that society is willing to tolerate."

24. See Estrella (1995) for an explanation of the differences between optimal and minimum capital levels.

somewhat different ways but, as defined by the Basel Committee itself, it is the risk of loss resulting from “inadequate or failed internal processes, people and systems or from external events [including] legal risk” (Basel Committee 2004d, 144). Thus the current notion of operational risk includes everything from the physical disruption of a bank’s operations by natural or human agents to a massive liability judgment entered against the bank. Interest rate risk refers to the problems that ensue for banks when rising interest rates result in nearly immediate increases in the bank’s cost of capital, while most of its assets (in the form of previously extended loans) will continue to provide only the lower rate. Liquidity risk refers to the possibility that a bank will have inadequate cash or other liquid assets available to it to meet the demands of depositors or other short-term debtors, even though the bank is solvent on a balance-sheet basis. Liquidity risk is inherent in the maturity mismatching that characterizes the bank’s economic role of financial intermediation. Attention is sometimes also paid to reputational, political, and other risks.

If one can quantify the risks that the banks themselves face, then regulators can better judge how much capital will be needed as a buffer to contain the chances of bank insolvency below a specified level. Of course, quantifying with precision the risks that banks face is a daunting task. Some risks, such as political risk, seem to defy any reasonable quantification. Credit and market risk, which both refer to the value of assets held by the bank, have been the strongest candidates for quantification. More controversially, as will be seen later, Basel II also attempts to quantify capital requirements for operational risk.

As the next section describes, even before Basel I most countries computed capital requirements or guidelines by reference to the amount of assets held by the bank. The simple ratio of capital to assets is a crude but, in its own way, comprehensive measure that covers all risks—or at least all risks that are susceptible to significant mitigation through the maintenance of higher capital levels. Two obvious problems with this simple approach are, first, that it does not cover off-balance-sheet items, and, second, that it does not account for the very different risks of loss that inhere in different portfolios of assets. A bank that lends exclusively to start-up companies without established income streams is exposed to significantly higher risks of loss than a bank with the same amount of assets that lends exclusively to AAA-rated governments and corporations. Thus, the sustained regulatory tendency of the last few decades has been in the direction of a “risk weighting” of assets to reflect better the chances of loss to the bank. Technology has had an enormous impact here, first with the regulatory embrace of value-at-risk models for calculating capital requirements for market-traded assets and, with the coming of Basel II, credit risk models for calculating capital requirements for loans. The results of this tendency are seen most starkly in the A-IRB approach; thus, analysis

of the reliability of the new metrics will be deferred until chapter 5, where Basel II is considered in detail.

## Evolving Role of Capital Regulation

Capital levels of credit institutions have long been subject to some form of supervisory scrutiny. Many jurisdictions traditionally required a minimum capitalization before promoters of a new bank could obtain a charter and begin business. Regulatory monitoring of capital levels at operating banks has existed in the United States since at least the early years of the 20th century. The relative sophistication of that monitoring evolved fairly steadily thereafter, particularly following World War II. Despite this long-standing concern with bank capital, explicit minimum capital requirements were not imposed by US bank supervisory agencies until the 1980s. Until almost that same time, formal capital regulation was either undeveloped or wholly absent in the other Basel Committee countries. In the intervening decades, capital requirements have not only been formalized, they have also become the most important form of prudential regulation.<sup>25</sup> This steady shift in regulatory approach has occurred as, and to a considerable extent because, the banking industry itself has been substantially transformed.

From about 1900 to the late 1930s, the most frequently cited measure of capital among US regulators was the ratio of capital to deposits, rather than the now familiar ratio of capital to assets or risk-weighted assets. A number of state banking regulators required this capital/deposit ratio to be at least 10 percent (Orgler and Wolkowitz 1976). The Office of the Comptroller of the Currency adopted the same minimum ratio for national banks in 1914 and even proposed amending the National Bank Act to make this a statutory requirement. This may seem a peculiar requirement, insofar as losses to banks arise from deterioration in *asset* quality, not from deposits. However, this ratio does give a rough idea of a bank's leverage and, until the federal deposit insurance system was established in 1933, it accordingly gave a rough indication of how well depositors would be protected should the bank fail. By the late 1930s, the newly created Federal Deposit Insurance Corporation (FDIC) had shifted emphasis to the ratio of capital to total assets that is still used today as the basis for one of several US capital requirements (though no longer in most other Basel Committee countries).

During World War II, US banking agencies essentially suspended application of administrative guidelines for capital ratios, in recognition of

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25. While a host of supervisory practices and requirements arguably equals capital requirements in importance, it is clear that the latter are the most important set of prudential *rules*.

the fact that banks were purchasing massive quantities of US government securities to help fund the war effort (Hempel 1976). Application of a capital/assets requirement would obviously have constrained those purchases. After the war, a prolonged period of experimentation with capital ratios began, during which there was substantial divergence in practice among the federal banking agencies. The Office of the Comptroller of the Currency and the Federal Reserve Board shifted their focus to the ratio of capital to “risk assets,” in recognition of the now commonplace observation that the optimal amount of bank capital varies with the riskiness of its assets. “Risk assets” were defined as total assets less cash and government securities. The FDIC, meanwhile, returned to its use of the capital-to-total-assets ratio.

The discrepancies in agency practice actually increased as time went on. During the 1950s, the Federal Reserve Board further refined its approach to capital requirements. It began assigning risk weights to major categories of items on the asset side of a bank’s balance sheet before calculating the capital ratio (Orgler and Wolkowitz 1976, Hempel 1976). The Office of the Comptroller of the Currency, however, did not adopt this rough precursor to the Basel I approach to risk-weighted capital adequacy.<sup>26</sup> To the contrary, the comptroller’s office actually disclaimed reliance on capital ratios until 1971 and, throughout the 1970s, insisted that it used capital ratios only as a helpful indicator of potential problems at national banks. It emphasized the importance of a variety of nonfinancial factors in assessing the adequacy of a bank’s capital.<sup>27</sup> The FDIC, meanwhile, continued to use several variations on the total-capital-to-assets ratio.

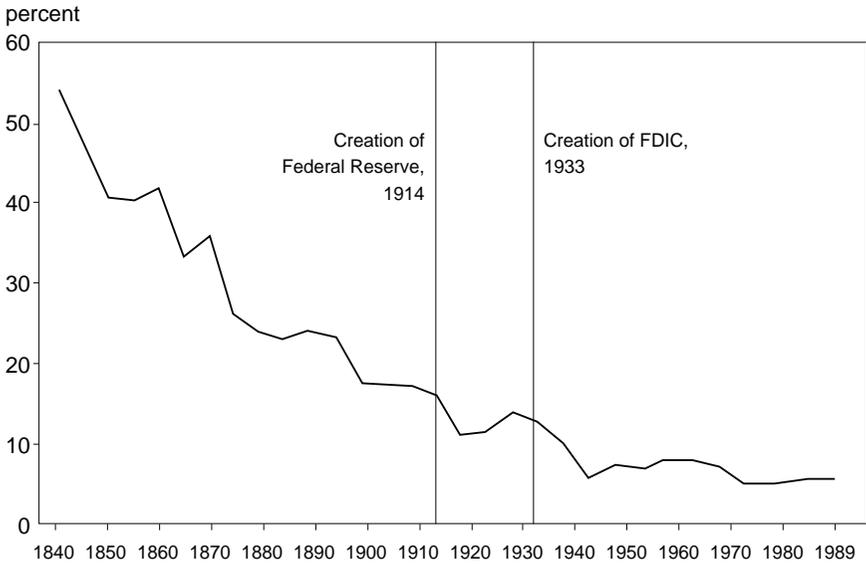
Obviously, capital adequacy was unlikely to play a central role in bank regulation in the United States or elsewhere, so long as there were such basic differences between regulators themselves over the appropriate use and characteristics of capital ratios. However, three interrelated developments combined to produce a focus on capital levels that became progressively more important in banking regulation within the Basel Committee countries and eventually in the rest of the world as well: first, a decline in capital ratios; second, the upheaval in the finan-

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26. During this period, the role of the Federal Reserve in bank regulation was actually quite circumscribed. It was the primary federal regulator only for state banks that were members of the Federal Reserve System. However, the Federal Reserve also has regulatory authority over all bank holding companies. As that corporate form became the dominant mode of bank ownership in the 1960s and 1970s, the Federal Reserve’s influence on bank regulation increased.

27. The practice of the Office of the Comptroller of the Currency, more fully explained in Orgler and Wolkowitz (1976, 70–71), was itself a precursor to the system for evaluating banks that is now used by all US bank examiners. Thus, the comptroller’s office examined—among other factors—the quality of management, the liquidity of assets, the history of bank earnings, and the liquidity of assets. Eventually, the comptroller’s office began experimenting

**Figure 2.1 Equity as a percent of assets for all insured commercial banks, 1840–1989**



FDIC = Federal Deposit Insurance Corporation.

Note: Ratio of aggregate dollar value of bank book equity to aggregate dollar value of bank book assets.

Source: US Department of the Treasury (1991).

cial services industry; and third, the modification or outright abandonment of many traditional regulatory devices for assuring bank safety and soundness.

Figure 2.1 shows that bank capital levels had been in decline for well over a century. Most of the decline in the late 19th century was the result of wholly salutary developments such as the growing efficiency and transparency of the US financial system. The decline in the 1930s and 1940s was probably due in significant part to the establishment of the federal deposit insurance system, though the general economic environment of the Depression and then war undoubtedly played a part as well.

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with classifying assets before calculating the ratio even within the context of its use as a guideline rather than a rule. In 1978, Congress established the Federal Financial Institution Examination Council, composed of the federal agencies with responsibility for regulating depository institutions, and instructed the agencies to establish uniform standards for bank examination. The council adapted the comptroller’s list of factors and instituted the CAMEL system, which provided for an evaluation of a bank’s capital level, *asset* quality, *management*, *earnings*, and *liquidity*. Subsequently the council added sensitivity to market risk, hence the current acronym of CAMELS.

**Table 2.1 US bank capital ratios, 1970–81**

Year	All banks	Banks with assets	
		over \$5 billion	17 largest banks
1970	6.58	5.34	5.15
1971	6.32	5.10	4.91
1972	5.95	4.71	4.43
1973	5.67	4.14	3.82
1974	5.65	3.82	3.49
1975	5.87	4.13	3.94
1976	6.11	4.51	4.00
1977	5.92	4.32	3.86
1978	5.80	4.13	3.76
1979	5.75	4.03	3.61
1980	5.80	4.12	3.69
1981	5.83	4.21	3.83

Note: All figures are percentages of equity capital to total assets.

Source: Board of Governors of the Federal Reserve System (1983).

There followed a plateau in overall capital levels that lasted a quarter century. Capital levels began to decline again in the 1970s, ultimately provoking the concerns that led, among other things, to Basel I.

As shown in table 2.1, the capital levels of US banks as a whole actually declined only modestly during the 1970s—by about 11 percent. Indeed, the capital ratios of the smallest banks (less than \$300 million in assets) actually *increased* significantly. The decline in overall US capital levels was predominantly due to significant declines in the capital levels of the biggest banks. The last column in table 2.1 shows that the capital levels of the 17 largest multinational banks, which as a group had been identified for special concern by banking supervisors, declined by about 25 percent. The capital levels of the somewhat larger group of all banks with assets in excess of \$5 billion had declined almost as much, by about 21 percent. The distribution pattern of capital declines thus reinforced systemic fears, since the failure of a very large bank is far more likely to trigger a banking crisis.

The risks to the banking system resulting from lower capital levels did not appear purely hypothetical. In the space of a few months in 1974, the Herstatt Bank failed in Germany and the Franklin National Bank failed in the United States. Because it had massive foreign exchange exposure, Herstatt's failure threatened the payments systems of other countries. Franklin, the 20th largest bank in the United States, posed less of a threat, but only because the Federal Reserve provided lender-of-last-resort assistance, including to the bank's London branch (Dale 1984, Spero 1980). These failures spurred creation later that year of the group of banking regulators that has become known as the Basel Committee on Banking Super-

vision, as national authorities saw the need for increased cooperation to prevent further banking problems that could cross national boundaries.

The decline in capital levels was due in significant part to the changed environment in which commercial banks were operating. They faced both turbulent macroeconomic circumstances and a structural change in competitive conditions within their own industry. The world economy was turned upside down in the 1970s. First, the Bretton Woods system collapsed. The resulting volatility in foreign exchange rates was something contemporary bankers had never faced and, until they developed the requisite expertise and financial hedging instruments, something that could play havoc with the profitability of foreign lending. Then came the oil embargo and worldwide recession of 1974–75, which resulted in increased defaults on loans and an across-the-board decline in credit quality. The stagflation of the late 1970s was the third of this harsh trio of developments. Even as credit quality continued to deteriorate, double-digit inflation eroded the profitability of loans that *were* being serviced.

Within their own industry, commercial bankers were caught in a kind of business pincer, squeezed by more competition on both the buy and sell sides of their business. On the sell side, companies that had historically been among the most important purchasers of bank credit found other, cheaper sources of capital. Most important were the burgeoning public capital markets, whose growth and consequent increased liquidity made them attractive to more and more companies. The maturation of the commercial paper markets, for example, gave large companies an alternative to bank loans for a source of short-term operating capital. Domestic banks were also facing more competition in meeting the borrowing needs of the largest corporations, both directly from foreign banks and through the expanding euromarkets.

On the buy side, net savers found more lucrative destinations for their money than bank accounts. The period of prolonged high inflation in the 1970s accelerated the flight of funds from traditional savings and checking accounts to money market funds organized by investment companies as part of their families of mutual funds. The money market funds were able to grow so rapidly because of the increasing supply of commercial paper, which was a principal investment of the money market fund managers because of its high credit quality and short duration to maturity. The resulting increased liquidity further expanded the commercial paper market. Thus, the competition to banks on the buy and sell sides was mutually reinforcing. From 1976 to 1982, the assets of US mutual funds rose from less than \$3 billion to about \$230 billion.<sup>28</sup> The days when most of

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28. Later, middle- and upper-middle-class Americans would begin investing in equities through broadly diversified mutual funds. Thus, even after interest rate caps on depository institution accounts were lifted, prospects for recapturing the funds that had fled to money market funds were limited.

the savings of most Americans could be found in commercial and savings banks were fast becoming history. As a result, the time when banks had access to a vast pool of capital, the cost of which was arguably suppressed by the federal deposit insurance system, was also drawing to a close.

Faced with increased competition, and thus decreasing margins, in their established customer base, many banks looked for new sources of revenue. In part, they simply tried to lend more, placing downward pressure on their capital ratios. They also sought permission to engage in new lines of business such as data processing and leasing. They asked the Federal Reserve for a liberal interpretation of the Glass-Steagall Act's restrictions on commercial bank affiliation with investment banks. Even within their traditional business of extending credit, they looked for new borrowers. The most attractive new borrowers were those without access to public capital markets who would presumably be willing to pay a higher premium for loans. Of course, borrowers without access to public capital markets are usually less creditworthy. Thus banks were taking on more risk in a search for higher returns. One source of much new business for the largest multinational banks was sovereign borrowing, which would have disastrous consequences for both debtors and creditors in the 1980s. In short, banks responded to competition by extending more credit to riskier borrowers, a development that reduced capital ratios immediately and exposed the banks to more losses down the line, as a result of which capital ratios would decline further.

The competitive squeeze on banks was related to some of the traditional prudential rules that had restricted their activities. Since World War II, the US bank regulatory paradigm had significantly restricted competition in banking. The Federal Reserve's Regulation Q, which limited the interest rate banks could pay on deposits, restrained price competition among banks. Prohibitions on interstate branching protected banks from incursions by large out-of-state banks. The Glass-Steagall Act forbade investment banks from engaging in the "business of banking." For several decades the result had been a fairly quiet and predictably if unspectacularly profitable industry. Beginning in the 1960s, however, and more obviously in the 1970s, technology, competition, regulatory relaxation on non-banks, and a growing public financial sophistication were fast eroding the insulation that protected commercial banks. Now the same regulations that had protected banks appeared to remove many options for a competitive response. In an inflationary environment, the Regulation Q cap of 5 percent on interest rates left banks vulnerable to the money market funds. The restrictions on branching foreclosed realization of economies of scale by the more efficient banks. Restrictions on affiliations between commercial and investment banks barred the former from realizing what many believed to be a potentially important source of earnings diversification. Reserve requirements put domestic banks at a disadvantage in competing with offshore banks.

Citing these developments, commercial banks urged relaxation of these and other constraints on their ability to enter new markets and new lines of business.<sup>29</sup> The regulatory agencies, concerned that the banking system itself could be weakened if banks were handicapped in responding to the new forms of competition, were receptive to at least some of the calls for change. Thus began a 20-year period during which many traditional bank regulatory devices were relaxed or removed.<sup>30</sup> In 1980 Congress passed legislation phasing out the limits on interest rates. Two years later, the Garn-St. Germain Act authorized depository institutions to establish the equivalent of money market deposit accounts. Limitations on the activities and investments of banks were relaxed in significant ways, such as the 1980 administrative ruling that banks could compete directly with securities firms in selling commercial paper. The political heft of investment banks offset that of commercial banks in the latter's campaign for Glass-Steagall reform in the Congress and produced a stalemate that would not be broken until 1999. However, the Federal Reserve Board authorized by regulation some affiliations between commercial banks and firms engaged in investment banking—first in a quite limited way, but progressively more generously. Reserve requirements were applied to a narrower range of deposits and reduced.

Since the Depression era reforms, banking law in the United States had been based on restricting the activities, investments, and businesses of banks. Removal of so many elements of the old regulatory approach freed the banks to compete with other banks and with nonbanks making inroads into traditional banking markets. It also freed banks to fail in these new endeavors. Some of the resulting failures were quite spectacular, provoking concerns about systemic stability and costing taxpayers hundreds of billions of dollars. While the efficiency gains from the deregulatory steps promised to be substantial, the potential gap in prudential regulation was worrisome to some regulators and members of Congress. Capital regulation was the most obvious candidate to fill that gap. It appeared to be a more flexible mode of safety and soundness controls, one that could be a shock absorber for whatever difficulties banks might encounter in the new competitive environment. Since the modification and repeal of traditional constraints on banks continued after Basel I—as, for example, through the effective elimination of restrictions on geographic expansion by banks in the United States—the centrality of capital regulation in banking regulation has only increased.

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29. For example, in responding to an argument for continuity in bank regulation put forth by then-president of the Federal Reserve Bank of New York Gerald Corrigan, an executive of Chase Manhattan Bank relied heavily on the new forms of competition faced by commercial banks in arguing for deregulation in the early 1980s (Aspinwall 1983).

30. For one comprehensive account, see Wilmarth (2002).

By 1980 the foregoing considerations led regulators in many of the Basel Committee countries to place more emphasis on capital regulation. In the United States, as in some of the other countries, the various capital ratios employed by banking regulators had not been freestanding, independent requirements so much as guidelines for supervisory scrutiny. Even where the Federal Reserve or the FDIC informally communicated the ratios they found to be generally acceptable or made known the specific levels that would trigger closer inspection, they had not published regulations with required ratios. In 1981 the banking agencies took the first of several steps that would, in the years prior to the first Basel Accord, formalize and risk-weight capital requirements.

Stating that they were “increasingly concerned about the secular declines in the capital ratios of the nation’s largest banking organizations, particularly in view of increased risks both domestically and internationally,” the Office of the Comptroller of the Currency and the Federal Reserve jointly published numerical capital ratios applicable to all but the largest banks (Board of Governors of the Federal Reserve System 1982, at 34). The agencies used only simple ratios of primary capital and total capital to total assets, rather than some form of risk-weighted ratio. Although the specific ratios were still characterized as guidelines for administrative action rather than independent requirements, the agencies made clear that banks with capital below a specified level would create “a very strong presumption that the bank is undercapitalized.” In effect, the agencies had adopted a minimum primary capital/assets ratio of 5 percent (6 percent for small banks). The 17 banks with assets in excess of \$15 billion were not covered by the guidelines, though the Board of Governors and the Office of the Comptroller of the Currency indicated that their policies with respect to these institutions “would be modified to insure that appropriate steps are taken to improve over time the capital positions of banking organizations in this group” (Board of Governors of the Federal Reserve System 1982, at 34).

The FDIC issued a separate statement establishing a “minimum acceptable level” of primary capital at 5 percent of assets for the banks for which it was the primary federal supervisor (FDIC 1981). The FDIC did not include a total-capital-to-assets ratio requirement. While observers also noted the FDIC’s disagreement with the Board of Governors and the Office of the Comptroller of the Currency on the issue of whether different-sized banks should have different minimum ratios, the more important point was that all three federal regulators of commercial banks had converged around a presumptive minimum capital requirement.

The Latin American debt crisis accelerated the trend toward a central role for capital adequacy requirements in US banking regulation (Kapstein 1994, Reinicke 1995). The significant exposure of several large US banks to defaulting sovereign debtors such as Brazil and Mexico called into question the adequacy of their existing capital levels to absorb the losses they would incur on these assets. This lending was itself a response by the

banks to the competitive squeeze mentioned earlier. Developing-country lending commanded a substantial premium over other significant categories of bank lending, and in the 1970s, few if any developing countries had access to public capital markets. Between 1978 and August 1982 (when Mexico defaulted), the total developing country debt held by the largest money-center banks had increased from \$36 billion to \$55 billion. This portfolio of assets was more than twice the total capital and loan loss reserves of the largest banks (FDIC 1997). So critical was the problem that a quick resolution of the crisis through restructuring and write-downs might have rendered one or more of these banks technically insolvent.

In May 1984, the problems in US banking reached a new stage with the crisis faced by the Continental Illinois National Bank, at that time the seventh largest commercial bank in the country. Continental was a poster child for the threats to banking safety and soundness posed by changes in the industry and its regulation. Despite the challenging environment confronted by commercial banks in the 1970s, it had grown quickly, in part by engaging in considerable high-risk lending (FDIC 1997). It had substantial exposure to Mexican sovereign debt and had \$1 billion in participations originated by Penn Square Bank, itself a now-notorious example of a bank that had financed its aggressive (and imprudent) lending in part by taking advantage of the deregulation of interest rates to purchase high-cost deposits. Concerns about its financial condition turned quickly into an electronic run on Continental Illinois, as large domestic and foreign account holders shifted their deposits elsewhere. Regarding the bank as too big to fail and unable to find a healthy merger partner, the FDIC kept the bank afloat through a de facto nationalization.

These unhappy developments prompted regulators to reconsider their exemption of the largest money-center banks from the minimum capital ratios applied to all other banks in 1981. In June 1983, the Board of Governors and the Office of the Comptroller of the Currency jointly announced application of the capital requirements to those 17 multinational banks.<sup>31</sup> However, this belated action was not enough to assuage influential members of Congress who believed that more rigorous capital regulation of large banks could have mitigated the effects of the crisis on the US economy (FDIC 1997). Indeed, the June extension of capital rules to the “big 17” was regarded as an effort to stave off congressional action.<sup>32</sup>

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31. Based in part on an internal Federal Reserve Board memorandum, Reinicke (1995) hypothesizes that the banking agencies took this step not only because of congressional pressure but also because 12 of the 17 large banks had improved their capital ratios to at least the minimum levels set by the guidelines.

32. In fact, compliance turned out not to be difficult for most of the 17. By year's end, only Citicorp and Manufacturers Hanover had ratios below the 5 percent minimum level. See Robert Trigaux, “Multinationals Raise Primary Capital Ratios: Only Citicorp, Hanover Fall Below 5% Minimum,” *American Banker*, December 1, 1983, 3.

When the large banks bluntly opposed both congressional calls for additional capital regulation and the banking agencies' five-point plan for strengthening supervision of international lending, their resistance actually increased the likelihood that Congress would legislate on the topic (Reinicke 1995).

Meanwhile, the shift toward more generally applicable and binding capital ratios was abruptly called into question in 1983, when a federal court overturned a 1980 order by the Comptroller of the Currency requiring a national bank to increase its capital ratio to 7 percent. The court itself was not altogether clear as to the limits it was imposing on the discretion of regulators to require banks to maintain specific capital levels. However, it implied that the promulgation of industrywide capital requirements, detached from an analysis of the condition of a particular bank, might not be within the powers of the bank regulatory agencies.<sup>33</sup>

Already exercised over the banking agencies' failure to implement tighter capital regulation, Congress now had additional incentive to legislate, and an occasion for action had already presented itself. The Reagan administration had requested an increase in the US quota at the International Monetary Fund (IMF) as part of the general augmentation of the institution's quotas initiated to shore up its resources in the face of the Latin American problems. As would be the case a decade later during the Mexican and Asian crises, legislators of both parties reacted negatively to a request for additional US government resources that would be seen, at least in part, as intended to bail out the large banks. As Senator Jake Garn (R-UT), chairman of the Senate Banking Committee put it, "[T]he price of an \$8.4 billion increase in the IMF authorization in Congress is going to be legislation so that lawmakers can go home and report that 'we did not bail out the banks'" (quoted in Reinicke 1995, 46). Thus, a variety of factors galvanized the Congress later in 1983 to pass legislation that not only expressly permitted but *required* the federal banking agencies to establish minimum capital levels for banks and bank holding companies.<sup>34</sup>

Following passage of the 1983 legislation, the three banking agencies moved quickly not only to apply mandatory capital levels to all US banks but also to bridge the differences among them that had marked (or marred, depending on one's perspective) previous supervisory practice in

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33. The judicial decision in question was *First National Bank of Bellaire v. Comptroller of the Currency*, decided by the United States Court of Appeals for the Fifth Circuit in 1983. Ironically, the comptroller's office appears to have been overturned partly because of its explicit reliance on both quantitative and qualitative measures in assessing the adequacy of bank capital. The comptroller's office had given high ratings on the qualitative measures such as quality of management.

34. Later that same year, Congress included the new authority for capital regulation in §908 of the International Lending Supervision Act. The provision can now be found in §3907(a) of Title 12 of the United States Code.

the area of capital ratios. The Federal Reserve, Office of the Comptroller of the Currency, and FDIC published parallel final regulations in early 1985. Although these regulations were similar to the Fed/Comptroller guidelines of 1981 in their definitions of capital and other components of the capital calculation, they raised the minimum primary capital/asset ratio to 5.5 percent and the minimum total capital/asset ratio to 6 percent (as compared with 5 and 5.5 percent, respectively, for noncommunity banks in the 1981 guidelines).<sup>35</sup>

Almost as soon as the agencies had published these regulations, they turned their attention to developing risk-based capital requirements. As indicated by the Federal Reserve in its preliminary proposal, the agencies were responding to a series of worrisome developments: the growth in off-balance-sheet assets that were not covered by the simple capital ratios,<sup>36</sup> the apparent regulatory arbitrage of some banks in shifting toward higher-risk assets in the face of the simple capital ratio requirements, and “the growth and change in the nature of risks to which banking organizations have become exposed” (Board of Governors of the Federal Reserve System 1986, 3977). The Fed was first to issue a proposal, which would have added an “adjusted capital measure” to the existing two capital ratio requirements. This measure divided a bank’s assets into four categories based on risk and assigned different percentage weights to those assets in calculating a capital requirement. The Fed proposal also covered, for the first time in US regulatory practice, certain off-balance-sheet items such as letters of credit. This regulatory proposal never became operative, as it was subsumed into the Basel I exercise. But it reflected a convergence and evolution of views among US supervisory agencies in the direction of a risk-weighted capital requirement as a central component of banking regulation.

The increasing emphasis on capital ratios and, as noted by the Fed, risk-based ratios was not unique to the United States, with its particular combination of industry structure and regulation. However computed, bank capital ratios had declined in other Basel Committee countries. While no other country had the combination of highly developed capital markets and restrictions on bank activities that created such a severe squeeze on the business of commercial banks in the United States, the effects of adverse macroeconomic conditions, increased competition, and financial innovation were felt in banking industries everywhere (Pecchioli

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35. One version of the parallel regulations may be found in US Department of the Treasury Office of the Comptroller of the Currency (1985).

36. Examples of these growing risk exposures included (1) an increase in standby letters of credit issued by the 10 largest banks from 7.6 percent of total assets at year-end 1981 to 11.6 percent of assets by mid-1985; and (2) interest rate swaps, introduced only in 1981, but which had grown to 14 percent of total assets by mid-1985 (Bardos 1987, 88). The latter example overstates the actual risk, since the 14 percent figure is based on the notional amounts of the swaps, rather than the amount actually at risk.

1987). As in the United States, the economic upheavals of the 1970s and early 1980s led to deteriorating asset quality. Although savers in most countries may have had fewer alternatives than in the United States, large borrowers throughout the world could seek financing from foreign banks or, increasingly, from public debt issues through the euromarkets or elsewhere. Again, as in the United States, many banks responded to the competitive pressures by offering new financial instruments that, by virtue of their novelty, posed significant risk management challenges.

The regulatory response to these developments in other Basel Committee countries was less dramatic than in the United States. But the trend was similar—removing constraints that had originally protected the competitive position of banks but now handicapped them in responding to market developments. One example was the legal separation of the banking industry based on the duration of assets and liabilities. In countries such as France, Italy, and Japan, banks were in either the short- or long-term segment.<sup>37</sup> Between the late 1960s and the early 1980s, France essentially eliminated these restrictions and the latter two countries significantly reduced them (Pecchioli 1987). The separation between commercial and investment banking was under pressure everywhere. Where the separation was the result of legal barriers, as in Canada and Japan, there was pressure for change. In countries that permitted banks to underwrite securities—such as France, Germany, and the United Kingdom—there was a noticeable shift in banks' business toward those activities.<sup>38</sup> The result was another supervisory challenge, insofar as the greater concentration of nonlending activities created a different mix of risks to be managed.

Historically, the other Basel Committee countries had placed even less emphasis on bank capital than had the United States. Norton (1995) attributes the earlier attention to capital adequacy by the Federal Reserve Board and Office of the Comptroller of the Currency to the revealed utility of capital ratios in the US practice of extensive, on-site examinations for all banks. Whatever the reason, the other Basel Committee supervisors attached little importance to capital ratios as a supervisory device. Yet just as competitive pressures and other developments in the rest of the world paralleled those affecting US banks, supervisors in the rest of the Basel Committee countries responded with a parallel elevation of capital adequacy to a key position in bank regulation during the late 1970s and early 1980s. As a group, in fact, the European supervisors had leapt well ahead of their US, Canadian, and Japanese counterparts in moving toward a risk-based standard for capital ratios.

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37. Actually, the segmentation scheme was considerably more complicated in many instances, particularly in Japan, which traditionally limited banks' activities not just to a particular duration of assets and liabilities but also to particular kinds of borrowers.

38. See David Lascelles, "Survey of World Banking: Why the Transatlantic Deal Must Be Extended," *Financial Times*, May 7, 1987.

In 1979 France introduced a risk-related capital standard. In 1980, Switzerland and the United Kingdom both thoroughly overhauled their approaches to capital ratios. The changes effected by Swiss banking authorities were particularly striking, in a single stroke shifting Switzerland from the anachronistic capital/liabilities approach to a capital/risk-based assets ratio requirement with 15 different risk categories. German capital rules weighted certain risks differently in calculating the overall capital/assets ratio under its Banking Act (as amended in 1985). In fact, of the nine European countries with representation on the Basel Committee in 1985, seven had already adopted some form of risk weighting in the capital ratios they had issued as requirements or supervisory guidelines.<sup>39</sup>

To some degree, the similarities in European regulatory evolution were the results of similar circumstances and shared analyses of the implications of changes in the banking industry. In addition, though, the trend toward convergence had been accelerated by the activities of the European Economic Community (EEC). Beginning in 1973, the European Council adopted a series of directives that required member states to harmonize various elements of bank supervision. The Banking Coordination Directive of 1977 provided, among other things, for the establishment of capital ratios.<sup>40</sup> Though only for “observation purposes,” this directive began the process that eventually led to the post-Basel I directives that set capital requirements for all credit institutions and investment banks in the European Union. As we will see, the harmonization efforts of the Basel Committee and the European Community/Union have, in significant ways, reinforced one another ever since.

By 1985 all but two of the other 11 countries represented on the Basel Committee had formal capital adequacy ratios in place.<sup>41</sup> In 1986 Japan published ratios for supervisory guidance, probably motivated by what turned out to be a vain effort to resist British and US pressure for mandatory measures. Thus, only Italy had no specified ratios for capital levels by the time the Basel Committee began discussions in earnest on a harmonized set of capital requirements. Regulatory authorities in Japan and, as already noted, the United States soon thereafter issued their own proposals for some form of risk-based asset capital requirements.<sup>42</sup> Canada, although

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39. Luxembourg was still using the capital/liabilities ratio that had been abandoned decades before in the United States. As noted below, Italian supervisors did not use any specific ratios—general or risk-based—either as supervisory guidelines or as requirements.

40. This directive may be found in the EEC’s *Official Journal*, no. L322, of December 17, 1977, Document Number 77/780/EEC.

41. In the 1980s, there were only 12 Basel Committee member countries. Spain was invited to join in 2001.

42. Japan’s 1986 policy innovation involved a simple capital/assets ratio, whose value varied from 4 percent for banks without overseas branches to 6 percent for banks that did have an international presence (Pecchioli 1987).

not using a risk-weighting system, took off-balance-sheet items into account in its guidelines for overall capital ratios, thereby covering the second principal purpose of moving from simple to risk-weighted capital ratios. In six countries the capital ratios were binding regulatory requirements: Belgium, France, Luxembourg, Netherlands, Sweden, and Switzerland.<sup>43</sup> In Germany, if a bank's capital ratio fell below the published guideline, it created a rebuttable presumption that capital levels should be raised. In the United Kingdom and Canada, the published capital ratios were not technically binding but were used by supervisors in assessing banks under their jurisdiction.

Excessive significance should probably not be attached to whether the ratios were, by their own terms, mandatory. While the Bank of England's guidelines were not mandatory, supervisors were quite fastidious in their reviews of capital levels and, in many instances, insisted on higher levels of capital than those indicated by the published ratios. Conversely, it was not clear how rigorously some of the countries with nominally mandatory guidelines actually interpreted and enforced them. The required ratios varied. So too did the number of "risk buckets"—the weighting categories for assets posing different levels of presumed riskiness—vary from four in Germany to 15 in Switzerland. There were also important differences in the operative definition of capital for purposes of calculating the numerator in the ratios, notably on the issues of whether subordinated debt and unrealized capital gains on bank assets would qualify. Beyond these differences, however, the pattern of capital ratio requirements revealed a common trend, both toward attaching more importance to capital regulation and in converging around a risk-weighted ratio approach. This conceptual convergence was very significant in setting the stage for the harmonization of capital requirements in Basel I.

## Conclusion

As has recently become apparent, the supervisory trend toward dominant reliance on capital requirements for prudential regulation has been at least in part misguided. The problem arises partly from the shortcomings of regulatory models in achieving accurate risk sensitivity and partly from the importance of liquidity, reputational, and other risks not captured by capital regulation. Still, the theoretical case for bank capital requirements as an important part of national prudential regulation is broadly accepted among regulators and most academics. Even at the level

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43. Descriptions of capital adequacy requirements as they stood in the 1980s in the Basel Committee countries and certain other countries may be found in Dale (1984) and Pecchioli (1987).

of theory, however, the optimal level of capital requirements depends on judgments about the trade-off between the social benefits of efficient capital allocation and the social costs of bank failure or financial crisis. The practical task of setting minimum capital requirements depends on a similar set of judgments.

Those who believe the actual degree of systemic risk is small must still, in considering the optimal level of capital requirements, take into account the beliefs of market actors as to the likelihood that government authorities will rescue a specific bank whose failure is imminent. That is, the widespread assumption that regulators consider certain banks too big to fail may affect the pricing of private credit extended to those banks.<sup>44</sup> The importance of this consideration is that optimal capital requirements cannot convincingly be set solely through the use of even the most sophisticated institution-specific formula. It also suggests an argument for capital requirements being set higher for banks likely to be regarded as too big to fail. It is unclear to what extent this factor might offset the traditional presumption that the greater degree of portfolio diversification at large banks argues for lower capital requirements at larger banks.<sup>45</sup> Of course, the preceding observations do not preclude the possibility that, as a practical matter, minimum capital requirements might best be set through a formula-based approach. They simply remind us that, even at a conceptual level, capital regulation is necessarily part art as well as part science. As W. P. Cooke, the first chair of the Basel Committee, once wrote: "There is no objective basis for ex-cathedra statements about levels of capital. There can be no certainty, no dogma about capital adequacy."<sup>46</sup>

The evolution of capital adequacy regulation in Basel Committee countries in the late 1970s and early 1980s reveals two points of some significance in evaluating the Basel II approach as a substantive regulatory paradigm for an international arrangement. First, the movement toward risk-based capital/asset ratios was widespread even before the United States and the United Kingdom began their campaign for an international arrangement based on this method. Indeed, although the Federal Reserve Board had tentatively moved in that direction in the 1950s, the United States was a laggard rather than a leader on risk-based approaches in the

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44. The reasons why banks may be considered by government regulators as too big to fail are not limited to classic fears of a domino-like collapse of the whole banking system. For example, the fact that there are only two banks that offer a full range of settlement services on US Treasury securities may make those banks too important to fail in the eyes of the Treasury Department (Stern and Feldman 2004).

45. It is also worth noting that bank regulators, including the Basel Committee, have not been explicit about the trade-off between bank stability and increased financial intermediation that is necessarily made in any capital requirement.

46. W. P. Cooke, "Banking Regulation, Profits and Capital Generation," *The Banker*, August 1981.

1970s and early 1980s. In at least one respect, then, the time was ripe for an international arrangement.

Second, however, there was substantial variation in the required capital levels, the definition of capital, and other features of the capital/risk-based asset ratios. As will be seen in the next chapter, this variance may have arisen in part in the search for competitive advantage by national banking authorities for their own banks. Yet it may also have been explained by variations in the nature of the banking industries, the regulatory and accounting context in which banking regulation existed, and other factors peculiar to each country. If any such differences remain important today, they may call into question the appropriateness of a highly detailed harmonized approach to capital adequacy. Conversely, if the highly detailed approach nonetheless allows for substantial national variation in implementation, then one may question exactly what purpose is served by such a high degree of harmonization.