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Capital regulation after the crisis: Business as usual?

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**Capital Regulation after the
Crisis: Business as Usual?**

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Abstract

The paper discusses the reform of capital regulation of banks in the wake of the financial crisis of 2007/2009. Whereas the Basel Committee on Banking Supervision seems to go for marginal changes here and there, the paper calls for a thorough overhaul, moving away from risk calibration and raising capital requirements very substantially. The argument is based on the observation that the current system of risk-calibrated capital requirements, in particular under the model-based approach, played a key role in allowing banks to be undercapitalized prior to the crisis, with strong systemic effects for deleveraging multipliers and for the functioning of interbank markets. The argument is also based on the observation that the current system has no theoretical foundation, its objectives are ill-specified, and its effects have not been thought through, either for the individual bank or for the system as a whole. Objections to substantial increases in capital requirements rest on arguments that run counter to economic logic or are themselves evidence of moral hazard and a need for regulation.

JEL Classifications: G01, G21, G28

Key Words: financial crisis, Basel Accord, banking regulation, capital requirements, model-based approach, systemic risk

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1. Introduction

In December 2009, the Basel Committee on Banking Supervision has submitted proposals for a reform of the regulation of capital requirements for banks in the wake of the crisis. In its Consultative Document, the Basel Committee observes that banks entered the crisis with too little capital and that the insufficiency of bank capital played an important role in the crisis. To improve matters, it proposes an international harmonization of the definition of capital and the introduction of a leverage ratio, as well as tighter standards for bank liquidity, and various measures to reduce the procyclical effects of capital regulation. The Basel Committee does not, however, present any systematic analysis of why the proposed measures should have the salutary effects that are expected of them.

Nor does the Basel Committee present any systematic analysis of why the existing system of capital regulation has failed so miserably in the crisis. Over the past two decades, this system has been developed and ever more refined with an enormous investment of effort and sophistication. Why then could major banking institutions manage their risks and their equity in a way that materially contributed to the crisis? Why was bank capital so low that, shortly after the onset of the crisis, there were doubts about bank solvency, and interbank markets were destroyed by mistrust? What assurance do we have that individual banks or the overall banking system would have fared better if the changes that are now being proposed had already been installed a decade ago? Is it really enough to tighten a screw here and put in a new nail there? Or doesn't the entire ship of banking regulation need a thorough overhaul?

The regulatory community seems unwilling to even ask such questions. It sticks to a tradition of discussing the rules of capital regulation among the bureaucratic *cognoscenti*, in some interaction with the industry, without ever providing any theoretical or empirical analysis of the effects that the measures under consideration are deemed to have and without heeding demands that such analyses should be just as much a precondition for the implementation of new regulatory rules as for the introduction of new pharmaceutical drugs into the market.²

2. Capital Regulation and the Financial Crisis

It is by now widely recognized that the global financial crisis of 2007 – 2009 was not just a matter of subprime mortgage securitization in the United States having gone astray.³ Although the real estate and mortgage crisis in the United States was serious enough, losses from real estate and mortgage investments in the United States were not larger than, e.g., losses in the Japanese banking crisis of the nineties, which did not take down the global financial system. The real estate and mortgage crisis in the United States ended up taking down the global financial system because the institutions that were involved were more fragile and more interconnected than in previous crises. Moreover, once the crisis broke into the open, in August 2007, the system devel-

2 Hellwig (1996).

3 For a systematic account of the crisis, see Hellwig (2009).

oped an implosive dynamic of its own, based on the interplay of price decreases in malfunctioning markets, fair value accounting requiring immediate writedowns on the affected assets, an insufficiency of bank capital requiring deleveraging, thus adding to the downward pressure on asset prices. The downward spiral that this interplay generated didn't come to a stop until, in October 2008, the taxpayers of the most important countries were committed to stepping in.

Fragility was due to excessive indebtedness and to excessive maturity transformation. Some of this excessive indebtedness and excessive maturity transformation was due to the development of a shadow banking system, institutions outside the domain of banking regulation that financed themselves by issuing short-term debt in wholesale markets and that invested in tradable assets with longer maturities. Thus, conduits and structured-investment vehicles (SIVs) provided banks with a way of investing in asset-backed securities without putting up the equity that would have been required if they had held these investments in their own books.⁴ Equity requirements for the guarantees that the sponsoring banks had provided for these vehicles were much lower, indeed in many instances, no equity was required at all. Nor were these guarantees subjected to large-exposure regulation.

Some of the excessive indebtedness and maturity transformation was also due to the exploitation of the model-based approach to capital regulation by banks inside the domain of banking regulation. Many institutions had equity amounting to 1 – 3 % of their balance sheets even as they were vaunting themselves as having 10 % “core capital”. The latter quantity, which relates equity to risk-weighted assets, is of course useless if the risk weights have not been chosen appropriately. An example⁵ is provided by UBS Investment Bank retaining the super-senior tranches of MBS CDOs of their own creation in their own portfolio and avoiding capital charges by engaging in credit defaults swaps against the credit risks of these securities.⁶ The correlation of the counterparty risks of these credit default swaps with the underlying credit risks of the MBS CDOs themselves went unnoticed.⁷

When the crisis broke into the open in August 2007, much of the shadow banking system fell apart. Because rating downgrades induced significant capital losses on assets held by conduits and SIVs, refinancing of these vehicles through the market was no longer forthcoming. In line with the guarantees they had given, the sponsoring banks had to step in. As they did so, they had to take these vehicles into their own books. As a result, they were short of equity; some of them were even insolvent because the vehicles that they had guaranteed had incurred losses that exceeded their own previous equity. For those that were not insolvent, the capital charges against

4 According to Acharya, Schnabl, and Suarez (2009), this is the only reason why these investments were considered worthwhile.

5 UBS (2008).

6 Thus, in its 2007 Annual Report, AIG writes that “approximately \$ 379 billion ... of the \$ 527 billion in notional exposure of AIGFP’s super senior credit default swap portfolio as of December 31, 2007 represents derivatives written, for financial institutions, principally in Europe, for the purpose of providing them with regulatory capital relief rather than risk mitigation.”

7 On the role of such correlations of counterparty risks and underlying risks in derivatives hiding systemic risk, see Hellwig (1995).

the assets newly taken into their own books created a need to raise additional capital or to deleverage by selling assets.

A need to raise additional capital or to deleverage by selling assets also arose for institutions that had to take writedowns on asset values in their books and that failed to have “free capital”, i.e., capital in excess of regulatory requirements. In the crisis, however, there was only limited scope for raising new capital. Therefore, a lot of deleveraging had to take place. Such deleveraging is unproblematic if it involves a single bank trying to improve the structure of its balance sheet. It is a source of systemic risk, however, if there are many banks trying to improve the structures of their balance sheets by selling assets and reducing their debts. Such simultaneous deleveraging will mainly serve to lower asset prices. The asset price decreases feed back into a need for further writedowns, again cutting into bank equity and creating a need for further deleveraging.

The systemic problem is enhanced by maturity transformation. If economic lifetimes of assets are short, some deleveraging can be engineered, even at the level of the overall system, by not reinvesting when the assets’ lifetimes come to an end. If economic lifetimes of assets are long, however, such disinvestment by the overall system is not possible. Houses and long-term mortgages are there and have to be held by someone. Individuals can disinvest by selling them, but the system as a whole cannot do so.⁸ Thus, the various conduits, SIVs and investment banks that held asset-backed securities with medium- to long-term maturities and that refinanced themselves by issuing debt of very short maturities contributed to systemic risk not only because they were overindebted but also because their balance sheets contained the seeds of a tremendous deleveraging spiral.

The deleveraging spiral was particularly pronounced because the multipliers for deleveraging were enormous. If equity amounts to 2.5 % of the balance sheet, one dollar’s worth of losses creates a need to sell forty dollars’ worth of assets on average in order to bring the capital ratio back into line.

If equity amounts to 2.5 % of the balance sheet, it also doesn’t take long for concerns about solvency to arise.⁹ Such concerns cause frictions for refinancing, in particular, in the wholesale markets that had provided the major source of short-term funding for many institutions. Fears for one’s own refinancing prevent institutions from acting as buyers of securities even if prices are deemed to be “too low”. Such fears may also create incentives for deleveraging in excess of regulatory requirements, thereby adding to the spiral. From August 2007 until October 2008, there were several episodes where interbank markets broke down and central banks had to step in to replace them. In the end, in the wake of the Lehman insolvency, these markets broke down completely, and the turmoil in the global financial system induced governments to step in and provide wholesale guarantees for financial institutions.

8 For a warning about this, see Blum and Hellwig (1995, 1996).

9 Prior to the crisis, UBS had equity capital equal to 40 bn. CHF, with an overall balance sheet of 1600 bn. CHF. Losses on subprime-mortgage backed securities and derivatives amounted to well over 40 bn. CHF. If it hadn’t been for recapitalization by the government of Singapore and by the Swiss Confederacy, UBS would have had to declare bankruptcy.

3. Regulatory Capture by Sophistication: A Brief History of Capital Regulation

The focus of banking regulation on bank capital is a recent phenomenon. From the nineteen-thirties to the nineteen-seventies, banking regulation and supervision focused on market structure, asset allocation rules, and interest rates. Between the mid-seventies and the late eighties, however, these modes of regulation were largely dismantled. They had become dysfunctional because financial innovations, the liberalization of international capital flows, and the revolution in information and communication technologies had changed the makeup of the industry and intensified competition in financial sectors all over the world.

The Basel Accord of 1988 tried to stop this trend towards deregulation. Under the guise of international harmonization of banking regulation, the Accord stipulated minimum capital requirements for banks. For ordinary credit risks the capital charge amounted to 8 % of the loan.¹⁰ Banks were required to have equity capital exceeding the sum of capital charges.

In 1993, the Basel Committee presented a proposal for extending capital regulation to market risks, i.e., the risks from changes in market prices of assets held in the trading books of banks. This proposal, which corresponds roughly to what is now called the “standard approach”, was greeted with scorn by the industry. The rigid capital ratios that it stipulated were said to mark a step back from the quality of risk management which sophisticated banking institutions had already achieved through the development of quantitative models with a firm conceptual and empirical foundation. Risk management on the basis of these models was said to be much more precisely attuned to the actual risks that different assets posed for the banks. Following this lobbying, the 1996 Amendment to the Capital Accord to Incorporate Market Risks gave banks the option to determine regulatory capital on the basis of their own risk models, rather than the standard approach. “Basel II”, the second Basel Accord, which was concluded after long deliberations in the mid-2000’s, provides a similar option for credit risks as well as market risks.¹¹

The various modifications of “Basel” since the mid-nineties have all been designed to improve the risk calibration of capital requirements. The idea was, in principle, that average capital requirements should be unchanged, but regulatory capital should be ever more closely attuned to actual risks in banking. In fact, these modifications have enabled the large, internationally active banking institutions to reduce regulatory capital, more precisely, to use their capital for ever more levered activities.¹² This development underlies the Basel Committee’s finding that, as they went into the crisis, large banks had equity amounting to only 2 % of their balance sheets.¹³ The Basel Committee ascribes this finding to various deficiencies of risk models and risk management. It fails to consider the possibility that the very attempt to calibrate regulatory capital towards measured risks might be responsible for the insufficiency of bank equity capital.

10 4 % for credit risks on mortgage loans or loans to other banks, 0 % for loans to sovereign debtors.

11 Basel Committee on Banking Supervision (2004).

12 For an early warning by a regulator that this was to be expected, see the contribution of D. Zuberbühler in Hellwig and Staub (1996), pp. 768 ff.

13 Basel Committee (2009), # 7.

The fact that the equity of many banks is much lower than it was before the mid-nineties is not so much due to deficiencies in risk modeling as to the incentives that bank managers have to expand the business of their banks as much as they can get away with. “Economizing on equity”, the catch phrase of the industry, is really a euphemism for a strategy that tries to capture the excess returns to equity that are associated with high leverage. If the balance sheet is forty or fifty times equity, even small margins between asset returns and refinancing costs can be turned into substantial returns on equity. In a world of “shareholder value” and “market discipline”, in a discourse with analysts, investors, and the media that is focused on returns as opposed to risks, bank managers have strong incentives to go after these returns, neglecting the induced risks for creditors, the financial system, and last not least the taxpayer. The deficiencies of risk modeling and risk management that we have seen should at least partly be ascribed to these incentives. Eliminating these deficiencies without addressing the underlying incentive issues will merely shift the problem elsewhere.

The real problem is one of governance. The Basel process has so much focused on risk calibration that the problem of governance has been neglected. The problem of governance comes in because a financial institution’s activities can induce substantial risks for the financial system and for the taxpayer. In the absence of regulation, there is no reason why these external effects should be taken into account by bank managers. Regulation and supervision are there to reduce this governance problem. When the model-based approach to capital regulation was introduced, however, the regulatory community was so impressed with the sophistication of recently developed techniques of risk assessment and risk management of banks that they lost sight of the fact that the sophistication of risk modeling does not eliminate the governance problem which results from the discrepancy between the private interests of the bank’s managers and the public interest in financial stability.¹⁴

4. The Illusion of Measurability of Risks

The Basel Committee is certainly right in finding that many of the risks that were realized in the crisis had not been properly accounted for in the various risk models that were used to determine regulatory capital under the model-based approach:

- Insufficient account was taken of risks arising from correlations of credit risks in mortgages or mortgage-backed securities and other derivatives. Such correlations arise naturally from a common dependence on underlying factors of macroeconomic significance such as market rates of interest, real-estate prices, or the business cycle. Earlier instances of the problem, which should have served as warnings, occurred in the various real-estate and banking crises of the late eighties and early nineties in the United Kingdom, the Scandinavian countries, Japan, Switzerland...

14 Hellwig and Staub (1996) documents a panel discussion held at the time. The governance problem, which was raised in my own contribution, was either overlooked or poo-pooed by the representatives of the Basel process on the panel, from the regulatory community as well as the industry.

- Insufficient account was taken of risks arising from correlations between counterparty credit risks and underlying risks in derivatives and other hedge contracts. Such correlations arise naturally when the counterparty is concluding many similar contracts at the same time. Earlier instances of the problem, which should have served as warnings, concerned variable-rate mortgages in the eighties and dollar-denominated loans from international banks to Thai banks and from Thai banks to Thai firms in the mid-nineties. Default rates on the former shot up, e.g., in the United Kingdom, when, in the late eighties, market rates were very high; default rates on the latter shot up when, following the devaluation of the Baht in 1997, Thai firms, which were doing business in domestic currency, were unable to fulfill their dollar-denominated obligations.¹⁵ In the current crisis, the problem arose when monoline insurers and AIG proved to be vulnerable to the correlated defaults on the mortgages and mortgage-backed securities for which they had entered into credit default swap contracts.
- Insufficient account was taken of the possibility that asset prices might tumble because important institutions holding these assets were unsoundly financed and might have to sell. This risk had not recently been observed, but it had figured prominently among the reasons why, in 1998, Long Term Capital Management was rescued from immediate insolvency.

The Basel Committee is wrong, however, in looking at these deficiencies as technical flaws that can be corrected by improvements in rules and procedures. These deficiencies should instead be seen as symptoms of more fundamental problems which raise doubts about the model-based approach to capital regulation altogether.

In the first place, the empirical basis for risk modeling is often insufficient. Many of the time series that are being used are very short. Moreover, these time series exhibit substantial nonstationarities which preclude reliable estimates of the underlying structures.¹⁶ These problems are particularly serious when it comes to estimating correlations.¹⁷ For credit risks, there is the added complication that defaults are relatively rare events – unlike changes in asset prices.

More importantly, many of the risks involved are not exogenously given, but must be seen as endogenous. They depend on the behavior of the parties in question and on the development of the markets in which these parties operate. They change over time, and these changes are hardly observable from the outside. Thus, counterparty credit risks in derivatives and other hedge contracts – and the correlations of these counterparty risks with the underlying risks – depend on the counterparties' total exposures from such contracts. If a counterparty has many such contracts, an adverse realization of the underlying risk may impair its ability to fulfill its obligation precisely when it is needed. If the counterparty itself is hedging the risk from these contracts through further contracts with third parties, the exposure also depends on the credit risks in these addi-

15 See also M. Hellwig (1995).

16 I raised these issues in my contribution to Hellwig and Staub (1996). Their relevance in the context of the crisis is documented in UBS (2008).

17 For a warning about this prior to the crisis, see Duffie (2007).

tional contracts. The notion that these risks are objectively given and can be reliably measured is an illusion.¹⁸

Some of the endogeneity involves the system as a whole. As I explained in Section 2 above, the downward spiral of the financial system from August 2007 to October 2008 can be understood as a systemic response to a collective deleveraging attempt. Some of the correlations that have been observed arise from the joint dependence of different securities and markets on common factors that drive the overall system. The correlations and nonstationarities that these common factors induce are hardly amenable to measurement, let alone reliable measurement.

5. Conceptual Deficits of Capital Regulation

In discussions with industry representatives or members of the regulatory community, I often get the rhetorical question “Don’t you agree that a system of regulation that calibrates capital requirements to risks is better than a system of regulation that fails to do so.” The presumptions behind this question have dominated the discourse about capital regulation since the early nineties. However, as long as the context is not clear, as long as the objectives and the presumed functioning of capital regulation have not been specified, the question is ill-posed. I might as well answer that the Soviet Union’s five-year plans under Breshnev were better than under Stalin, before the computer age.¹⁹

The regulatory community as well as the industry must take the blame for never having specified the objectives and the presumed functioning of capital regulation. Ever since it started, with the deliberations about Basel I, discussion about the development and refinement of capital regulation has suffered from the following deficits:

- The precise objective of the regulation is unclear.
- The dynamics of implementation over time have not been given sufficient attention.
- Systemic concerns have been neglected.

These deficits are one reason why the regulatory community has been unable to put up stronger resistance against the industry’s claims that capital regulation must be finely attuned to the actual risks that banks are taking. They are also a reason why dysfunctional effects of the regulation

18 Interestingly, the Basel Committee’s Consultative Document (2009, # 112 ff.) only calls for a consideration of counterparty risks in hedge contracts without explaining how this is to be done. The role of correlations with the underlying, the variable that really matters, is not even discussed.

19 An illustration of industry input into this type of discussion is provided by Frenkel and Rudolf (2010). The authors acknowledge that the lack of bank equity has played a role in the crisis, but oppose the introduction of a leverage ratio approach without risk calibration on the grounds that (i) such a regulation would induce a credit crunch and (ii) deficits in risk-calibrated capital regulation should be eliminated by improving that regulation, rather than introducing a bound on leverage ratios. They do not discuss why capital was as low as it was. In particular, they do not discuss the role of the model-based approach as tool for having excessively low capital. Nor do they observe that the credit crunch argument against a leverage ratio would apply just as much to an attempt to raise bank equity by improved capital regulation.

have by and large been overlooked. The regulatory community knew that risk calibration was mainly a tool to reduce capital requirements. However, they also knew that, in discussions about risk management, they were no match for the industry.

Objectives: In principle, capital regulation should contribute to maintaining the safety and soundness of banks. How it serves this purpose is usually not explained, at least not beyond the truism that insolvency corresponds to a situation where equity is negative. There seem to be three possibilities:

- Capital serves as a buffer against unexpected losses.
- Capital reduces incentives for incurring risks that might end up burdening creditors or the taxpayer.
- A capital requirement provides the supervisor with room for intervention before the bank becomes insolvent.

In the various documents on banking regulation, all three purposes of capital requirements are named. No account is given, however, of the differences between them, and, in particular, of possible conflicts and tradeoffs concerning appropriate standards for determining regulatory capital. Whereas the role of capital as a buffer against losses might call for a calibration with respect to total risk, the role of capital as an incentive device would call for calibration with respect to incremental risks from additional assets, and, finally, the role of capital regulation as a basis for intervention prior to insolvency would call for a calibration with respect to the ease with which assets can be disposed of during this intervention. The three modes of calibration differ; the differences have so far not been considered.

Dynamics of Implementation over Time: Prior to the crisis, there had been no consideration of the paradox that the buffer function of regulatory capital is limited because this capital is needed to satisfy the regulator. The dynamics of implementation over time had not received much attention. Conceptually, the discussion had hardly moved beyond a two-period model where financing and investment decisions are taken in period one, returns are realized and paid out in period two, and then the world ends. In a two-period world, of course, the buffer function of capital and the effects of capital on incentives for risk taking are easily understood.

If one moves from the two-period model to a real world where financing, investment and payout decisions are taken on an ongoing basis, neither the buffer argument nor the incentive argument can be taken for granted. The incentive argument breaks down because today's anticipation of tomorrow's capital requirements can induce additional risk taking today; the reason is that, if the additional dollar of earnings on today's investment can be reinvested tomorrow with a multiplier of fifty, this multiplier enhances the attraction today of gambles that offer large prizes if they succeed.²⁰ The buffer argument breaks down when the interplay of price declines, fair-value ac-

20 See Blum (1999).

counting and capital regulation forces the bank to deleverage by selling assets; such deleveraging may even endanger long-run solvency because, in malfunctioning markets of the sort that we have seen in the crisis, market prices of assets may well be below discounted present values of returns.²¹

In a world with ongoing financing and investment decisions of banks, a key question must be how capital regulation ought to be implemented over time, in particular, how the bank's assets and liabilities should be adjusted over time when unexpected losses have caused equity capital to drop. Schemes for dynamic provisioning and de-provisioning that are currently under discussion represent a step in this direction. However, I suspect that current plans involve too many illusions about the scope for attuning such dynamics to macro-developments, measurements of cyclicity and the like.

Neglect of Systemic Concerns: Three aspects merit particular mention. First, in the context of risk calibration of regulatory capital, too little attention is paid to the dependence of counterparty credit risk and of market risks on systemic developments. The various correlations that I have mentioned above provide relevant examples. Second, in the context of implementation dynamics, too little attention is paid to the systemic impact of regulation-induced deleveraging. Forcing Bank A to deleverage when it has experienced losses will harm Bank B if Bank A's asset sales depress the prices of securities held by Bank B. If Bank B in turn is induced to sell assets, the backlash may end up hurting Bank A itself. Contrary to the ideology of capital regulation, such deleveraging can hurt the safety and soundness of the institutions that are forced into it.

Third, the model-based approach to determining capital regulation has increased the susceptibility of financial institutions to systemic developments. Two mechanisms seem particularly important. First, by encouraging banks to engage in derivative transactions as a way of getting risks, if not out of their books, at least out of their models, the model-based approach has contributed to enhancing the interconnectivity of the system. There is thus more room for domino effects than there used to be. The fate of AIG is a case in point. Second, because, under the model-based approach, capital requirements for market risks tend to be lower than capital requirements for credit risks, this approach has encouraged banks to put as many assets as possible into their trading books rather than their credit books. They were thus more vulnerable to book losses arising from changes in asset prices arising from market malfunctioning and/or other institutions' deleveraging.

6. Where Should We Go From Here?

The preceding discussion indicates that it is not enough to tighten a screw here and put in a new nail there. The system of banking regulation as a whole needs a thorough overhaul. Such an overhaul should involve two major changes:

21 For an assessment of market prices versus discounted present values of returns in the crisis, see International Monetary Fund (2008).

- We should get away from the principle that regulatory capital must be finely attuned to the risks that banks are taking.
- We should aim for substantially higher regulatory capital, well above ten percent and perhaps even closer to the twenty or thirty percent that were common before banks got used to the idea that the taxpayer couldn't afford to let them fail.

These proposals are *not* based on the notion that capital is a buffer that protects the safety and soundness of the individual bank in question. They are, instead, based on the notion that capital requirements should aim at enhancing the safety of the financial system as a whole.

The first proposal, elimination of risk calibration of regulatory capital, is based on the assessment that risk calibration of capital requirements has been a major reason for the decline in banks' capital ratios and for the increase in systemic interconnectedness. The calibration of capital requirements to the risks that banks were recognized as having taken has provided banks with an incentive to shift risks out of their books through various operations, most prominently hedge contracts with other financial institutions. The interconnectedness of financial institutions – and therefore the scope for systemic repercussions of one institution's difficulties through domino effects – was thereby increased. At the same time, there was a failure to recognize that, because of correlations of the counterparty risks in the hedge contracts with the underlying risks on which the hedge contracts were written, removal of the underlying risks from the banks' books was at best incomplete.

In some prehistoric past, it was common to distinguish between risks that had been recognized and risks that had not been recognized. It was also common to have provisions as a buffer against risks that had been recognized and equity as a buffer against risks that had not been recognized. These distinctions are blurred when regulatory capital is attuned to the risks that have been recognized. Such an attunement might be appropriate if it was known that unrecognized risks and recognized risks go together so that the risks that one knows about can be treated as a useful indicator of the risks that one does not know about. Experience with the incidence of risks in the crisis, however, suggests that this is not the case: Risks that one did not know about turned out to be enormous; moreover, these risks appeared in places that, under the model-based approach to risk management, had been deemed to be altogether safe, such as AAA-rated MBS CDOs whose credit risk had been hedged with monoline insurers. This experience suggests that, even apart from the systemic concerns raised above, it is desirable to return to the view of equity as a buffer against risks that have not been recognized.

The second proposal, a substantial increase in equity ratios, is also based on systemic concerns. First, with capital requirements well into the double-digit range, there is much less of a chance that unexpected shocks will endanger bank solvency. Therefore, interbank markets are much less likely to be perturbed by worries about solvency, i.e., there will be much less of a danger of interbank markets panicking and breaking down and much less need for government support to contain systemic damage. Second, deleveraging multipliers are lower if capital requirements are

higher. At 20 % of the unweighted balance sheet, a capital requirement would still be procyclical. However, a deleveraging multiplier of five is much to be preferred to a deleveraging multiplier of forty or fifty.

7. Do Higher Equity Requirements Increase the Bank's Cost of Lending?²²

At this point, the banking community will object, saying that equity capital is scarce and expensive, and that high and nonmanipulable capital requirements will induce a credit crunch.²³ This assertion can be heard in practically every discussion of banking regulation,²⁴ but I have yet to see a coherent and convincing argument as to why it should be true.

The typical argument goes as follows: The required rate of return on bank equity is on the order of 25 %, much higher than the required rate of return on bank debt. If we raise the capital requirement by ten percentage points, we are likely to add about two percentage points, i.e. 200 basis points, to the required rate of return on bank lending.²⁵ As a result, loan rates will have to be that much higher, and the equilibrium amount of bank lending will be reduced. This argument involves one fallacy and one mongrel of a fallacy and a moral hazard problem, which in itself might be a reason for inefficiently low bank equity.

A fallacy

The fallacy lies in neglecting the fact that the required rate of return on equity depends on how much equity the bank has. The required rate of return on equity contains a risk premium. The difference between the required rate of return on equity and the required rate of return on debt reflects the fact that the returns to equity are riskier than the returns to debt. In bankruptcy states, shareholders get nothing, in non-bankruptcy states, they get the excess of the bank's returns over its debt service, depends on how the bank is doing. However, the risk in returns to equity depends not only on how well the bank is doing. It also depends on how well capitalized the bank is. The more debt finance a bank has and the lower its equity is, the greater is the risk per dollar invested that shareholders bear and the higher is the expected rate of return that they require. If a banker talks about 25 % being the required rate of return on equity, this in itself is reflection of the bank's being undercapitalized. If the bank were forced to have substantially more equity than it currently does, this required rate of return on equity would go down significantly. To the extent that the additional equity also decreases the bank's bankruptcy risk, interest rates on the bank's debt should also go down.

22 For a more extensive discussions of the arguments in this and the following section, see Admati et al. (2010).

23 For an example, see again Frenkel and Rudolf (2010).

24 For an example, see the interview of *Süddeutsche Zeitung* (2009) with Dr. Josef Ackermann, the Chairman of Deutsche Bank.

25 Calculation based on a 5 % interest rate on debt; 2 % is obtained as 10 % of the difference between the required return on equity and the interest rate on debt.

These changes in required rates of return lower the bank's cost of capital and counter the direct impact of the increased share of equity in the bank's financing mix. Under certain conditions, the two effects neutralize each other. Indeed, according to the Modigliani-Miller Theorem, they will do so *unless* there are additional factors such as a privileged tax treatment or government guarantees that introduce a bias in favour of debt finance.

The Modigliani-Miller Theorem is sometimes shoved aside on the grounds that the assumptions on which it is based are highly restrictive.²⁶ However, even if the different effects do not neutralize each other, *the risk premium must change if the risk in the returns to equity changes*. Neglect of this implication of the fact that higher capital requirements reduce the risk in the returns to equity amounts to a fallacy of economic logic.

These considerations do not depend on whether other banks raise their equity as well; they apply to each bank on its own. This assertion stands in contrast to the notion of a benchmark for the required rate of return in the industry. However, such a notion only makes sense if the different banks in the industry have similar capital structures. For two banks with similar asset portfolios, required rates of return on equity must differ if capital structures differ. Thus, if a 25 % rate of return on equity is said to be the benchmark for the industry, we should infer that the industry as a whole is undercapitalized.

The banking community has often maintained that banking is different, and therefore the logic of capital market theory, and, in particular, the logic of Modigliani and Miller, do not apply to banking.²⁷ This assertion has some merit when bank debt takes the form of deposits, where investors receive returns in the form of convenience and transactions services rather than interest payments. The assertion is without merit, however, when bank debt takes the form of wholesale market finance, as it increasing did in the decade prior to the crisis. The assertion is also without merit if the bank's own risk management is based on hedging through derivatives. The set of assumptions under which the Modigliani-Miller Theorem is known to hold is the same as the set of assumptions that are required to validate the models that banks use to price derivatives or to determine their risk management and hedging strategies²⁸ – and to determine required capital under the model-based approach. A banker who insists on questioning the relevance of the Modigliani-Miller logic for his institution is implicitly arguing that there is no justification for his use of the model-based approach to risk management and risk control; by implication, this banker is also arguing that there is no justification for the use of the model-based approach to determining bank capital requirements.

26 This assessment was justified for the original formulation of Modigliani and Miller (1958). Stiglitz (1969), however, has shown that the theorem holds under much more general assumptions; see also Hellwig (1981).

27 For a stinging critique of this position, see Miller (1995).

28 In both contexts, the analysis relies on some version of completeness of the market system; see Stiglitz (1969), Hellwig (1981) for the role this assumption plays in the Modigliani-Miller Theorem, Harrison and Kreps (1979) for the role this assumption plays in derivatives pricing and hedging.

A Mongrel of a Fallacy and an Instance of Moral Hazard

The mongrel between a fallacy and an instance of moral hazard lies in the presumption that the decision on whether to grant a loan or not should depend on the way the loan is financed or on the way that financing are attributed to the loan. As a normative statement, i.e. as a statement about what a bank should do, this is another example of faulty economic logic. As a descriptive statement, i.e. as a statement about what a bank is actually doing, it describes an instance of moral hazard, banks taking risks that they should not be taking and that they would not take if it wasn't for agency problems in the relation between them and their financiers.

From a normative perspective, the decision on whether to grant a loan or not should depend on whether the expected rate of return on the loan provides enough of a risk premium for the additional risk that this loan contributes to the bank's portfolio. A risky loan whose expected rate of return is just slightly above the riskless rate of interest should *not* be made even if it can be fully financed by issuing debt at the riskless rate – and even if no equity requirement is imposed. Granting this loan and refinancing it at the riskless rate raises not only the bank's expected profits, but also the bank's risk. Shareholder value will therefore go down *unless* the expected rate of return on the loan contains enough of a risk premium to compensate for the added risk in shareholder returns. This assessment has nothing to do with whether the bank is required to allocate equity to the loan or not.

Quite generally, under competitive conditions in capital markets,²⁹ for any loan under consideration, there is a benchmark rate of return such that, if shareholders were asked for their assessments, they would be unanimous in considering that the loan should be granted if the expected rate of return exceeds the benchmark and should not be granted if the expected rate of return falls short of the benchmark. The benchmark depends on the distribution of returns on the loan, in particular, on the risk of these returns and the relation of this risk to other risks in the market. However, the benchmark is independent how the loan is being financed; it is also independent of the bank's overall capital structure.³⁰ Moreover, under competitive conditions in capital markets, reliance on this benchmark is not only in the shareholders' interest, but also yields a socially efficient allocation of investment funds.³¹

From a descriptive perspective, it must be acknowledged that bank managers do take account of how they finance the additional loan or investment. An example is given by the use of conduits and SIVs mentioned above to invest in mortgage-backed securities without putting up equity. According to Acharya, Schnabl, and Suarez (2009), rates of return on these investments were just ten basis points above the rates on the commercial paper that was used for refinancing them; if the banks that used the conduits and SIVs had had to put up 8 % equity for these investments,

29 “Competitive conditions” require that state-contingent market returns be independent of whether the bank grants the loan under consideration or not; see Baron (1979), Grossman and Stiglitz (1980).

30 Independence of the benchmark from financial structure is established in Grossman and Stiglitz (1980).

31 For Pareto efficiency of equilibrium outcomes, see Baron (1979) and Hart (1979).

they would have considered that, with a risk premium of 500 basis points for equity, the investment would have required a margin of at least 40 basis points, 30 more than it actually brought.

In this assessment, the risk of the investment and the associated maturity transformation are completely neglected. Such neglect of risk must be regarded as an instance of moral hazard, due perhaps to an exclusive focus of management on expected rates of return – and due to the fact that incumbent shareholders were unable to prevent management from pursuing such strategies. The risks were of course very real and ended up destroying a lot of shareholder wealth. Indeed, in some cases, the banks in question would have become insolvent, i.e., they would have destroyed creditor wealth as well as shareholder wealth if it hadn't been for the fact that the banks were bailed out by third parties, other banks, private investors, and governments.

Moral hazard in the form of excessive risk taking at the expense of incumbent shareholders and creditors should be seen as a major source of inefficiency. Although, *ex post*, the willingness of bank management to engage in such behavior may seem to provide for generous bank lending, from an *ex ante* perspective, the prospect of such moral hazard will cause shareholders and creditors to be more cautious about the funds they invest in a bank, requiring higher rates of return in compensation and imposing covenants that restrict the bank management's scope of activities and that even may increase the fragility of the bank.³² The net effect on the bank's ability to provide loans may well be negative.

8. For Whom is Bank Equity Expensive? Social Costs versus Private Costs

The preceding discussion has abstracted from government subsidies and taxes. If government taxes and subsidies are taken into account, there is more merit to the proposition that equity is scarce and expensive. Government subsidies and taxes can introduce a bias into the financing decisions of banks. Specifically, there is a bias in favour of debt finance if bank debt holders anticipate that the government will bail them out if the bank should become insolvent. Such anticipations reduce the rate of interest that the bank has to promise to debt holders; to the extent that debt holders are protected from the consequences of bank insolvency, there is less need for interest payments in normal states to compensate them for losses in insolvency states.

There may also be a bias because the bank's profits are subject to corporate income taxation, but interest payments on debt (or resources spent to provide transactions services on deposits) are not. In the absence of other considerations, this effect encourages banks, like all other corporations, to use debt, rather than equity, for finance.³³

32 According to Calomiris and Kahn (1991), the "On Demand" clause in the deposit finance serves mainly to protect the bank's financiers from moral hazard; this protection however is obtained at the cost of making the bank susceptible to the danger of a run.

33 The effect can, however, be counteracted by the fact that, at the level of personal taxation of investors, capital gains on shares are often taxed at a lower rate than interest income. Whether debt actually has a tax advantage depends on whether the sum of corporate income taxes and capital gains taxes on value accruals

The biases in favour of debt finance that are induced by these effects are very real. If debt enjoys tax advantages and implicit subsidies from government guarantees, then the assessment that equity finance is expensive is justified and one must expect increased capital requirements to raise the bank's overall cost of doing business.³⁴

From a public-policy perspective, however, this increase in capital costs of banks should not be a matter of concern. The private benefits of bank debt finance that are due to tax advantages and government guarantees must not be treated as benefits to society. The savings in taxes and interest costs that a bank obtains by relying on debt finance rather than equity finance have external costs in the form of reduced government revenues from corporate income taxes or in the form of additional government spending on bank bailouts. These external costs of bank debt finance may force the government to reduce its spending on public goods or to increase taxes elsewhere. The private benefits of the bank finding debt finance to be cheap thus have an immediate counterpart in terms of negative effects on people who enjoy fewer benefits from public goods or people who must pay higher taxes.

Underlying this discussion is the question of what is a desirable structure of taxation. The tax system should be designed so as to minimize the overall distortions that taxes induce while providing the government with the funds that it needs. In particular, therefore, taxes and subsidies should be designed so as to encourage behaviour that generates positive externalities and to discourage behaviour that generates negative externalities. By this criterion, the tax advantages that banks obtain by issuing debt rather than equity are quite undesirable, as are the advantages they obtain from the prospect of government bailouts. These private benefits to bank debt finance encourage banks to be highly levered. This generates a significant negative externality because the increase in leverage raises the probability of bank failure, with negative repercussions on the rest of the financial system and of course the public purse. The discussion here links up with the discussion of the preceding section about moral hazard due to the ability of bank management to engage in additional risks at the expense of incumbent financiers, debt holders and shareholders, who are unable to renegotiate the terms on which they previously provided funds to the bank.

Given these negative externalities from banks using debt rather than equity, there is no reason to refrain from requiring banks to have more capital on the grounds that equity is expensive and the regulation would raise the banks' cost of capital. Quite the contrary, such a regulation would merely counteract the perverse incentives that are created by the corporate tax system and by the inability of government to commit to not bailing out banks.

from retained earnings exceeds or falls short of interest income taxes at the personal level; see, e.g., Ch. 4 in King (1977).

34 Even so, Kashyap, Stein, and Hanson (2010) estimate the long-run effect of increased capital requirements on bank lending costs to be modest, but suggest that it raises concerns about competition between banks and non-bank institutions.

9. Concluding Remarks: Public Concerns and Private Interest in Regulatory Debate

Statutory regulation and supervision draw their legitimacy from the assessment that certain activities have significant external effects on the economy as a whole and that these external effects are not sufficiently taken into account in private decision making and private contracting. For the banking industry, the externalities arise from the systemic implications of bank breakdowns. If a bank goes under, systemic repercussions can cause damages that exceed anything the managers of the banks could have considered. If the government steps in to contain the systemic repercussions, the damage may be contained, but the cost to the taxpayer may still be substantial. Statutory regulation and supervision should be designed to mitigate these problems.

This very rationale for statutory regulation and supervision implies that there must be a conflict of interest between bankers and bank regulators. If regulation is there to force bankers into modes of behavior that they would not choose otherwise, the bankers are bound to resent the intervention. Given this resentment, they will protest the infringement of their freedom of action and the loss of competitiveness that the regulation imposes on them.

It should be clear, however, that their contributions to the public discourse on banking regulation are shaped by their private interests. While accepting that risk modelers and risk managers in banking institutions are highly professional and very competent, we need to appreciate that a bank's private interests in managing its risks is not the same as the public interest in having banks manage its risks so as to avoid systemic damage. If they were the same, we should not need any regulation of banking at all. However, experience has made clear that they are not the same and that the systemic fallout from bank failures is sufficiently serious to warrant the regulator's intervention. Therefore, the professional competence of risk managers and risk controllers in banks is *not* a good reason to shape the regulation and supervision of banks to the bankers' wishes. Because of resource limitations, regulators and supervisors may be less competent in matters of risk management and risk control, but this is no reason to eliminate their role of giving voice to the public interest as distinct from the private interest pursued by the banks.

Political authorities and the media also need to pay more attention to the distinction between public and private interests. In current discussions about the reform of banking regulation after the crisis, one often hears that we cannot really do very much because the other countries don't want to go along and we do not want to hurt the competitiveness of "our" banks in their international activities. In the German context, I usually respond to this argument by asking whether the interlocutor really believes that, from a public-policy perspective, the competitiveness of the Landesbanken in acquiring mortgage-backed securities and their competitiveness in refinancing these securities by issuing asset-backed commercial paper have been so beneficial. The costs of this kind of competitiveness have been enormous.

In the years leading up to the crisis, regulatory and political authorities alike have taken a hands-off stance towards the risks that banks were taking. Some of the excessive indebtedness and ex-

cessive maturity transformation by banks exploiting the shadow banking system or the model-bases approach to determining regulatory capital could have been avoided if supervisors had been more willing to use the discretionary powers they have under Pillar II of the Basel Accord, namely the power to assess the professional quality of banking institutions and to intervene if this quality is lacking; some of the maturity transformation and leverage that banks engaged in was simply unprofessional. However, the supervisors as well as the political authorities did not want to be seen as throwing sand into the wheels of what was perceived to be a successful industry working for the common weal. Financial innovation, success in international markets, funding for housing for low-income families – or for other purposes deemed worthy in the political arena – all these successes of “our” champions made supervisors weary of asking annoying questions – and politicians and journalists did nothing to strengthen their backbones.

The experience of the crisis, however, should make us think again about these “successes”. No matter what the rhetoric may have been, subprime-mortgage securitization as a basis for channeling funds into housing for low-income families in the United States was *not* provided as a public service, but as a private, profit-making venture. The fallout from this activity hurt investors and taxpayers worldwide. By portraying this profit-making activity as a contribution to social policy, the participants merely diverted attention away from the real public concerns.

Similarly, “competitiveness” is in the first place a private concern of the individual bank or firm. Returns to the bank’s being competitive accrue to its shareholders and, depending on governance, to its stakeholders. Conditions that affect competitiveness in the industry as a whole are likely to be reflected in factor prices and, perhaps, the allocation of resources, in particular, of human talent, to the industry. In a market economy, however, none of this is a matter of public interest calling for intervention by the polity. By contrast, the risks with which the industry burdens the taxpayer and the rest of the economy are a matter of public interest. Regulator intervention to contain these risks may harm “competitiveness” in private markets, just as clean-air regulation harms the “competitiveness” of affected firms in their markets. As the market system adjusts to these interventions, there may be a change in factor prices and in the allocation of resources to the industry. However, just as the consumption value and health effects of cleaner air may justify the costs of clean-air regulation, including the resulting downward effect on measured real wages, so the benefits for the rest of the economy – and for the taxpayer – may justify the – private – costs of infringing the bankers’ freedom of action by statutory regulation and supervision. If this implies that, in any given cohort of young people, the fraction of high-talented people going into the financial sector decreases, perhaps the joint benefit from having these people go into engineering and from having fewer financial crises may be worth it.

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