

Thirteen Questions about the Subprime Crisis
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James Tobin would have been saddened by the subprime crisis, but he would not have been surprised.¹ He would have been saddened by the human consequences, not so much for investment strategists forced to forego their bonuses as for families unable to keep their homes. He would have been further saddened that economic analysis had not done more to warn of financial risks so that policy-makers could have avoided those social costs. But he would not have been surprised that financial markets, left to their own devices, produced unforeseen and socially suboptimal outcomes.

At the same time, Tobin would have been reluctant to move too far in the direction of re-regulation. He appreciated the role of financial markets in resource allocation and in enhancing the productive efficiency of the economy. He always emphasized the role of finance, and financial innovation, in mobilizing resources for the investment that undergirds economic growth and rising living standards. He understood the limits of our knowledge about how markets work and that interventions could have unintended consequences. He would have urged regulators to proceed cautiously. He would have cautioned against killing the golden goose.²

He also studied these problems for the better part of 50 years. We by comparison have had considerably less time to assess the causes and consequences of the subprime crisis. What follow therefore are less recommendations than they are questions for policy. Questions without answers do not provide closure, but they at least offer food for thought, as well as road maps for

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² Recall that, in the context of international financial markets, Tobin advocated taxing, not regulating, much less prohibiting, international capital flows. His proposal was for a small tax to slow down international capital flows, thereby balancing the private benefits with what he saw as both private and social costs, not for draconian regulation to stop them.

scholars who wish to sharpen political debate about how public officials might usefully respond to the crisis in credit markets.

1. Questions about Originate and Distribute. Over the past twenty years, large banks have refined strategies of securitizing credit – that is, they originate loans or purchase them from specialized brokers and transfer them to a special purpose vehicle, which then packages them into Collateralized Debt Obligations for sale to other investors.³ Some commentators have argued that this business model has simply set the stage for financial crisis. Securitization, they argue, weakens the incentive for the originator to assess the credit quality of those loans, relative to the once-upon-a-time world in which banks held their loans on their balance sheets⁴ As a result, the stability of the credit markets has come to hinge on the acumen of investors, who lack the specialized expertise needed to undertake such scrutiny of creditworthiness. Thus, while securitization spreads risk, it also has a tendency to raise it (creating more risk to be spread and ultimately borne by someone).

In principle, even banks that transfer loans off balance sheet will pay a price in reputational damage if they fail to adequately monitor those loans or systematically overstate their quality. Those who buy the nonperforming CDOs will blame the bank that set up the special purpose vehicle. But it is evident that this reputational mechanism is insufficient to ensure adequate monitoring.⁵ Some would say that this situation reflects problems of incentive alignment within financial institutions: the employment relationship creates incentives for

³ For more on mortgage brokers see Section 2 below.

⁴ Special purpose vehicles then signaled credit quality by dividing the streams of income from the underlying mortgages into tranches (senior, mezzanine and junior) that absorb default losses on the entire mortgage pool in lexicographic order and using quantitative models to predict default probabilities. These procedures made it possible to market the senior tranches to regulated investors and those with strict covenants.

⁵ As acknowledged by Bernanke (2007a).

decision makers to gamble with the firm's reputation. Investment analysts and financial engineers change jobs and employers. They thus have an incentive to take risks with the firm's reputation, since a good outcome means larger bonuses while a bad outcome tarnishes the reputation of an institution with whom they will no longer have a relationship. One can make similar arguments about the incentives provided by the structure of compensation within corporate America. A CEO who encourages risky behavior will be paid handsomely if the bet pays off and will be paid less than zero if it does not (in other words, the distribution of returns is asymmetric).⁶

Observations like these have led some observers to recommend that originators should be required to hold a specific minimum share of the securities on their own balance sheets. Banks might be required to hold, say, 20 per cent of each CDO (or 20 per cent of each CDO tranche). This proposal would, at least in part, restore the traditional financial incentive of a bank that held the loans it originated to carefully scrutinize their credit quality.

By design, such a reform would be a step back in the direction of good-old-fashioned banking, in which institutions making loans would have less scope for diversifying their risks.⁷ One should recall, therefore, that the old model had limitations. It left banks vulnerable to housing-market downturns, in turn rendering them more cautious about extending housing finance and raising the price of the latter. Reforms along these lines would thus solve problems in securities markets at the cost of heightening risk in the banking system and raising costs to consumers.

One can also question whether regulation of this form would be effective. In particular, one would expect banks to seek ways of hedging the additional exposure that regulators were

⁶ Indeed, recent severance packages suggest that CEOs are handsomely compensated even when the bet doesn't pay off.

⁷ The "good-old-fashioned banking" line is from Alastair Darling (see below).

attempting to force them to hold. They could take offsetting short positions in other assets whose returns were correlated with their own CDOs, use credit derivatives markets, or have their own financial engineers design and sell instruments tailored to offset the associated risks. To the extent they succeeded, incentives would not differ very much from the current situation.

The counter-argument is that hedging is not free; to the extent that such offsetting operations were costly, there would still be induced changes in behavior. But those large investment and commercial banks which did in fact retain substantial fractions of the CDOs and other residential-mortgage-backed securities that they issued did not obviously behave more prudently in 2006-7. A number of financial institutions, from Citibank to Merrill Lynch, ended up holding a large fraction of those securities themselves, either because they found them hard to sell or because in order to do so they were obliged to provide liquidity insurance – effectively, to buy them back in the event of difficulties.⁸ The fact of these actual and contingent holdings does not appear to have sufficed to induce more conservative behavior.⁹

2. Questions about Mortgage Broking. A second change in the structure of the home loan market, in addition to the fact that the banks which fund loans do not hold mortgages, is that many banks do not deal with the homeowner. Instead, banks typically outsource dealings with homeowners to independent mortgage brokers who receive fee income from both the borrower and lender. Because the broker does not look forward to a 30-year relationship with the borrower, his incentive to provide the best possible information and advice may be less than in the case of an old-fashioned bank that brokers, services, and holds the loan. Outsourcing the broking function also creates principal-agent problems for the banks, which may find it more

⁸ Interestingly, they often had better success in selling the high-risk and mezzanine tranches of CDO issues, for which there was a strong demand from hedge funds, than the relatively low-risk tranche.

⁹ See also Section 4 below.

difficult to maintain loan documentation standards when the assessment of loan applications does not rest in the hands of their own employees. The result has been an explosion of inadequately documented and ultimately unsustainable subprime loans which have left in their wake defaulted mortgages, foreclosed houses, disappointed families and nonperforming securities.¹⁰

Mortgage companies specializing in such brokerage have been a feature of the American financial landscape for more than a century.¹¹ In other words, it is not likely that policy-makers can put this genie back in the bottle. Officials are therefore left to contemplate strengthened regulation and tougher legal liability. The argument for better regulating mortgage broking is mainly an argument for regulation on consumer-protection grounds – that the state must hold brokers to minimum standards when communicating and explaining mortgage provisions and alternatives to their clients. Congress could achieve this goal through legislation that subjects brokers to agency obligations – this giving them a fiduciary responsibility to their clients – and by requiring them to disclose their fees so that their clients can help to enforce those obligations.¹² In a similar vein, the Joint Economic Committee has suggested that the federal government subject brokers to the provisions of the Truth in Lending Act, which would establish their fiduciary responsibility for their customers and make them subject to federal penalties.¹³

The issue for systemic stability, namely that brokers who originate loans should furnish enough documentation to enable banks and other entities providing funding to know what they

¹⁰ Industry sources suggest that nearly two-thirds of subprime mortgages in 2006 were originated by brokers (Joint Economic Committee 2007).

¹¹ Snowden (1995) provides a very interesting account of the agricultural mortgage boom and bust of the 1880s and 1890s that emphasizes principal agent problems between the Western mortgage agents and companies identifying potential borrowers and broking the loans and the Eastern insurance companies ultimately holding the mortgage-backed securities. The more things change...

¹² Currently, independent mortgage companies are state chartered and subject to state law and oversight, whose provisions and enforcement are variable. Under most state laws, brokers are not fiduciaries with a legal responsibility to put the borrower's interest first.

¹³ Going further and making loan purchasers and investors responsible for the malfeasance of brokers would probably have the effect of destroying significant parts of the mortgage market.

are purchasing, relates to the banks basic business practices. Concerns about these practices are appropriately addressed by strengthening supervision and regulation of the banks that fund the loans originated by mortgage companies and brokers.

3. Questions about Capital Adequacy. By applying minimum capital requirements to bank balance sheets and requiring more capital protection of riskier assets, the 1988 Basel Accord encouraged banks to shift risky activities off balance sheet. The growth of structured investment vehicles (SIVs) and conduits was not exactly a coincidence, in other words.

By design, the creation of these off-balance sheet entities allowed banks to reduce the capital associated with a given risk profile.¹⁴ In addition, it reduced the transparency of risky activities and hid them from regulatory scrutiny. Unsurprisingly, these innovations encouraged excessive risk taking, inadequate transparency, and weak regulatory scrutiny.

Basel II, which international banking authorities have designed to correct some of these deficiencies, came into operation at the beginning of this year. Under Basel II, regulators will take into account the riskiness of a bank's overall portfolio, including contingencies, when establishing capital requirements. The new approach requires banks to use portfolio models, very much in the spirit of Tobin, to assess the riskiness of the portfolio. (Where circumstances do not allow such modeling, banks must calculate their capital requirements from the credit ratings assigned to the bond portfolio.) This accounting regime should reduce the incentive for shifting risky activities to a special purpose vehicle or conduit, insofar as the probability that the position will come back onto the bank's balance sheet is part of the modeling exercise.

¹⁴ This profile included the risks that banks would face if off-balance-sheet activities were forced back onto the balance sheet by funding problems or contractual provisions.

The problem is that banks will still have an incentive to make convenient assumptions about when the loans they originate and distribute will come back onto the balance sheet, and it is not clear that supervisors will be in a position to correct them. Typically banks can assume that a loan, once sold, is gone for good.¹⁵ In practice, however, originators may feel compelled to repurchase securities that they previously sold for reputational reasons.¹⁶ David Dodge, the now former governor of the Bank of Canada, has argued that bank capital requirements should be raised across the board to compensate for this bias.¹⁷

Prevailing accounting standards continue to a banks to use their own internal models in making this assessment, and one can question their incentive to give proper weight to downside risks.¹⁸ Even state-of-the-art models have a tendency of underestimating the probability of extreme outcomes. (Of late, once-in-a-thousand-year events have a habit of happening every ten years.) They underestimate the correlation of returns on different assets in periods of high volatility. Financial engineers are familiar with distributions with fat tails, but the tails may be even fatter than they think.

Raising questions about Basel II is easy – not so identifying effective reforms. One option would be to go back to Basel I, under which regulators again place assets into risk buckets by type and assign capital requirements accordingly. This would relieve regulators of having to rely on credit ratings and the banks' internal models, neither of which have emerged from the

¹⁵ An exception, presumably, is when the sales contract includes a provision that explicitly provides for repurchase in the event of specified contingencies.

¹⁶ Note the tension with the previous subsection, where I discuss Reserve Board Chairman Bernanke's suggestion that reputational factors may not be enough to induce responsible behavior by originators. The tension dissolves in cases like that of Citigroup, which inserted put options into many of the CDOs backed by subprime mortgages that it sold to customers. Those puts allowed buyers who ran into financing problems to sell them back to the originator at original value – something that was not accounted for on the bank's balance sheet. See Wray (2007) and the references therein.

¹⁷ See Dodge (2007).

¹⁸ And ratings from the major rating agencies will be used by banks that do not have their own internal models. On the rating agencies, see below.

subprime crisis with burnished reputations. But here it is important to recall that the authorities launched the mammoth effort culminating in Basel II because of flaws in this then-existing procedure, notably the relatively arbitrary categorization of assets by risk class and the failure to account for correlations among their returns.. At the other extreme, regulators might acknowledge the impossibility of fixing the capital adequacy regime and jettison capital requirements for market discipline. They could require banks to issue subordinated debt in the hope that debt holders would exercise strong oversight of banks' investment and management decisions.¹⁹ But proposals for proceeding in this way assume more confidence to the effectiveness of market discipline than is likely to be comfortable for many observers.

A compromise would be to stick with Basel II and its reliance on credit ratings and internal models but to address problems of regulatory arbitrage and procyclicality.²⁰ Regulators would have to adopt more rigorous treatment of contingent and off-balance-sheet assets and liabilities – they would have to insist that the portfolios of structured investment vehicles (SIVs) and conduits (see below) be brought back onto bank balance sheets and that adequate capital be held against them.²¹ In other words, the so-called shadow-banking system would have to be brought into the light of day. This could be part of a more general effort to require banks to hold more capital as a cushion against the possibility that complex and opaque securities can suddenly become illiquid – and against the new risks of 21st century banking generally. Banks could be similarly required to hold a portion of any derivative securities they originate and distribute on

¹⁹ This is the recommendation of Calomiris (2007).

²⁰ This alternative would, however, place an even greater premium on dealing with another set of problems associated with the credit ratings that provide the basis for weighted capital requirements for small banks (those without internal models. On the rating agency problem, see Section 6 below.

²¹ An interesting article by Tett (2008) asks why there have been no major bank failures or related problems in Spain despite that country's overheated and now declining housing market. The explanation appears to be that the Bank of Spain signaled Spanish banks that they would be required to hold capital against the assets of any SIVs they established, in contrast to regulatory practice in, inter alia, the United States and Germany. The result was that Spanish banks chose not to rely on SIVs but held their residential mortgage exposure on balance sheet – and therefore held capital against it.

their own balance sheets. Such reforms will only be attractive to national regulators, concerned with the competitive position of the institutions they regulate, if they are coordinated internationally. Of course, that is precisely why we have the Basel Capital Accord in the first place.

A reformed Basel II should also deal with the backward-looking nature of ratings and other traditional determinants of capital requirements. Goodhart and Presaud (2008) have argued that capital requirements should be made forward looking by indexing them not just to bank lending but to the rate of growth of bank lending and not just to the value of residential mortgage collateral but to the rate of growth of residential mortgage collateral. Thus, capital requirements would rise in good times instead of falling as the rating agencies respond by upgrading the constituents of bank portfolios. Simple reforms along these lines could go a long way toward containing the unsustainable credit booms that have a history of leaving financial wreckage in their wake.

4. Questions about Stress Testing. Financial institutions and their supervisors do extensive stress testing of portfolios. Regulators similarly use simulation exercises to test the adequacy of crisis-management systems. The question is whether the scenarios they simulate are extreme enough. These are based on estimates derived from finance-theoretic models of the distribution of returns and on how returns on different assets co-vary in more and less volatile periods. The experience of the last decade suggests that these models may systematically underestimate the likelihood of extreme returns and the increase in covariances when volatility spikes. Thus, stress tests based on these estimates produce a maximum loss in portfolio value that is only a fraction

of actual losses when things go bad.²² In the same sense, supervisors and regulators simulating a market event in order to test the adequacy of their management systems may be too conservative in their assumptions about the violence of the shock and scope of the market reaction.²³

Better models of financial market dynamics may eventually allow for more effective stress testing and systems simulation. But if the shortcomings of existing models are severe and mainly work in one direction, one can reasonably ask whether supervisory and regulatory practice should be based on such flawed frameworks.

5. Questions about Liquidity. The distinguishing characteristics of many CDOs and made-to-measure mortgage-backed securities are their complexity, opacity, and specialized clientele. These characteristics meant that when significant doubts arose in the summer of 2007 about the performance of these securities, market liquidity dried up. Investors all lined up on one side of the market, as the imperfectly informed attempted to infer underlying conditions from the actions of others. Potential buyers of last resort were unable to fund their operations by borrowing from banks reluctant to lend against uncertain collateral. There was a spike in interbank rates and worries about gridlock in the interbank market as banks reluctant to lend to other banks were forced to take complex structures bank onto their balance sheets.

In light of these worrisome events, some economists have argued that banks and other financial entities should be subject to liquidity requirements so that when some institutions are forced by deteriorating market conditions to sell CDOs others are in a position to buy, obviating liquidity problems. These observers similarly suggest that regulation should be used to prevent

²² A case in point is Northern Rock, the British building and loan society that has become a prominent casualty of the current crisis. This bank reportedly carried out – and passed – all the stress-testing exercises to which it and the UK Financial Services Authority agreed in the first half of 2007. Evidently, the possibility that of the bank’s funding sources all could dry up at the same time was not one of these scenarios.

²³ As Buiter (2007a) puts it, their “war games” lack imagination.

banks like Northern Rock, which possess liquid liabilities and illiquid assets, from pursuing such a risky business model; in short, the state should require such banks to keep a proportion of their investments in liquid assets, where that portion of a function of their funding strategy.²⁴

Champions of the Basel Accord defend its lack of specified liquidity requirements on the grounds that the Accord is concerned with capital adequacy, not liquidity. But this argument, critics insist, ignores the extent to which the Accord's approach encouraged regulators to neglect the importance of liquidity in their supervisory activities.

By definition, liquidity requirements raise the cost of doing business and the price of housing finance, as well as other forms of lending. Banks have always been in the liquidity transformation business, and the more that the regulatory framework requires them to hold liquid assets, the more expensive their liquidity transformation services will become. And even if banks and other institutional investors had more liquidity on hand, it by no means follows that they would wish to deploy it under the conditions anticipated by the advocates of more restrictive reserve policies. The problem in 2007 was not that the banks as a group had no liquidity to deploy but that they had no wish to deploy it, given the pervasive lack of information about the underlying economic condition of potential counterparties.

6. Questions about the Rating Agencies. The role of modern credit rating agencies is to provide specialized intelligence, in the form of publicly-available ratings, for use by investors seeking to price opaque securities. The subprime crisis suggests that the rating agencies' execution of this function was subpar. They failed adequately to distinguish between the riskiness of different securities. They were too generous in providing AAA ratings. They failed

²⁴ This proposal assumes, of course, that supervisors can reliably determine what assets are liquid. Given that some normally liquid assets can become illiquid abruptly, as the subprime crisis reminds us and as numerous past financial crises demonstrate, one would presumably want a narrow definition of the category.

to downgrade mortgage-backed securities as the housing market and hence the value of the underlying mortgage obligations deteriorated. They then aggravated the crisis by reacting with wholesale downgrades once the market collapsed.

One explanation for this dismal performance lies with the imperfect models used by the rating agencies to value residential-mortgage-backed securities and the associated derivatives. Their methods emanate from long experience (in two cases, more than a century's worth) of rating corporate bonds. Mason and Rosner (2007) point to a number of reasons why the application of valuation models for corporate bonds to securities backed by claims on the residential mortgage market may be misleading. For example, the performance of a corporate bond depends on both the condition of the issuing firm and the condition of the macroeconomy. By comparison, debt securities backed by baskets of mortgage loans depend more heavily on the macroeconomic cycle and therefore are more highly correlated.²⁵ Similarly, in building their estimates of default probabilities on historical evidence, the rating agencies used data from both good and bad times for corporate bonds but only data from good times for newer assets (since these novel products had never previously experienced serious market turbulence.).

A second set of problems, as Calomiris (2007) notes, stems from the use of ratings by bank regulators. Basel II directs regulators to use bond ratings to determine the range of permissible bank investments and, for (smaller) banks lacking their own internal models, weighted capital requirements. Unsurprisingly, banks have responded to this delegation of public authority by applying subtle pressure on the rating agencies to elevate the entire spectrum of bonds a couple of notches, without necessarily disguising information about relative risks, in

²⁵ It is worth observing that this problem is not simply Monday-morning quarterbacking. Well before the subprime crisis erupted (back in May 2007), *The Economist* wrote how “the models misread the level of correlation between different types of assets – a crucial variable—and ignored signs that risks were greater than historical data suggested.” See *Economist* (2007).

order to widen their investment choices and lower their capital costs. This dynamic works to heighten banking-sector risk and subverts the intent of regulators' use of bond ratings.²⁶

A related source of problems concerns the agencies' conflicts of interest. Rating agencies first earn fees from advising on how to structure bonds and derivatives so that these receive the desired rating. They then have a not-so-subtle incentive to rate those issues in the promised manner.²⁷ All of these patterns were apparent in earlier emerging market crises. But now that the problem has hit home – now that it has hit the United States, in other words – perhaps policy-makers will take the question of how to constrain the ratings process more seriously.

The rating agencies' conflicts could be addressed by Glass-Steagall-style legislation that prevents them from both acting as advisors and issuing ratings.²⁸ Since the problem of uniformly optimistic ratings has probably been exacerbated by the oligopolistic nature of the rating industry, Congress might also seek to foster more competition, since the better rating agencies will presumably out-compete the bad ones over time. The Credit Agency Reform Act of 2006 (implemented by the SEC in 2007) has the goal of increasing competition by making it easier for potential entrants to obtain preferred status from SEC staff, so that regulators and banks can use their ratings in setting capital requirements (and so that they can thus get business). But to date

²⁶ Evidence of the extent of this problem is conflicting. Dittrich (2007), for example, questions the significance of this “grade-inflation” problem.

²⁷ I am not alone in this critique. Something similar was argued by the International Organization of Securities Commissions, the umbrella organization of the world's securities watchdogs, last September. As it put it, the agencies may have traded quality for “getting the business.” The one systematic empirical analysis of the issue of which I am aware is Covitz and Harrison (2003), who looked at rating downgrades of corporate bonds and asked whether there were significantly longer delays when the rating agency in question had other business with the issuer. They find no evidence of significant conflicts of interest, at least insofar as these influence the speed of rating downgrades. There is anecdotal evidence pointing the other way – the rating agencies did not downgrade Northern Rock until after the market reacted on September 14th – but as yet no systematic study. As noted above, Mason and Rosner (2007) provide a range of arguments for why evidence from the corporate bond market may in any case be inapplicable to residential-mortgage-backed securities.

²⁸ Some argue that the problem runs deeper: it will be impossible to eliminate conflicts of interest, they insist, so long as it is the issuer (the seller) rather than the investor (the buyer) who pays for the rating. Schemes for placing a model tax on all transactions in the relevant securities (“Tobin tax 2”) as a way of funding the process of acquiring a rating are not obviously practicable but worth contemplating.

there has been little real progress in this direction. Finally, on December 21, 2007, the SEC agreed to confer Nationally-Recognized-Statistical-Rating-Organization status on Egan-Jones, a narrow rating agency (one that does not also advise on the structuring of bond issues), but only after 11 years of trying on the part of the firm. Potential entrants continue to complain about insurmountable regulatory hurdles. Until entry and real competition are possible and, as a result, rating agencies incur the standard market penalty for being wrong – namely, loss of business or even franchise – significant improvements in their performance are unlikely.

7. Questions about Hedge Funds. The hedge-fund industry is more than half a century old, but it has never been as prominent and well capitalized as at present. Criticism of hedge funds as opaque, unregulated and unaccountable is a predictable bi-product of every financial crisis. That two prominent hedge funds run by Bear Stearns and a number of stand-alone funds were casualties of the subprime crisis has resuscitated those complaints and renewed the question of whether hedge fund regulation should be part of the next round of regulatory reform.

Another reading of the crisis is that all this attention to hedge funds is misplaced. Although some hedge funds took significant losses and even went out of business, others profited. Hedge funds as a class posed no special threat to financial stability. Moreover, hedge funds played no special role in the crisis. Everything they did, from risk-taking to the use of credit and procyclical portfolio adjustments, a variety of other investment vehicles from SIVs to conduits to investment and commercial banks themselves similarly did.

Even if hedge funds posed a special problem, it is by no means clear what regulators can do about them. Requiring hedge funds to periodically release more information about their investments would make little difference for market transparency, since these firms can turn their

portfolios upside down in a single trading day.²⁹ Requiring them to hold more capital, use less leverage or divulge more information runs the risk of simply facilitating physical and virtual relocation, whether to London or a post-office box in the Cayman Islands.

Regulators generally agree that the main way of addressing the risks posed by hedge funds is by encouraging more effective counterparty risk management. Banks providing credit to hedge funds should be encouraged to more effectively monitor the positions of their hedge-fund clients, to demand adequate collateral from those counterparties, and to hold adequate capital as a buffer against counterparty risks.³⁰ Credit is as essential as oxygen for the managers of highly-leveraged hedge funds, and banks, as its suppliers, have the leverage to demand to see the books – unlike even many hedge fund investors. This should enable the banks to adjust their lending decisions so as to limit their exposure to hedge-fund-propagated risks. Those same banks, which are at the center of the financial system and, historically, the weak link in the financial chain, can be insulated from hedge-fund-propagated financial shocks by adequate collateral and capital buffers. For their part, highly leveraged hedge funds that might otherwise take on large exposures using borrowed funds – positions that could destabilize financial markets if a sudden price movement forced them to be unwound – will be restrained from using excessive leverage by the suppliers of bank credit. Such is the magic of counterparty risk management.

If the reality were only so simple. What constitutes adequate collateral for credit exposures is unclear when where a hedge fund is large relative to the market or asset class in which it invests. In this case, sales of an asset by a hedge fund faced with investor redemptions

²⁹ The requirement of additional information disclosure from hedge funds might also encourage herd behavior by investors, insofar as other actors regard hedge fund managers as the smart money.

³⁰ Truth in advertizing requies acknowledging that this is a case where the present author has a dog in the race, as lead author of the IMF report that reached many of these same conclusions almost ten years ago (there is nothing unique about hedge fund position taking or funding; calls for greater hedge fund transparency are problematic; attempts at tighter regulation are limited by the high mobility of these entities; and the main way of any threat to systemic stability is by tighter oversight of bank lending). See Eichengreen and Mathieson et al. (1998). A recent analysis that reaches broadly similar conclusions is Ferguson et al. (2007).

can trigger a drop in asset prices that reduces the value of the collateral; not only does the hedge fund end up unable to repay its bank borrowings, but the collateral it put up in return for that line turns out not to be worth the paper it was written on.

More generally, one can imagine a number of reasons why counterparty risk management might be ineffective or lax.³¹ The key problem that arose in the subprime market – banks and brokers earn fees from originating and distributing securities now but leave for someone else the problem of cleaning up the mess later – operate in this context as well. Some hedge funds are willing to pay handsomely for bank credit lines, and if that creates a large contingent liability for the bank in the future, that will be future management’s problem.

Similarly, hedge funds and the proprietary trading desks of commercial and investment banks may have many of the same positions.³² Then when an asset-price shock forces a hedge fund to sell into a falling market, eroding the value of the collateral held by the bank, that bank’s own proprietary trading desk will suffer additional losses. The existence of firewalls between the trading and credit departments may mean that this risk is not adequately taken into account.

In addition, large hedge funds will often negotiate credit lines from several banks. Insofar one function of a credit supplier is to monitor whether its hedge fund counterparty is taking on excessive risk, there may be a temptation not to invest in due diligence, insofar as other banks also known to be supplying credit to the same outfit are assumed to have done their due diligence. The result at the end of the day may be that the oversight function is undersupplied.

These three market failures have familiar names: agency problems, externalities, and the tragedy of the commons, respectively. They are the reasons why the stability of the financial system cannot be blindly entrusted to banks and their risk management officers. They are among

³¹ A good summary of the central points is Kambhu, Schuermann and Stiroh (2007)..

³² As was the case, in some instances, during the Asian crisis in 1997.

the most basic reasons why banks are supervised and regulated. Supervisors are supposed to sanction banks that fail to do their due diligence and extreme cases to revoke their licenses. They are supposed to force bankers to worry about how distress experienced by one of their large counterparties can erode the value of its collateral or cause the bank itself to suffer proprietary trading losses. Regulators are supposed to be in the business of forcing banks to hold adequate capital and to demand adequate collateral to protect against these contingencies. The appropriate response to the real-world limitations to counterparty risk management is not to imagine that effective regulation can somehow be imposed on footloose hedge funds but rather to strengthen the supervision and regulation of the banks that are the providers of credit to the hedge fund industry.

8. Questions about SIVs and Conduits. Structured investment vehicles and other mechanisms for using short-term bank funding to invest in long-term derivative securities pose some of the most striking if obscure dilemmas of the current crisis. Few market participants had even heard of SIVs and conduits before the summer of 2007. At that point they abruptly discovered that their own financial prospects and the stability of the U.S. financial system turned on their condition.

The best way of understanding the role of these programs is by distinguishing those with and without a formal commercial bank connection. Consider self-standing SIVs. These investment funds issue asset-backed commercial paper, typically of three months maturity, to fund investments in CDOs and other long-term securities. When a CDO portfolio comprises senior or super-senior (AAA) rated securities, its managers fund as much as 90 per cent of the

vehicle by issuing asset-backed commercial paper.³³ In practice, commercial banks are among the main purchasers of that paper, but typically on an arm's-length basis – that is, they have no ongoing business relationship with the SIV issuing the paper.³⁴

These SIVs are essentially hedge funds by another name. They invest in risky and sometimes illiquid assets; they use significant amounts of leverage and credit in their operations; and they are not transparent. If their investment practices require significant regulatory responses, then those responses should be broadly similar to those applied to hedge funds as a class (see above). Investors in such funds are well-capitalized, savvy individuals, firms, and mutual funds; it is not at all obvious that state intervention into their affairs is required on consumer-protection grounds. These funds remain outside the financial safety net; in the event of difficulties, their principals can choose to restructure them or close them down.

The banks extending credit to SIVs, by contrast, do not reside not outside the financial safety net and frequently are too big to fail. Regulators therefore need to be sure that the banks extending back-up credit lines engage in realistic assessments of the likelihood that associated SIVS will draw on those lines; banks, in other words, must not simply assume that, because SIVs had no need to draw on credit lines in the past, they will be not do so in the future. As the events in the latter half of 2007 make clear, stress testing by banks and supervisors should include the possibility of wholesale disruption of the asset-backed commercial paper market.³⁵

Some SIVs are wholly owned and operated by a commercial or investment bank, with bank employees running the portfolio and the same bank providing the credit line.³⁶ In such

³³ The other ten per cent being the conduit's own equity (Calomiris 2007).

³⁴ In addition, an SIV may contract for a back-up line of credit with a bank or a syndicate as a precaution against disruptions in access to the commercial paper market.

³⁵ As it presumably will after that seizure of the market for commercial paper.

³⁶ This was essentially the case of Rhineland Funding, the conduit operated by the German Bank IKB, whose difficulties ignited the crisis in August.

cases, financial engineers simply disguise and repackage traditional banking, and the distinction between the bank protected by the safety net and the SIV left to its fate becomes wholly artificial. Among other things, banks are in the business of maturity transformation (they use short-term funding to make long-lived long-term investments). Here the maturity transformation by which banks use short-term funding to make long-lived term investments occurs through the off-balance sheet arm, outside the purview of regulators.

It follows that banks that own and operate SIVs should bring them onto their balance sheets, and those SIVS should be subject to regulatory scrutiny. To the extent that regulatory and tax arbitrage explain the creation of many of these bank-sponsored SIVs, then Congress and regulatory agencies need to tighten the relevant provisions.

9. Questions about Transparency. Numerous commentators on the subprime crisis maintain that it was aggravated by the opacity of mortgage-related derivative securities. With one layer of derivatives built on another built on another, even specialists incompletely grasped the risks of the structured products they had bought. Because holders rarely traded these securities, their market value was elusive at best; often holders relied on their own complex economic models, with all of its limitations, to assign a value.

Thus, when the market for mortgage-backed derivatives soured and some investors headed for the exits, other investors concluded that their holdings were riskier than previously thought, leading to panicked attempts to liquidate. Financial institutions worldwide recalibrated their valuation models, which in turn generated alarming balance-sheet revisions. Liquidity problems spilled over to other markets as investors refused to accept residential-mortgage-backed securities as collateral for issuing asset-backed commercial paper. This latter day version

of a cascading crisis of economic confidence suggests how a sharp shock to a limited segment of the U.S. housing market could ultimately come to threaten the entire financial system.³⁷

Concocting ever more complex derivatives is the bread and butter of financial engineers. There is a market for their products because they allow economic agents to efficiently identify, isolate, and resell risks during periods of low volatility. (What happens in periods of high volatility is another matter.) Thus, to the extent that regulators are inclined to push for greater simplicity and transparency in the design of financial securities, they will be swimming against a powerful tide.

One way to tackle the financial rip currents would be to apply higher capital requirements to more complex derivative securities. This approach would involve going back to something resembling Basel I, in which accountants placed different kinds of securities into different risk buckets, with banks then adjusting capital requirements accordingly. Unfortunately, such a tack would obviate a key feature insight of Basel II -- that regulators and banks should take into account the correlation of returns on different kinds of assets when assessing risk.³⁸

Another strategy would be for central banks to announce that they were prepared to accept relatively simple, transparent instruments when providing collateral, but not complex ones. This reform would in turn reduce the attractiveness of holding relatively complex securities. The problem is that this policy might ultimately come into conflict with the authorities' responsibility for financial stability, limiting their capacity to act as liquidity provider of last resort to the markets most in need.³⁹

³⁷ The disproportion between the underlying real shock and the financial consequences has been noted by inter alia Bernanke (2007b).

³⁸ Whether or not these costs would dominate the benefits of this simpler approach is an open question, as I explain above.

³⁹ To be clear, there is disagreement about whether it is appropriate for central banks as lenders of last resort to discount risky securities that constitute questionable collateral in times of duress. See below.

10. Questions about a Securities Exchange. One explanation for the severity of the current crisis stresses that brokers trade CDOs and RMBSs over the counter (traditionally by telephone but now electronically) rather than through an organized exchange. An exchange would require participants to hold margin in order to maintain positions. It would subject nonbank participants to the equivalent of capital requirements. It would encourage instrument standardization, enhancing transparency and the liquidity of the market for distress sales.

As evidence that exchange-based trading would function more smoothly, Cecchetti (2007) cites the contrasting reactions to news of the difficulties of Long-Term Capital Management in 1998 and of Amaranth Advisors in 2006. LTCM's traded its positions mainly in swaps traded over the counter, while those Amaranth dealt in natural gas futures contracts through an organized exchange. Because the exchange required Amaranth to put up margin, it could stretch its distress sales over time rather than having to make them in bunches. And because the existence of exchange-based trading encouraged the standardization of futures contracts, the relevant economic parties had a much clearer sense of the situation than was the case with LTCM. The argument for an exchange follows directly.

What then explains the continuing domination of over-the-counter trading of these assets? Cecchetti has speculated that there might be tax or regulatory incentives that encourage over-the-counter trading, but without specifying them. This situation may be a case of path dependency, where history matters. It may be equally efficient to organize trading of a security on a centralized exchange or over the counter, but whichever venue starts first attracts the bulk of the business and thus offers superior liquidity and lower transactions costs. The initial disinclination to rely on exchanges may have partly reflected fee-seeking behavior by banks,

since as originators of the relevant securities they also receive fees when they trade them over the counter, but are less likely to receive fee income from trading on an exchange. If it is the case that trading can be organized as efficiently over the counter or on an exchange, and that the latter has external social benefits, then regulations requiring exchange-based trading would have few if any costs to market participants, aside from the changeover costs – and, by the preceding arguments, significant social benefits.

11. Questions about Consolidated Bank Supervision. The credit crisis of 2007, and specifically the response of the Bank of England to the liquidity squeeze at Northern Rock, raises several questions about consolidated bank supervision. Throughout the industrialized world, financial regulators are increasingly separating bank supervision from monetary policy and delegating the former to an agency independent from the central bank – preferably a single agency, to facilitate the centralization of that information about different financial institutions linked together through the interbank market.. This model has been adopted not only by the UK, where since 1997 prudential supervision has been the responsibility of the Financial Services Authority (FSA), but also by a growing number of other countries.

The question is whether this structure actually impeded the flow of information about the condition of at least one major financial institution to the central bank, causing it not to appreciate the gravity of the unfolding problem and thus delaying its response. If so, and if such problems are commonplace, there is an argument for either returning supervisory responsibility to the central bank or giving the financial supervisor an unlimited credit line at the central bank so that it can provide lender-of-last-resort services when needed.

At this juncture, the severity of this problem remains unclear. Mervyn King, the governor of the Bank of England, has described how deputies from the Bank, the FSA and the Treasury met on August 14th, 2007, when the FSA relayed to the two other institutions its judgment that Northern Rock had serious problems. The key question is whether the FSA already had a glimmering of those problems some days earlier but did not communicate them.⁴⁰

In principle, nothing prevents a country's financial supervisor from picking up the phone and sharing its latest information about the condition of the banking system with central bankers. In theory, information can flow as freely between two agencies as between two departments of the same agency. But one suspects that different bureaucratic incentives would lead to different behavior in the two circumstances. When two agencies have different objectives or when they are simply jockeying for influence, they may have an incentive to strategically withhold information. But when the same individual oversees the two entities (when the central bank governor appoints and can demand the resignation of key supervisory staff as well as sitting on the monetary policy committee), the scope for strategic behavior by underlings almost surely diminishes – since the sanctions in the event that it occurs are greater.

An American recommending that countries avoid separating the lender-of-last-resort function from the financial-supervision function will likely encounter accusations of parochialism. But advocates of such regulatory separation should encounter accusations that they are courting excessive risk.⁴¹

⁴⁰ See Telegraph (2007). FSA officials' testimony to the Treasury Select Committee suggests that they had already developed serious concerns about Northern Rock's funding practices earlier in the year and placed them under special supervision. (Parliament 2007).

⁴¹ In early January 2008, the Chancellor of the Exchequer proposed changes in the organization of bank supervision in the UK designed, among other things, to eliminate ambiguity in the allocation of responsibilities between the Treasury, the FSA, and the Bank of England. See Parker (2008). Whether the changes he proposed come to pass only time will tell. But this would seem to represent an acknowledgement of the problems alluded to in the text.

12. Questions for Central Banks. The Fed, the ECB, and the Bank of England responded very differently to unfolding events in the second half of 2007. The ECB and the Fed provided large amounts of emergency liquidity through the discount window and open market operations. The ECB provided about E100 billion in the month from August 7th, reflecting the extent to which the European financial system remains heavily bank-based, with short-term stringency centered in the interbank market.⁴² These operations responded to the central bank's mandate to preserve the smooth operation of the payments system and prevented the crisis from ramifying further through the financial system.⁴³ European central bankers took this step in part because they assumed that they could avoid any inflationary consequences of such maneuvers by subsequently reversing these operations.

The non-response of the Bank of England is perplexing in this light. It provided no liquidity to Northern Rock or any other British bank, except possibly overnight, prior to September 12th. On the 12th, Mervyn King, the Bank's governor, released written testimony to the House of Commons warning of the dangers of exceptional support.⁴⁴ When immediately thereupon Northern Rock, unable to refinance a large tranche of mortgage securities, approached the Bank for assistance, the latter turned on a dime and announced that it was providing exceptional credit for an extended period through an emergency facility. Observers concluded that the impression left by the governor's earlier comments, that all was well in the British banking system, had been misleading, and a depositor panic ensued.

⁴² In addition, European banks can redeposit excess reserves with the ECB and earn interest on those balances. Since interest is not paid on excess reserves by the Fed, European financial institutions had an incentive to engage in more precautionary borrowing than their American counterparts.

⁴³ Rates went up in the interbank market because banks raised their demands for reserves, which they use for payments – payments becoming more uncertain after the first week in August. In addition, banks may have attached a risk premium for lending through interbank markets, given growing uncertainty about the condition of their counterparties. But it is hard to argue that this was the major factor, given that interbank lending is short maturity (overnight).

⁴⁴ See King (2007).

The Bank of England knew of Northern Rock's financing problems (see the discussion of consolidated banking supervision above), although it is hard for outsiders to determine whether it knew all the details (and whether it had advance warning of the specific financing problem that arose in the second week of September). If it did have such intelligence, then it is impossible to defend its turnabout after September 12th. If the earlier policy was right, then the Bank should have stuck with it and allowed Northern Rock to fail on the grounds that there were fundamental problems with its business model and it was too small to have adverse implications for systemic stability.⁴⁵ Or if Northern Rock's assets were sound and its funding difficulties were temporary, then the failure to support it earlier and the Bank of England's inconsistent signals aggravated the problem.

The British authorities also decided in the aftermath of September 12th to continue providing liquidity to Northern Rock until the bank could find a buyer.⁴⁶ But if the problem was one of temporary funding, then only temporary support was necessary, and the institution should have been able to find a suitor in relatively short order. Alternatively, if the dearth of potential buyers reflected deeper problems at Northern Rock – which appears to have been the case – then the British authorities should have shut it down. Such a response would likely have had little impact on systemic stability, since Northern Rock had fewer than 3 per cent of the assets of all commercial banks and its problems were localized (they derived mainly from its funding model and not its investments). The British government could have placed the bank's assets into receivership, with sales following as soon as a buyer materialized.⁴⁷ Alternatively, the state

⁴⁵ Being only the fifth largest mortgage lender in the UK.

⁴⁶ Strictly speaking, this was the decision of the Treasury rather than the Bank of England. The Treasury also announced on September 18th that it was guaranteeing all of the deposits of Northern Rock (not just the retail deposits), an action that was criticized for compounding the moral hazard problem.

⁴⁷ Under UK insolvency law, those deposits would have been frozen until the bank was reopened. This is in contrast with US law, where the authorities can make deposits immediately available even when taking control of a bank – which may explain why the British authorities were reluctant to take this step.

could have put the bank under public ownership until a buyer emerged. Either alternative would have created less moral hazard.

The three central banks' responses also diverged over what kind of instruments to discount. The Bank of England, following the Bagehot principle, discounted (accepted through its Standing Lending Facility) only a small spectrum of high-quality assets (good collateral) and lent only overnight. British banking legislation does not permit the Bank of England to take CDOs or other non-investment-grade securities as collateral or to lend for an extended period.⁴⁸ While these restrictions do not preclude the BOE's aiding a sound bank with a short-term need for reserves, they greatly complicate the provision of liquidity to a financial market in which everyone wishes to sell and no one is in a position buy. In contrast, the ECB accepts at its discount window euro-denominated debt instruments rated as low as A. The Fed faces no restrictions on the credit quality of the instruments it can discount. And it did accept mortgage-backed securities as collateral for the \$35 billion in repurchase agreements it provided on August 10th.⁴⁹

A subsidiary issue is whether a central bank purchasing temporarily illiquid securities in order to restore market liquidity should do so at a discount from current market prices. The longstanding view about this matter, one at the heart of central banking orthodoxy, views such a penalty rate as an essential means of avoiding moral hazard – to prevent institutions from overinvesting in potentially illiquid instruments.⁵⁰ More recently, some economists have argued that temporary illiquidity is a pure market failure; it does not reflect prior investment decisions,

⁴⁸ Indeed, the Bank of England is even precluded from taking prime mortgages through its discount window – hence the need to a special Liquidity Support Facility to aid Northern Rock. Precisely in response to this problem, the Bank of England agreed to take credit card securities, covered bonds and mortgage-backed securities as collateral against three-month month in its scheduled auction of L10 billion in the third week of December 2007. Too little, too late...

⁴⁹ These were, however, mortgage-backed securities guaranteed by federal agencies, so they were still investment grade.

⁵⁰ See King (2007).

and therefore the risk of more episodes of illiquidity is not heightened if central banks discount such instruments at their normal value.⁵¹ Regardless of whether central banks impose a penalty rate in such circumstances, the events of late 2007 highlight the need for central banks to intervene directly in illiquid markets – and thus for a change in the Bank of England’s rules.

Finally the crisis raised anew the question of whether central banks should respond differently to asset bubbles and housing booms and busts. The argument that central banks should react more aggressively to housing downturns is buttressed by two statistical observations: that the marginal propensity to consume out of housing wealth is greater than the marginal propensity to consume out of other wealth (according to the Fed’s model of the U.S. economy) and that the housing market is a reliable leading indicator of recession risk (every major housing market downturn since World War II has been followed by a recession, and every postwar recession but two – that following the Korean War and that following the late-1990s high-tech bubble – was preceded by a housing market decline).⁵²

A number of scholars have questioned the Fed’s estimate of spending out of incremental housing wealth, on the grounds that changes in housing wealth are mainly redistributive – they redistribute wealth from those who are long housing to those who are short housing – and as such should have little impact on aggregate spending.⁵³ One can similarly question the validity of housing as a leading indicator of business cycles, given the relative paucity of pertinent natural experiments and the fact that the American economy is undergoing such radical change. Ultimately, the argument that the Fed should pay more attention to declining home values and

⁵¹ See Buiter (2007b). There is the additional problem of ascertaining the normal market value of rarely traded instruments, especially in turbulent times when central bank intervention is needed.

⁵² Evidence from the Fed’s model is discussed by Mishkin (2007). The statistical connections between housing cycles and business cycles are the subject of Leamer (2007).

⁵³ See Buiter (2007b). In other words, if the price of my house goes up, there is no reason I should feel wealthier, since I am consuming the same stream of housing services (unless I plan on trading down in old age or have a significant bequest motive). Of course, this leaves aside the impact on the value of collateral and hence on the financial accelerator.

housing starts rests on the belief that it paid insufficient attention to the implications of a weakening housing market for recession risk between the summers of 2006 and 2007. We will presumably know more about the validity of this belief when our conference rolls around in February.

13. Questions about the Future. The subprime crisis represents the first crisis of the age of mass securitization.⁵⁴ One conclusion sometimes drawn from this experience is that the costs of securitization, in the form of risks to financial stability, exceed the benefits. The implication is that we should return to the simpler days of “good old-fashioned banking” in which commercial banks originate loans to households and firms and hold them on their balance sheets, rather than slicing them, dicing them and selling them off.⁵⁵

This back-to-the-1960s formula ignores economic realities -- there is no turning back the clock on financial technology and, more fundamentally, on advances in information and communications. Securitization is bound up with the broader deregulation of financial markets and with the information-technology revolution. Policy-makers cannot eliminate this process short of reimposing the kind of restrictive regulation to which banking and financial systems were subject half a century ago. Even then, regulatory institutions may well fail to suppress securitization, given the ease with which financial institutions can move their activities offshore in the age of broadband and low-cost communications.

In any case, turning back the clock would not be desirable because the constellation of financial innovations referred to as securitization has real benefits for the economy. Those innovations have allowed the financial system to repackage and spread risk. They have reduced

⁵⁴ Champions (as it were) of the Long-Term Capital Management crisis in 1998 may argue that it deserves this mantle, since LTCM’s problems centered on its positions in interest-rate swaps.

⁵⁵ To quote Alastair Darling in a speech from mid-September (BBC 2007).

the amount of equity capital that this system requires to absorb that risk.⁵⁶ The result has been to lower funding costs for both firms and homeowners as a class.

Regulatory dilemmas not uncommonly arise in the course of the diffusion of a technology or financial innovation, a pattern to which financial securitization offers no exception. Some early adopters lack the training and capacity to safely operate new machinery. Like a novice driver given the keys to a more powerful car, they manifest a troubling tendency to run off the road – or to collide with other vehicles. This problem was compounded, in the case of the automobile, by the mismatch between the design of the roads and traffic regulations and the capabilities of the new generation of engines.

In the aftermath of the Great Securitization Crisis of 2007-8, would-be reformers will argue that financial regulators should repave and re-grade, rethinking speed limits and the rules of the road more generally. But specifying desirable changes is not easy. In my view, policymakers should focus on the banking system. The rise of securitization notwithstanding to the contrary, banks still play a unique role in the economy. They are at the center of the information-impacted segments of the financial system. They are the critical suppliers of credit to hedge funds, SIVs, monoline bond insurers, and all the other entities active in the financial system. Historically, the only times when financial volatility has resulted in a sharp drop in economic activity is when it is allowed to destabilize the banking system. This is why banks receive official protection via the financial safety net. It is also why they need to be vigorously supervised and regulated.

Thus, focusing on the banking system means focusing on bank regulation, including but not limited to Basel II. Banks should be required to hold more capital. Capital adequacy standards should be related not just to the level of bank investments but the rate of growth of

⁵⁶ To be sure, regulators may have allowed the amount of capital to fall too far, but this point is analytically distinct.

those investments, and not just to the value of the collateral pledged against bank loans but the rate of growth of the value of that collateral. Scope for regulatory arbitrage needs to be reduced, and the shadow banking system of SIVs and conduits needs to be brought back into bank balance sheets so that proper provisioning takes place. Banks could also be required to hold on their own balance sheets a portion of any security issues they originate and distribute.

To be sure, there is more to do, including regulations to more effectively protect consumers against deceptive practices of banks and mortgage brokers where these exist, considering changes in the tax treatment of executive compensation in the financial sector in order to better align the incentives of managers, shareholders and other stakeholders, introducing more competition in the rating industry, and encouraging the development of organized derivatives exchanges to replace over-the-counter trading. But it is with addressing recently-revealed problems in the banking system that work should start.

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