

5

Responding to the Crisis¹

Joseph E. Stiglitz²

The financial crisis that began in August 2007 turned into a recession in late 2008 and is now well on its way to being the longest and deepest downturn since the Great Depression. There is a growing consensus that at certain critical times it has not been well managed. This chapter deals with four critical problems: (a) monetary stimulation; (b) fiscal policy; (c) handling the foreclosure problem; and (d) rescuing failing financial institutions.

It was written in August 2008, before the Lehmann Brothers bankruptcy, before the massive bank bail-out, and before Obama's stimulus package and his foreclosure program. As this chapter goes to press, much has changed—but, remarkably, much has stayed the same. I have added a brief "April 2009" postscript to three of the sections.

Monetary policy

Much of modern economic policy discussions begin with the premise that monetary policy should bear the brunt of the responsibility for stabilization. Fiscal policy, it has been argued, moves too slowly. By the time that a tax cut or stimulus package is enacted and implemented, the economy is likely to have turned around.

But under current circumstances, monetary stimulus is likely to be ineffective for several reasons, and even if it were effective, it is not obvious that it is desirable. Over recent years, monetary policy has worked mainly by encouraging a housing bubble, which has sustained a consumption boom. If monetary policy works through the same channels, it is not clear that that is desirable—it will simply prolong the adjustment period. No one wants to recreate another housing bubble.

Moreover, monetary policy typically works by encouraging banks to lend more and to lower interest rates. Banks are not going to be willing and able to lend, given the impairment to their balance sheets and the uncertainties which

Joseph E. Stiglitz

they face—including uncertainties concerning their balance sheets. Moreover, with prospects of a continued decline in real estate, it is not clear that households either will be willing to take more money out of their housing in mortgage equity withdrawals.

Keynes long ago recognized that monetary policy is typically ineffective in a downturn. He likened it to pushing on a string. So far, interest rate reductions have had two effects: (a) they may have contributed to a weaker dollar, thus helping export US problems to other countries—from a global perspective, this is simply a new version of a “beggar thy neighbor” policy; and (b) their actions may have prevented a meltdown of the financial markets—but at an unnecessarily high cost. Preventing a meltdown is not the same as reigniting the economy.

Today, monetary policy faces two further challenges: increased liquidity in US (or European) markets does not necessarily translate into lower real interest rates—especially lower real medium- or long-term interest rates—if there is a belief that the lower interest rate will lead to higher inflation. As interest rates were raised by the Fed in the period after 2003, it had less of an adverse effect than some had expected, because medium- and longer term interest rates did not increase in tandem. Today, we face the possibility that something similar will happen: as interest rates are again lowered, medium- and long-term interest rates may not fall. They may even increase.

Second, increased liquidity in US (or European) markets does not necessarily translate into increased investment expenditures in the US (or Europe). The liquidity that is provided to financial markets can be spent wherever investors believe the returns are highest. There are worries that the increased liquidity in Western financial markets will show up as increased demand for real estate assets in China and elsewhere in Asia.

Even Fed Chairman Ben Bernanke seems to have given up on the notion that monetary policy can rekindle the economy. The burden must shift to fiscal policy. Unfortunately, there has been little attention paid to basic economic principles in the design of the stimulus package.

April 2009 postscript

The defining event in financial markets occurred a little over a month after our conference. The Fed and Treasury let Lehman Brothers go bankrupt on September 15 with little thought given to the ramifications, including to money market funds. Rumors had been flying about the potential demise of Lehman Brothers at least since the fall of Bear Stearns. The Fed and Treasury seemed to believe that markets should have prepared themselves for a collapse but, remarkably, they did not check on whether they had. They had not. With the failure of Lehman Brothers, a key money market fund “broke the buck”—i.e. was unable to pay back fully those who had deposited their money with the fund. For a

Responding to the Crisis

while, it suspended payment. Panic broke out in the markets. Shortly thereafter, AIG (American International Group) faced default before it was rescued. It was clear that the Fed and Treasury were veering from one strategy to another, without a clear set of principles. No one could ascertain who would be bailed out or under what terms. While there were vague references to bailing out systemically important institutions, some suspected having political connections was more relevant than systemic importance. The AIG money, for instance, was passed onto “counterparties” to which AIG had sold derivatives. While the government initially hid where the money went, when it was eventually disclosed, it turned out that the biggest recipients were foreign banks—if they had been systemically important, and at risk, presumably their governments would have bailed them out. Goldman Sachs was the largest American recipient, but it had claimed that it would have easily survived an AIG bankruptcy. With Paulson having come from Goldman Sachs, and with its CEO reportedly having been in on the meetings discussing the AIG bail-out, this seemed to confirm the political connections theory. At this point, some \$200 billion has gone to AIG. In the final quarter of 2008, credit markets and lending seemed to tighten greatly, contributing to the downturn.

In the ensuing months, the Fed pushed interest rates effectively down to zero to little effect. Lending did not pick up. The concerns that I expressed, that lowering the Treasury bill rate would not translate into greater availability of credit at lower lending rates, have proven to be the case. We have had a new version of a liquidity trap of the kind that Greenwald and Stiglitz (2003) pointed out. Banks’ willingness and ability to lend, and the terms at which they lend, do not just depend on the Treasury bill rate or the monetary base. If their equity base is eroded, if they face high uncertainty in the value of their portfolio, and if lending becomes highly risky, then credit availability may be restricted, and the spread between the Treasury bill rate and the lending rate may increase.

What no one could have anticipated in August 2008 was the Fed’s willingness to move from being the lender of last resort to the lender of first resort as credit markets froze. It more than tripled its balance sheet, taking onto its balance sheet assets that central banks normally shun. It also began to undertake other measures, trying to change the term structure of interest rates—with some success. Lower long-term interest rates would, it hoped, help revive the real estate market.

Together with the US Treasury and other government agencies, the Fed also took actions to shore up the banking system, including extending guarantees to depositors. These too helped prevent the collapse of the banking system but did not restart lending, and they may have contributed to another problem: with deposits in US banks guaranteed, some foreigners may have shifted their money to the United States. The dollar strengthened (at least for a while), hurting exports, which were already suffering as the US downturn became a global recession.

Joseph E. Stiglitz

Fiscal stimulus

The United States needs a stimulus, but it needs to be well designed and quick-acting (and if current trends continue, the same will be true for Europe). Any stimulus will add to the deficit, and with the deficit soaring since 2002, it is especially important to have as big a bang for the buck as possible. The stimulus should address long-term problems—and at the very least, it should not make them worse. If money is spent to create an asset, the nation's balance sheet may not be worsened—it may even be strengthened, as the increased liability from more government borrowing is matched by an asset.

Automatic stabilizers—programs that lead to increased spending if and only if the economy goes into a downturn—are able to dose out the right medicine as the economy needs it. The US has one of the worst unemployment insurance systems among advanced industrialized countries. It should begin by strengthening it, not just because it is the right thing to do but because money received by the unemployed would be spent immediately and so help the economy. Unemployment insurance has the biggest bang for the buck.

Unfortunately, states and localities are already beginning to feel the pinch—and will do so even more as property values fall.³ Typically, they cut back spending in tandem with the decrease in revenues (most states are required to have balanced budgets and are loath to raise taxes in the midst of a recession). This acts as an automatic destabilizer. The federal government needs to provide some assistance to the states and localities to prevent this from happening and, even better, to help them address the striking inadequacies in infrastructure. New Orleans levees and Minneapolis bridges are the tip of an iceberg: we as a country have underinvested in infrastructure. Spending on infrastructure would promote growth in the long run and strengthen the economy in the short run.

The Bush Administration had long taken the view that tax cuts (especially permanent tax cuts for the rich) are the solution to every problem. This is wrong. The problem with tax cuts in general is that they perpetuate the excessive consumption that has marked the US economy. However, middle and lower income Americans have been suffering throughout the 2000s—median income is lower today than it was in 2000. A tax rebate targeted only at lower and middle income households makes sense, especially since it would be fast acting.

There is some reason to be worried that the bang for the buck from tax rebates may be less than in previous occasions, because of the high level of indebtedness and the growing awareness of difficulties in obtaining credit going forward. Many Americans can be expected to use some or all of their tax rebates to pay off some of their debts. There would be real benefits for their sense of security; and the financial system may benefit from a lower rate of defaults, but the stimulus to the economy, in terms of increased expenditures, may be less.⁴

Responding to the Crisis

It would be nice, of course, if we could stimulate investment in plants and equipment, not just in more housing. But the standard ways of doing this are largely gifts to corporations for investment that they would otherwise have done—the bang for the buck is remarkably small. It is possible to craft a more effective investment stimulus, a marginal investment tax credit, but in the past, the corporate sector has shown little interest in such measures. It is the gift they want, not the stimulus.

US infrastructure, and public investment more generally, has been starved for a long time. The United States should be engaged in R&D to reduce its dependency on oil and should be investing more in public transportation. These investments would bring triple dividends, not just the ordinary direct economic returns, but would make us more energy secure and, by reducing the demand for oil, could help drive down the price of oil. Not a single one of the world's top ten airports lies in the United States. Studies show that the returns to public investment in R&D are extraordinarily high. These public investments would be complementary to private investments, and by increasing the returns to the private sector, would actually encourage investment there.

Other forms of public investment, such as in education, would stimulate the economy in the short run—far more than tax rebates would—and promote growth in the long run (again, far more than tax rebates.)

In 2001, the Bush Administration used the impending recession as an excuse for the tax cuts for upper income Americans—the very group that had done so well over the preceding quarter century. The cuts were not designed to stimulate the economy, and they did so only to a limited extent. Many of the country's current woes can be traced to that decision. To keep the economy going, the Fed was forced to lower interest rates in an unprecedented way and to look the other way as the US engaged in reckless lending. The economy was sustained—on borrowed money—but it was unsustainable. The example, unfortunately, was copied by other countries, and now the problems at the bottom are worse, especially with rising food and energy prices.

We have described what a good stimulus program should focus on: (a) maximizing the bang for the buck—the largest stimulant per dollar of deficit; (b) addressing the country's long run problems; (c) being fast acting; and (d) creating an asset to offset the liability of new debt.

This time the US, and other countries that face a slowdown, need a stimulus that stimulates. We know how to design a stimulus that works and will help address some of the United States' glaring problems, many of which (including the disparity between the rich and the poor) have only grown worse.

April 2009 postscript

In February 2009, the Obama Administration succeeded in getting a \$787 billion stimulus bill passed without the support of any Republicans in the House and

Joseph E. Stiglitz

with the vote of three Republican Senators. By then, the downturn was worsening, and it seemed clear that the stimulus would not be sufficient. Moreover, it was not as well designed as hoped—partly in the vain attempt to get more Republican support. About a third of the stimulus was in the form of household tax cuts, and with stock markets crashing and home prices falling, it seemed increasingly likely that much of the money from the tax cuts would be saved (or spent to repay debt), rather than used to stimulate the economy.

Much of the tax cut was back loaded—only about a quarter of the spending would occur in 2009—and the cutbacks in state and local spending were worse than I feared. California alone had cutbacks of \$40 billion. So much, if not most, of the 2009 stimulus at the federal level would be offset by a negative stimulus at the state and local level. The worry was that the stimulus would not work, not because Keynesian economics was wrong but because there was no real stimulus. Some stimulus would be provided by the looming federal deficit, expected in 2009 to exceed 10 per cent of GDP. That in turn would be offset by the reductions in exports, the cutbacks in investment, growing unemployment, and large increases in household savings. Most forecasters are now predicting a bleak year, even with the stimulus.

The foreclosure problem

Given that the problem in the financial sector originated with foreclosures, one might have thought that that problem would be the first to be addressed. However, it has not been, and the number of anticipated foreclosures has been mounting. What once seemed like high estimates—that a quarter of all homes would be underwater, with the value of the mortgage exceeding the value of the house—now seem conservative.⁵ Not all of these will default. Yet, unless something is done about the foreclosure problem, more mortgages will go into default, with follow-on consequences for the financial sector.

Dealing with the current foreclosure problem: a Homeowner's Chapter 11

There are a number of easy ways of dealing with the foreclosure problem—such as bailing out the lenders at the same time as writing down the loans—which, in the absence of budget constraints and worries about future moral hazard would make everyone (other than the ordinary taxpayer) happy. Individuals could stay in their homes, and lenders would avoid taking a hit to their balance sheets. Knowing that the government is taking this risk off balance sheets would contribute to alleviating the credit crunch.

The challenge is how to save the homes of the hundreds of thousands of those who otherwise would lose their homes and not bail out the lenders, who should be made to bear the consequences of their failures to assess risk.

Responding to the Crisis

One answer is a “Homeowners’ Chapter 11”—a speedy restructuring of liabilities of poorer homeowners, modeled on the kind of relief that we provide for corporations who cannot meet their debt obligations. Chapter 11 is premised on the idea that keeping a firm going is critical for the firms’ workers and other stakeholders. The firm’s management can propose a corporate reorganization which the courts review. If found acceptable, there is a quick discharge of debt—the corporation is given a fresh start. The Homeowners’ Chapter 11 is premised on the idea that no one gains from forcing a homeowner out of his home. There are large transaction costs associated with foreclosure. The house is often trashed, and surrounding houses decrease in value—making further foreclosures more likely.

This relief should be available for households with income below a critical threshold (\$150,000) and with non-household, non-retirement wealth below some critical threshold (perhaps dependent on age). The house would be appraised, and the individual’s debt would be written down to, say, 90 per cent of the level of that appraisal (reflecting the fact that were the lender to have to proceed with foreclosure, there would be substantial transaction costs). The borrower could then get an FHA (Federal Housing Administration) loan as described in the next section.

Banks have resisted this proposal, because it would force them to recognize a loss. They would rather hold on to the mortgage, hoping against hope that something will happen to revive housing prices. Government bail-outs have exacerbated the problem—the government has become an implicit (in the case of Citibank, explicit) insurer of large losses, while the banks will reap all the gains if real estate prices revive.

Treasury has resisted this proposal because if banks had to recognize the losses, more money would have to be put into the banks. It too has been hoping that something will happen to avoid having to put more money into the banks.

Some have opposed this, suggesting it would be a windfall gain to those who purchased a home on speculation around an increase in house prices. The criticism is a little odd, since in fact everyone in the market was speculating on an increase in real estate prices. We have been willing, nonetheless, to bail out the banks. But there is an easy way around this problem, one which would make the Homeowners’ Chapter 11 more fully analogous to corporate chapter 11: a large fraction of the capital gain upon sale of the home would go to the lender. In effect, there would be a debt-to-equity swap. Those who bought a house mainly to speculate on the capital gain would find such a deal unattractive. It acts as a *self-selection* device.

Low interest loans

A second important initiative to make home ownership more affordable is to provide lower interest rates. One way of doing that is for the government to

Joseph E. Stiglitz

extend the benefits of its low cost access to fund homeowners. The government has, in effect, been doing that with its bail-out of Bear Stearns. But why should it do that just for banks? The government can borrow at a very low interest rate, lend it to homeowners at a rate slightly higher, and actually make a profit. The fiscal position of the United States can be improved at the same time that the foreclosure rate can be reduced.

Banks have resisted this initiative as well, and again, for an obvious reason: they don't want competition from the government, even if they have proven to have done so poorly at credit assessment and mortgage design to have put at risk the entire economy.

Expanded homeownership initiatives

Advocates of the reckless sub-prime mortgages argued that these financial innovations would enable large numbers of Americans to become homeowners for the first time. They did become homeowners—but for a very short time and at a very high cost. The fraction of Americans that will be homeowners at the end of this episode is likely to be lower than at the beginning. The objective of expanding homeownership is, I believe, a worthy one, but clearly the market route has not worked well—except for the mortgage brokers and investment banks that profited from them.

Many conservatives have blamed the home ownership initiatives for the crisis. But that is wrong. No government official encouraged the banks to lend to individuals beyond their ability to repay. The lenders were supposed to do appropriate credit assessment. They failed—partly because of the flawed incentive structures noted in the previous chapter. Moreover, the worst practices did not occur in government housing programs (Fannie Mae and Freddie Mac.) The private sector showed that it did not need any government assistance to engage in bad lending practices. Indeed, many in the mortgage industry resisted laws that would have restricted the predatory lending practices that played a major role in the crisis.

The underlying problem is simple to state: median household income has been falling and house prices rising. This means that housing is becoming less and less affordable to more and more Americans. There are no easy fixes to the declining incomes—other than shifting the burden of taxation away from these individuals and towards those who have been doing well. Nor is there any way—short of public housing programs—that we can quickly reduce housing prices (the current market correction is likely to make housing more affordable).

At the current time, there is an argument for helping lower and middle income Americans *temporarily* with their housing costs (over the longer run, there is a question about whether it is appropriate to distort the allocation of resources to housing). Note that the US (and many other countries) does this with upper income individuals—tax deductibility of mortgages and property

Responding to the Crisis

taxes means than the government pays a large fraction of the carrying costs. But ironically, it does not do that with those who need the help the most.

A simple remedy is converting the current mortgage and property tax deduction into a flat rate cashable tax credit; the reduction in the subsidy to upper income Americans could help pay for the subsidy for poorer Americans. Even better would be a progressive subsidy, with a higher rate for the poor than the rich. A 25 per cent tax credit would increase the affordability of housing for many Americans. A complementary initiative is to provide low interest loans along the lines discussed in the previous subsection.

New mortgages

Ironically, the financial sector, for all of its claims at innovation, has not innovated in ways which are directed at shifting risk from poor Americans to those who are more able to bear the risk. For instance, even if mortgages have variable rates, poor Americans struggling to make ends meet need to know what their monthly payments are going to be. One can have fixed payments, even with variable rate mortgages, if one lets the maturity of the mortgage be variable. Danish mortgage markets have provided an alternative which has worked well for that country for more than two centuries.

The government has repeatedly had to take the initiative in innovating financial products (like making mortgages widely available) that meet the needs of ordinary citizens. When they are proven, the private sector often steps in. This may be another instance where government will have to take the initiative because of the failure of the private sector to do what it should.

Preventing foreclosures

There is little, at this juncture, that government can do to prevent large numbers of mortgages from going “underwater,” i.e. the mortgage will exceed the value of the property. But not all properties that are underwater will go into foreclosure. In a world with full rationality and perfect pricing, clearly individuals who see that the value of the house is less than the value of the mortgage should default: they can buy another (or the same) house at the lower price, and will be better off at least by the amount that the house is underwater. But individuals care about their reputation, and many will be reluctant to go into foreclosure. That is why the kinds of programs described in the previous section may help: if they can stay in their homes and meet their mortgage payments, they will try to do so.

There are other proposals that affect incentives to default. One proposal (due to Martin Feldstein) would exchange, say, 20 per cent of the individual’s current mortgage for a lower interest rate government loan (the government could pass on the advantage of its lower borrowing rate, so that the program would not cost the government anything). But the government loan would *not* be a

Joseph E. Stiglitz

non-recourse loan, so that even if the individual defaulted on his house, he would still be obliged to repay. There would then be little incentive to default. Individuals would only default when the price of the house was lower than the non-recourse debt, and for that to happen would require a very large fall in real estate prices.

One interesting aspect of the proposal is that it implicitly recognizes a market failure in financial markets—that the government has an advantage, both in raising funds (because of the almost zero probability of default) and in collecting. These have provided part of the rationale for government student loan programs and government mortgages; yet the political right has often insisted that the government not engage in these financial activities.

Beyond that, this proposal would, in effect, be giving a large gift to lenders—in effect, homeowners would be asked to give up their option in return for a lower interest rate. Most likely, financially unsophisticated borrowers would not understand the market value of the option and would only see the reduced payments. In a sense, the government would be duplicitous, unless it informed them of the value of the option.

However, a slight modification of this proposal would reduce the likelihood of foreclosure at the same time that it would not be giving such an unwarranted transfer to lenders. The government could act as an intermediary, allowing lenders to buy back the option at a fair market value (thereby reducing the uncertainty which they and markets face), and encouraging households to: (a) use (most of) the proceeds to buy down the value of the outstanding mortgage; and (b) convert another 10 per cent to 20 per cent of the mortgage into a recourse loan with interest at the government interest rate (plus an appropriate transactions cost). Lenders participating in this program would, of course, have to waive any pre-payment penalties.

April 2009 postscript

I had watched with amazement as the crisis worsened, and President Bush refused to do anything about the underlying problem, the mortgages. Providing \$700 billion to the banks without doing anything about the mortgages was akin to a mass blood transfusion to a patient suffering from internal hemorrhaging.

President Obama finally came forward with a proposal to deal with the foreclosure problem in February 2009. It was an important step in the right direction—but not enough to likely prevent large numbers of foreclosures still occurring. There were limited mortgage restructurings for those who went through bankruptcy proceedings. Ironically, prior law made it more difficult to restructure a mortgage on a primary residence than on a yacht. Many individuals will, however, resist going through bankruptcy, with all that that entails. The Homeowners' Chapter 11 was intended to facilitate the process and give homeowners better terms.

Responding to the Crisis

With the government takeover of Fannie Mae and Freddie Mac, it is easier for government to restructure many mortgages. It also provided access to lower interest rates. But the private sector still seems reluctant to renegotiate many mortgages and has been successful in restricting the scope of government low-interest loans. The Obama plan provided some (very limited) incentives for banks to restructure certain mortgages. The major objection to the Obama initiative is that the restructurings involve temporarily lower interest rates, not lower principle—yet the underlying problem is that the price of the house is less than the value of the mortgage. With prices lower than mortgages, incentives to default are strong, and the evidence is clear that those with mortgages underwater are more likely to default. Yet not only was the principle not written down, no direct incentives (e.g. of the kind discussed above) were put in place aimed at reducing foreclosures. The first is explicable partly because the renegotiation of principle would force the recognition by the banks of their losses, and as we have noted, the banks are going to great lengths to avoid that—supported by Treasury.

In the beginning of April, 2009, the Financial Accounting Standards Board took an action which weakened further incentives to renegotiate mortgages. It gave banks greater latitude not to write down the value of impaired mortgages. This meant that the cost of renegotiating mortgages effectively went up—because renegotiation would entail recognizing losses, which in turn would entail finding new funds for recapitalization. This compounded problems from the flawed bank restructuring, described in the next section. Part of that program entailed government guarantees on losses. With such guarantees, there were strong incentives for delay, for any gain would accrue to the holder of the mortgage, while most of the losses from delay would accrue to the government.

Financial rescue

Given the magnitude of defaults on the sub-prime mortgages, it is not surprising that these problems became translated into problems elsewhere in the system. Given the lack of transparency in the banks—who had moved so much of their risk taking off balance sheet—it is especially not a surprise that there was a “run” on a bank, with market participants pulling their money out (not rolling over loans). Even if they would have eventually fully recovered their assets, the risk of having their money tied up for an extended period of litigation, at a time when credit was tight, was simply not worth the slightly higher returns that they might receive.

Greenwald and Stiglitz (2003) and Battiston et al. (2007) have emphasized the importance of credit interlinkages and how defaults in one part of the system can lead to defaults elsewhere. It is easy to construct models of bankruptcy avalanches. The fear was that a default by Bear Stearns would lead to a

Joseph E. Stiglitz

series of other defaults and a run on other banks. Indeed, even after Bear Stearns was bailed out (through a Fed financed acquisition by J.P. Morgan) the fear of further defaults was so great that the Fed extended its lender of last resort facility to investment banks. Even most critics of the Fed agreed that, at that point, it had no choice. It may have failed in providing an adequate regulatory structure; it almost surely failed in acting too late. But given the risks at that moment, a bail-out seemed inevitable.

The criticism is addressed towards the form of the bail-out, which entailed potentially huge transfers of wealth to J.P. Morgan and large transfers to Bear Stearns shareholders, while taxpayers were put at risk for large amounts without any compensation. If taken as a precedent, it expanded the scope of moral hazard, rewarding those who had engaged in excessively risky behavior and had been already richly compensated. The defense that something had to be done quickly was hardly a defense: that there were potential problems had long been recognized, and it is hard to believe that contingency plans had not been thought through. Wall Street wanted a bail-out, and Wall Street got a bail-out, perhaps not as extensive as it had hoped, but still on terms that were unconscionable, in a manner that was not transparent and that seemingly paid little attention to the large distributions of wealth that were generated. Conflicts of interest (bordering on corruption) abounded.⁶ The bail-out took the form of a non-recourse loan from the Fed to J.P. Morgan to acquire Bear Stearns (originally for \$236 million, upped to \$1.2 billion). The Fed gave \$30 billion to J.P. Morgan and got what was supposed to be an equivalent amount in collateral consisting of a melange of assets, including sub-prime mortgages. No one is sure how they were priced. If the value of the assets falls below \$29 billion, J.P. Morgan absorbs the first billion of losses, but taxpayers are at risk for the remainder (and obviously, for the first billion, if J.P. Morgan itself were to go bankrupt).

Non-recourse loans are, in effect, put options. If the value of the collateral goes below \$29 billion, J.P. Morgan has little incentive to pay back the loan. In discussing the risk, attention has focused on the probability of default, particularly important because no one is sure how they were priced in the first place, i.e. what probability of default was built into the pricing. But there is a second problem: interest rate risk. If interest rates rise, then the value of the assets declines. Some of these assets are 30-year mortgages, meaning that they are highly sensitive to long-term interest rates. Providing a non-recourse loan even if the assets are currently correctly priced is like giving away an option—an option with a very high value.

Particularly irksome was that the government stood to lose large amounts of money (both on the credit risk and the interest rate risk), but there was no upside potential. Meanwhile, Bear Stearns shareholders walked away with \$1.2 billion, less than they would have liked, but still more than they should have, especially given their failure to manage risk appropriately.

Responding to the Crisis

There were many ways that the taxpayers could have been protected and at least received some compensation. For instance, shareholder value could have been put into escrow, until it was clear that taxpayers' money was not at risk. The first \$1.2 billion of losses would be paid either by J.P. Morgan or by shareholders. J.P. Morgan could have been asked to pay a risk premium up front and to pay the market value of the implicit put. If the collateral turned out to be more valuable than the value assigned to it, the government could have demanded a fraction of the excess.

Bailing out Bear Stearns also entailed large redistributions. Many had bet on Bear Stearns going into bankruptcy (in credit default swaps). Those that had bought insurance against this risk (bet that it would happen) were deprived of money that they otherwise would have received; those that provided the insurance received a windfall gain. This market is itself not very transparent, but allegedly among those who received large windfall gains were the big investment banks—including J.P. Morgan. In defense of the bail-out, one could argue that the risk of a bail-out should have been priced into the insurance in the first place. Still, the fact that J.P. Morgan was, in part, being bailed out should have played into the terms at which the bail-out occurred.

The events subsequent to the bail-out evidenced many of the potential conflicts of interest. The CEO of Bear Stearns was hired by J.P. Morgan, at handsome compensation. Clearly, a promise (pay-off) of this kind could interfere with his ability to negotiate in the best interests of the shareholders. Shareholders had to vote on the acquisition. But it is easy to show that those who had sold insurance against the risk of Bear Stearns going bankrupt had an incentive to buy shares, to ensure that the acquisition went through, even if shareholders as a whole might have thereby been disadvantaged.⁷

The bail-out orchestrated by the regulators illustrates a problem common to discretionary regulatory policy, an issue that arose in the bail-out of Long-Term Capital Management (LTCM) a decade earlier, where no public money was involved. The regulator has a variety of carrots and sticks for inducing cooperation. Lack of cooperation can induce tighter scrutiny; fuller cooperation can buy regulatory forbearance, now or in the future. In the case of LTCM, banks were induced to contribute funds to bail out the hedge fund benefiting, not necessarily incidentally, many of the corporate executives of the same banks who were contributing money (another instance of the complex web of conflicts of interest). Was participation in the bail-out in the best interests of the shareholders? The New York Fed believed it was in the interests of the system as a whole. Whether the individual banks agreed, and whether it was in the best interests of the individual participating bank, is another matter.

In the case at hand, this combined with lack of transparency to leave a high level of uncertainty: it does not appear that J.P. Morgan got a bad deal; on the contrary. But was it because it outsmarted the Fed? Because there were relatively few institutions able and willing to take over Bear Stearns, and the Fed wanted,

Joseph E. Stiglitz

at any cost, to avoid a collapse, given the exigencies of the moment, it could drive a hard bargain.

There were several alternative courses. One which the UK eventually took (though the delay in doing so may have cost it a great deal) is nationalization. Whether the legal framework would have allowed the US to do this may not be clear; but it was not clear whether the Bear Stearns bail-out was legal.

It is curious that it has become acceptable for a foreign government, or, equivalently, a fund owned by a foreign government, to bail out (or take over) a failing bank (as happened in the case of Merrill Lynch and Citibank), but there is still a reluctance to allow one's own government to do so. The standard rationale against governments running/nationalizing banks is ideological: governments shouldn't do it; the private sector is better at running banks and other such enterprises than the public sector. But the private sector has, in these instances, demonstrated its incompetence. The public purse is at risk. The government has a large stake in how the resolution is managed. Indeed, with implicit or explicit deposit insurance, it has more at stake than anyone else does. Yet it is difficult to provide incentives for any private firms that are compatible with the interests of the state. It is far better to have the government manage the resolution. In the case of Bear Stearns, the public interest was even more complicated. There was a public interest in maintaining the integrity of the financial system. There were no formal liabilities, as in the case of deposit insurance. What was required may not have been clear. In the event, there was a huge transfer of wealth to J.P. Morgan to ensure that this was done.

(There is a rationale for encouraging foreign government bail-outs: the arm's length bargaining ensures that the foreign government is not likely to be engaged in hidden transfers of wealth, as may have happened in the Bear Stearns bail-out and as has happened in bail-outs in many countries. On the other side, one of the concerns of government ownership of banks is that resources get directed according to political, not economic, objectives. This should presumably be more acceptable if it is one's own government's political agenda. However, as I have explained elsewhere,⁸ if there are concerns about resources being used in ways that go counter to public interest, it is a sign of an inadequate regulatory framework—the problems could arise as well with domestic private ownership.)

There were still other alternatives: the government could have lent to Bear Stearns directly. This would have been more transparent. And it would have been easier to design a system of allowing the government to participate in the upside potential, as the government did when it helped engineer Chrysler's bail-out. Still a third alternative, more akin to the Chrysler bail-out, would be providing a public guarantee to private funds, though—other than ideology—it is not clear why this is preferable to the direct provision of government funds.

Again, in the instance, it may not have been consistent with the legal framework, though the Fed's announcement that, going forward, it stood

Responding to the Crisis

willing to lend to other investment banks suggested that it believed that it did have regulatory authority. The issue here is the design of the appropriate framework: it would seem desirable to give government the right to lend, in return for taking a share of the potential gain or at sufficiently high interest rates to compensate for the risk that the collateral was less than the value assigned.^{9,10}

Ownership is often defined as the residual claimant on the returns to an asset and residual control. Current banking frameworks leave the government as the residual holder of negative claims and, in effect, with considerable residual control rights—when things turn out badly, but not when they turn out well. They can run things once the patient gets to the hospital, but they pick up the hospital bills and can do little (or at least not enough) to prevent the accidents that lead to hospitalization.¹¹ This seems neither efficient nor equitable; in many countries, such policies have resulted in huge transfers of resources from the public to the private sector (e.g. in Mexico's banking crisis).

Further comments on equity injections, capital adequacy standards, and forbearance

Typically, financial injections into the banking system occur before the actual meltdown, while the bank is viable but has failed to meet its regulatory capital adequacy standards. Banks facing such a situation can be forced to comply. Again, typically, when banks face a problem of inadequate capital in an economic downturn, they have found it difficult to raise the required capital. Part of the reason is (as here) the uncertainty concerning the value of the assets and liabilities—made even worse here because of the lack of transparency in off balance sheet accounting and the complexity of products. Part of the reason is that in downturns, uncertainty is heightened and there is a general scarcity of liquid funds for the bail-out.

In early 2008, it appeared that the current instance may be an exception or it may be a harbinger of a new world. The world was awash with liquidity—in fact excess liquidity was often blamed for the problems. In several instances, sovereign wealth funds came to the rescue. In today's world of globalization, it appeared that banks could turn to the global financial market. Funds may be scarce in the United States, but there is a whole world to turn to outside the United States. There may be another factor at play: the banks being bailed out are controlled by their managers. Their interests may not fully coincide with those of their shareholders. The managers may have been more willing to give up a greater share in the ownership of the bank to save the institution. On the other hand, the sovereign wealth funds may have been more willing to pay more than a typical risk averse buyer, focused on the actuarial value of the assets and their risk, to obtain a large share in these iconic assets.

Joseph E. Stiglitz

But by late 2008, these hopes of a new world of global finance coming to the rescue seemed a dream of a distant past. The sovereign wealth funds which had invested in the US, and especially in its banks, had been badly burned. They had learned how non-transparent the institutions were and how great the uncertainty about the true state of their balance sheet. Besides, the downturn had turned global, and many of the countries with liquid funds began to focus more on problems within their own region.

In the 1997 East Asian financial crisis, the International Monetary Fund (IMF) strongly urged government regulators to strictly enforce capital adequacy standards. I argued that such a policy could be counterproductive; if the banks couldn't raise additional capital, it would force a contraction of their loan portfolio, further deepening the economic downturns, and possibly even worsening balance sheets, contributing to a downward spiral. The IMF policy of no-forbearance was, in effect, instituting an automatic destabilizer into the economy.

One of the challenges in designing a regulatory regime based on capital adequacy standards is how to prevent this destabilizing behavior. One proposal is to introduce counter-cyclical standards, i.e. that automatically loosen the standards when the economy is weak and tighten them when the economy is strong. This proposal is discussed in the previous chapter and elsewhere in this book.¹²

Some urged government capital injections, since with these capital adequacy standards could be met, and a few countries took this course. Capital adequacy standards are supposed to serve two functions: they ensure that the bank has enough capital at risk that it does not take on excessive risk; and they provide a buffer, so that the government does not have to put up as much money should things turn out badly. When the government puts up money to meet capital adequacy standards, it is doing little to protect taxpayers' money: if it puts the money in the form of equity, its money is now at risk even if the bank survives but simply gets a low return. But more important is the fact that incentives are little affected: controlling shareholders care about their wealth, not the wealth of the government; what they have at risk is unchanged. Indeed, it can be shown that under some circumstances, incentives are adversely affected. The existence of capital adequacy standards lowers the franchise value of a firm (it is a constraint imposed on the firm, and therefore has to lower owners' expected discounted (utility of) future income), and dilutes existing shareholders' claims on future franchise value. As a result, the bank may even engage in more risky behavior—at the expense of taxpayers (see Murdock and Stiglitz, 1993; Helmann et al., 1997, 1998, 2000, 2002).

Restricting hidden bail-outs

Increasingly, there are concerns that the Fed currently is too centered on bailing out ailing banks and financial institutions (and possibly even those losing

Responding to the Crisis

money on the stock market) and less with maintaining the real strength of the economy.

This perspective was put forward by Princeton economics professor Uwe Reinhardt in a letter to the *Financial Times* (February 21, p. 10):

You report that the Federal Reserve has quietly lent US banks “on relatively attractive terms” some \$50bn to ease the credit crunch now befalling main street American business... Would it not have been more efficient for the Fed to have lent the \$50bn directly to main street business, on similarly subsidized terms, in place of feeding horses that may or may not feed the birds? After all, unlike most solid real businesses, banks worldwide have amply demonstrated their inability to fully understand and value the assets—often just casino-like bets—into which they place the enormous sums entrusted to them... I realize, of course, that the Fed’s lending directly to Main Street would immediately be decried as “socialism” in our financial press. Miraculously, when the Fed bails out inept private banks on subsidized terms it is called “prudence” rather than socialism. That may fool seasoned adults, but not any straight-thinking freshman in economics.

The fact is that when the Fed buys mortgages and other assets that are not widely traded, there is a risk that it will be overpaying—the lack of transparency should itself be a concern in a democratic society. It is understandable why the Fed wanted to do something about the freezing of credit markets; it is understandable that those in the affected institutions wanted a bail-out. However, it was incumbent on the Fed to do so in ways which did not put at risk taxpayers’ money,¹³ and which did not reward the financial institutions for their behavior. The fact is that the financial markets created these non-transparent hard-to-price financial instruments; they should now bear the consequences. If the Fed has used only a small fraction of the financial ingenuity that went into the creation of the mess, it could have protected American taxpayers against the risks; it could, for instance, have insisted that the banks from which it bought these mortgage backed instruments provide insurance that, should the value of these instruments decline, e.g. as a result of an increase in default rates, the banks would make the Fed whole. One could only surmise that it deliberately decided not to protect American taxpayers and that it may have done so because what was desired was a bail-out.

Congress should consider passing legislation to ensure that when the Fed engages in such risky transactions, American taxpayers are protected, and that whatever it does should be done more transparently. Similar legislation should be undertaken in other countries.

In the transition from Communism to the market economy, it became clear how government’s control of the banking system (either directly through ownership of banks, or indirectly, through the granting of bank licenses and regulatory supervision) affected the wealth distribution: those, and only those, who had access to capital could buy the assets, typically at far below prices that

Joseph E. Stiglitz

represented fair market value. The question today is, central bank liquidity doing something similar, though admittedly on a far less grand scale. If the central bank lends money to Bank A, and Bank A lends money to Hedge Fund Alpha, and Hedge Fund Alpha uses some of the money to buy shares in Bank B, and at the same time, the central bank lends money to Bank B, and Bank B lends money to Hedge Fund Beta, and Hedge Fund Beta uses some of the money to buy shares in Bank A, we can recapitalize both Bank A and Bank B. It is a private sector recapitalization—of course all funded by the government, but with a set of smoke and mirrors so confusing that no one (outside a few skeptic economists—and who pays attention to them anyway?) can figure out what is going on. The wonderful thing about this charade is that it perpetuates the long-standing dogma: privatize assets while socializing risk. If the banks do well, the hedge funds walk off with the profits; if the banks do poorly, the taxpayers pick up the pieces.

Is this really what is happening? In a sense, one can't really answer that question: funds are fungible. We don't have a clear view of what would have happened but for the extra liquidity provided to the banking system. What is clear is that the extra liquidity makes the recapitalization of the banking system easier.

April 2009 postscript

The weaknesses in the US banking system turned out to be far worse than most imagined, even in August 2008. Then, it was clear that there were massive losses on sub-prime mortgages. It was clear too that problems would be spreading to other mortgages, and to other forms of credit. It was clear too that the losses that had been taken were far smaller than the total losses. There were a lot of losses somewhere in the system, some in US banks, some outside.

The Bush Administration finally realized that something had to be done and asked for a blank check of \$700 billion with no Congressional oversight or judicial review. Congress eventually gave Treasury close to a blank check but insisted on some oversight. Treasury and Fed continued to vacillate in their views about what to do. First, they argued for a "cash for trash" proposal, entailing the government buying off the "toxic assets." They were eventually persuaded that such a proposal would not work—the process of buying them off separately would be too slow. They then tried direct "equity injections," giving the banks money in return for preferred shares and some warrants, to give at least some upside sharing of potential gains. The terms that the US government got, however, in these deals were very bad. The Congressional Oversight Panel estimated that *at the time* the value of the shares and warrants was about two-thirds of the value of the money given to the banks. When the program (called TARP, Troubled Asset Relief Program) was initiated, there was much talk that the government would not only get its money back but also

Responding to the Crisis

make a profit. A few months later, the Congressional Budget Office estimated that the government would get back less than 50 per cent of what it gave the banks. Clearly, prospects of recovering the money with adequate compensation for risk and the time value of money were nil.

While it was clear that TARP would lead to substantial increases in the government's national debt, the hope was that it would lead to more lending. It did not. The new Obama Administration's economic team, dominated by those who had advocated policies that had led to the mess and/or regulators who had failed to do an adequate job of oversight and were seen to be too close to the failing banks, continued the policy of shoveling out money to the banks. The new deals that it struck with the banks were even worse for the taxpayer. Some of them, entailing underwriting losses, distorted incentives.

In late March 2009, they came up with a new program, a public private partnership, where the government provided or guaranteed most of the funds, thereby absorbing most of the losses, but the private sector shared in 50 per cent of the gains as the partnerships bought off assets from the banks. The Administration sold it as using the private sector to help "discover" the true value of the assets, but the structure of the partnership meant that the private sector was only finding the value of the upside potential of the assets; the value of the option, with the government absorbing most of the losses, was obviously much greater than the value of the asset. The gains to the banks were at the expense of the taxpayers. It was a costly redistribution of the banks, one which at the same time distorted incentives.

If the program worked, it would only be at a very high cost to the nation's debt and at an unnecessarily high cost. Even with such massive redistributions, there was concern that the program might not work, partly because the banks were allowed to keep the toxic ("impaired") mortgages on their books at over-inflated prices. Even if they could sell them at prices that were greatly in excess of their true value, the best prices they could get for them might be considerably less than the value on their books, and that would force them to recognize the losses, which in turn would force them to raise more capital.

There was an alternative—the usual bank "bankruptcy" procedure, entailing temporary nationalization, with the government honoring obligations to insured depositors but with shareholders and unsecured creditors facing losses. Obviously, the shareholders of those banks likely to go under and their friends did not take warmly to this proposal. They preferred the Bush–Obama plan of continued bail-outs, with government getting little in return—little in the way of finance, little in the way of control. Yet with banks having misused so much of the money they received—to continue to pay dividends or to pay outsized bonuses seemingly for record losses—as this book goes to press, it is not clear whether this will be politically feasible. It is certainly not economically desirable. The normal procedures of financial reorganization would be far preferable to this form of ersatz capitalism (or corporate welfarism) of socializing

Joseph E. Stiglitz

losses while privatizing profits. We were, in effect, confusing the issue of bailing out banks with the issue of bailing out bankers and their shareholders.

The bank rescue plan is the weakest part of the response of the new Administration to the crisis. The prospect of lending being resuscitated remains weak, while the prospect of large burdens on the government remains high. Even if banks' ability to lend is restored, their willingness to do so may not be. Resuscitating the banks may be necessary for the economic recovery, but it is not sufficient.

Concluding comments

The financial crisis in the United States has grown into a global economic crisis, the worst since the Great Depression. As this book goes to press, it is not clear how deep the downturn will get, how long it will last, or how robust the recovery will be. The US recovery will, almost surely, depend in part in what happens elsewhere in the world. Nevertheless, what seems clear at this juncture is that the downturn will be longer and deeper because of the failure of the Bush Administration to design an effective response. It refused to do anything about the mortgages. When it came to a stimulus, it went back to its time-worn view that a tax cut was the appropriate medicine for any economy's ills. When it came to the ailing banks, it veered erratically from one course of action (or inaction) to another.

The new Administration finally came up with a stimulus package that might work—but it was too little and not well designed. It came up with a mortgage restructuring program—but it too was too little, and not designed to address one of the key problems, that of mortgages that were underwater. Its real failure was coming up with an effective program to restart lending. It focused on the past, dealing with the “legacy” assets, rather than looking forward. It was too influenced by the interests, concerns, and perspectives of the banks. It took a calculated risk: perhaps a policy that pleased the banks would manage to get us over the crisis, smoothly, without generating too much resentment from the rest of society and at not too great of a cost to the taxpayer. It may work, but as this book goes to press, it looks increasingly unlikely that the gamble will pay off. The cost to the taxpayer is high, public resentment is mounting, and it's not working. It is, of course, not too late for the new Administration to change course.

This is, in part, a crisis in confidence—confidence in our financial system has eroded. But if it appears that our financial system has managed to capture the government for its own interests, then confidence in our government will be equally eroded.

Responding to the Crisis

Notes

1. Paper prepared for a meeting on Financial Regulation sponsored by the Initiative for Policy Dialogue and Brooks World Poverty Institute, Manchester, July, 2008. The author is indebted to Stephany Griffith-Jones for helpful comments. Financial support from the Ford, Mott, and Rockefeller Brothers Foundations is gratefully acknowledged. Since the paper was originally written, the financial meltdown has in fact turned much worse. I have revised the paper to take into account some aspects of the subsequent events.
2. Columbia University and Brooks World Poverty Institute, Manchester.
3. A similar dynamic occurred in the 2001 downturn.
4. There should be something done about foreclosures—along the lines discussed in the previous section. But not too much should be spent on this. A big fund would almost surely wind up being a bail-out fund for investors, and they are not the ones who need help from taxpayers.
5. Estimates from First American CoreLogic for December 2008 put the ratio of houses with negative equity at 20 per cent of all mortgages. Since then house prices have continued to fall. Applying the scenarios for future home price declines from the bank stress tests, the total proportion of negative equity mortgages could hit anywhere from 41–55 per cent.
6. Similar concerns of corporate corruption had been noted in the publicly orchestrated but privately financed LTCM bail-out. Shareholder money was being used to in part bail out personal investments by corporate officials.
7. Assume, for instance, that if the company had gone into bankruptcy, it would have been worth \$400 million and (in the original offer) shareholders only got \$250 million. But bankruptcy might have exposed the providers of insurance to an additional risk of \$200 million. They gain more in *not paying out on their insurance* more than they lose in market value. They would vote for the acquisition, even if it was not in the interests of the shareholders as a whole. As Stiglitz (1972) and Grossman and Hart (1980) point out, the equilibrium may not be consistent with shareholder value maximization. A small shareholder who believes that the acquisition will go through (that those who will vote for acquisition are in a majority) will not pay more than \$2.50 a share, if there were a million shares. But, say, a bank (or even better, a consortium of banks) that had large outstanding liabilities if Bear Stearns goes bankrupt would be willing to pay more than \$2.50 a share to obtain controlling interest to ensure that the acquisition did go through. Of course, minority shareholders—that are not at risk if Bear Stearns goes bankrupt—are left short changed.
8. See Stiglitz (2009).
9. It is curious that those who believe in free markets are not only willing to accept a government financed bail-out but demand it; while they argue for the virtues of market determined prices, in these circumstances, they seem to suggest that market prices undervalue assets.
10. Stiglitz and Weiss (1981) explain why charging an interest rate high enough to compensate for the risk may have adverse incentive effects, so that more complicated financial instruments—or even nationalization—may be required.

11. In Orszag and Stiglitz (2002), we explain the need for better regulation (accident prevention) in those instances (such as here) where, it is argued, that when an accident occurs, there must be government action.
12. Another proposal is to use discretion. Most countries engage in discretion. Hopefully, the central bank can distinguish among the circumstances in which banks find themselves: is it an isolated bank that is facing a problem, in which case forbearance should not be engaged in; or is it systemic risk? (Of course, the government has to be careful—it can unwittingly encourage correlated behavior, which can increase systemic risk.) One of the criticisms of the IMF and the US Treasury in the East Asia crisis was their failure to recognize the possible desirability of discretionary forbearance. They worried that it would give rise to moral hazard—concerns that were evidently muted in the Bear Stearns bail-out.

In addition, the objective function of the IMF and the individual countries may have differed markedly. The former may have been concerned with consequences for the *global* financial system; the latter focused more narrowly on consequences for the national financial system and economy.

13. Profits of the Fed are turned over to the Treasury, so that any losses have a direct impact on the Treasury.

References

- Battiston, S., Delli Gatti, D., Gallegati, M., Greenwald, B., and Stiglitz, J. E. (2007) 'Credit Chains and Bankruptcy Propagation in Production Networks.' *Journal of Economic Dynamics and Control*, 31(6), pp. 2061–84.
- Greenwald, B. and Stiglitz, J. E. (2003) 'Macroeconomic Fluctuations in an Economy of Phelps-Winter Markets.' In Philippe Aghion, Roman Frydman, Joseph Stiglitz, and Michael Woodford (eds.), *Knowledge, Information, and Expectations in Modern Macroeconomics: In Honor of Edmund S. Phelps*. Princeton, NJ: Princeton University Press, pp. 123–36.
- Grossman, S. J. and Hart, O. D. (1980) 'Takeover Bids, the Free-Rider Problem, and the Theory of the Corporation.' *Bell Journal of Economics*, 11(1), pp. 42–64.
- Helmann, T., Murdock, K., and Stiglitz, J. E. (1997) 'Financial Restraint: Toward a New Paradigm.' In M. Aoki, H. Kim, and M. Okuna-Fujiwara (eds.), *The Role of Government in East Asian Economic Development*. Oxford: Clarendon Press, pp. 163–207.
- (1998) 'Financial Restraint and the Market Enhancing View.' In Y. Hayami and M. Aoki (eds.), *The Institutional Foundations of East Asian Economic Development*. London: Macmillan, pp. 255–84.
- (2000) 'Liberalization, Moral Hazard in Banking and Prudential Regulation: Are Capital Requirements Enough?' *American Economic Review*, 90(1), pp. 147–65.
- (2002) 'Franchise Value and the Dynamics of Financial Liberalization.' In A. Meyendorff and A. Thakor (eds.), *Designing Financial Systems in Transition Economies: Strategies for Reform in Central and Eastern Europe*. Cambridge, Mass.: MIT Press, pp. 111–27.
- Murdock, K. and Stiglitz, J. E. (1993) 'The Effect of Financial Repression in an Economy with Positive Real Interest Rates: Theory and Evidence.' Mimeo, August.
- Orszag, P. and Stiglitz, J. E. (2002) 'Optimal Fire Departments: Evaluating Public Policy in the Face of Externalities.' The Brookings Institution, January 4 <<http://www.brookings.edu/views/papers/orszag/20020104.htm>>.

Responding to the Crisis

- Stiglitz, J. E. (1972) 'Some Aspects of the Pure Theory of Corporate Finance: Bankruptcies and Take-Overs.' *Bell Journal of Economics*, 3(2), pp. 458–82.
- (2009) 'Regulation and the Theory of Market and Government Failure.' In D. Moss and J. Cisternino (eds), *New Perspectives on Regulation*. Cambridge, Mass.: The Tobin Project.
- and Weiss, A. (1981) 'Credit Rationing in Markets with Imperfect Information.' *American Economic Review*, 71(3), pp. 393–410.