

# Solving the Present Crisis and Managing the Leverage Cycle

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We are at the acute crisis stage of a leverage cycle, a very big cycle. I write to propose a plan with concrete steps that the government could take to address the severe financial condition that we now find ourselves in. It is critical that any rescue plan be clear and transparent, implementable and not subject to fraud, and comprehensive enough to succeed and to convince the public it will succeed. The law already enacted by Congress was admittedly an emergency measure designed to staunch further immediate hemorrhaging.

What to do next is the question; understanding how we got here will help us find the right set of answers.

The leverage cycle is a recurring phenomenon in American financial history. Most recently, one ended in the derivatives crisis in 1994 that bankrupted Orange County, and another ended in the Emerging Markets-mortgage crisis of 1998 that bankrupted Long Term Capital. A proper understanding of the origins of the cycle shows the way to manage it and to deal with the final crisis stage.

A critical aspect of the leverage cycle is that collateral margin rates change. Two years ago a home buyer could make a 5% downpayment on a house, and borrow the other 95%. Now he must put 25% down. Two years ago a mortgage security buyer could put 3% or 10% down, borrowing the rest. Now he must pay 100% in cash.

All leverage cycles end with (1) bad news creating more uncertainty and disagreement, (2) sharply increasing collateral margin rates, and (3) losses and bankruptcies among the leveraged optimists. The thematic solution is to contain the bad news, intervene to bring down margins, and carefully inject “optimistic” equity back into the system. As with most difficult problems, a multipronged approach is generally the most successful. I write to advise the government to choose a plan that respects all three remedial prongs. The government’s first plan, to buy troubled assets, while admirably bold, did not do that. Instead it concentrated almost entirely on the most problematic part of the third prong.

The three pronged approach I advise below tracks the three stages that characterize the crisis stage of a leverage cycle, my 1, 2, 3 in the paragraph above. First, then how to address the bad news:

The bad news in this cycle is falling home prices, and homeowner defaults and foreclosures. The uncertainty is over how far these processes will spiral down.

**Prong 1:** Put a floor under housing prices by:

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- (a) giving financial inducements to non-homeowners to buy homes, and for anybody to buy foreclosed homes; and
- (b) paying the expenses for a better system to modify mortgage loans to keep homeowners in their homes. This would also help lenders recoup more money than they presently get by foreclosing on homeowners and selling the properties for 50 cents or less on the dollar after fees

If the government is going to spend money, better to spend it on the people who need it the most, especially if that is where the money will do the most good. Money spent on homeowners will help housing prices suffering from the housing leverage cycle. It will also help mortgage security prices suffering from the mortgage security leverage cycle. Housing prices directly influence the payoffs of mortgage securities, since the recoveries these securities obtain from defaulting mortgages depend on the sales prices in foreclosures. A stabilized housing market would therefore staunch security losses, and by removing uncertainty from the system, encourage lenders to restore reasonable margins on housing and on mortgage securities.

My design for Prong 1(a) above (see the more detailed explanation later) helps reduce the collateral margin on housing in addition to stemming bad news. The plan uses government money to reduce the downpayment (margin) the homeowner-mortgagee must make, while at the same time improving the security of the loan to the lender. Success in raising the prices of foreclosed homes increases the incentives of defaulters to pay, and thus makes it more likely the renegotiation in Prong 1(b) can keep them in their homes.

Next, we need to address increasing collateral margins for security purchases.

**Prong 2:** Establish a lending facility to make loans available to investors willing to put up collateral to buy mortgage securities. The Treasury could

- (a) hold the borrower's IOU
- (b) guarantee it and sell it off to the private sector

For example, the Fed could commit to lending the buyer 50% of the purchase price of any mortgage security in an arm's length transaction, using the security as collateral. This eliminates the need for the government to figure out the price. That is the most efficacious and uncomplicated way to reduce margins and to prop up the tumbling mortgage security prices that are bankrupting so many of America's most famous financial firms. On many of these securities the private sector used to lend 90% of the purchase price, using the security as collateral, and now it won't lend anything with that collateral. So 50% moves us back to sane margins, re-leveraging the system without reverting to the previous excesses.

A variation on the lending facility 1(a) would be to have the private sector make the 50% loans, but with a government guarantee that any losses would be covered by the Treasury, as in 1(b). If the government is making the loan, its 50% is at risk, so guaranteeing the same loan held by the private sector exposes the government to exactly the same risk, but eliminates the need for the government to find the money. I provide further details for both variations later.

It is important to point out that lending is a much safer and more easily implementable step than buying. If the government buys it runs an immediate risk of losing money, if the assets it purchases fall in price. By lending, it avoids the risk of loss until the prices fall by 50%. Perhaps even more importantly, lending does not raise the conflict of interest problems that will inevitably arise from buying, given that the government does not have the expertise to determine fair prices for complicated mortgage securities.

Lending on risky collateral is a great departure from the traditional role of the Fed. The orthodox view is that the Fed injects liquidity into the system by lending money to banks and others with impeccable reputations for repaying so as to reduce the riskless rate of interest on very short term loans. However, the great bulk of lending in the investment world is not based on the reputation of the borrower but based instead on the value of the collateral. The lesson of the leverage cycle is that when lenders demand too much collateral for their loans, liquidity dries up. The Fed cannot undo this by making riskless loans at a lower interest rate than the market. It needs to make risky loans on less collateral than the market. The Fed has already moved in this direction, by trying to loan money to banks on some types of risky collateral. But the banks are not re-lending the money to investors who will buy the securities. The Fed must lend directly on risky collateral to the buyers, or force the banks to do so.

Finally, we need to address losses and bankruptcies from leveraged optimists.

**Prong 3:** carefully inject equity back into the system, beyond expenditures at the homeowner level described in Prong 1 above:

- (a) by putting money directly into financial institutions deemed vitally important in exchange for the shares of current owners and changes in management, and in exchange for a commitment to spend the money on mortgage securities or loans.
- (b) and, if that is not enough to rescue troubled assets, then by investing in funds set up by the private sector to purchase mortgage backed securities (instead of the government trying to buy and sell assets on its own).

Prong 3 is what the Treasury is concentrating on, while ignoring Prongs 1 and 2. Their first plan entailed Prong 3(b), which is the most controversial and problematic of

my recommendations to implement. And the variation on 3(b) the government chose is worse than the alternative I suggest. The market and the public have reacted very badly to this first Treasury approach. Apparently the negative reaction caught the Treasury by surprise. Now the Treasury appears to be moving rapidly toward 3(a), but that too has its difficulties. The main problem with 3(a) is that injecting equity into banks will do less good than one might guess unless they are coerced into lending it out.

Giving money directly to beleaguered institutions as in Prong 3(a) directly addresses the problem of their insolvency. If they are institutions that the Treasury wants to save or support, giving them the money is a much quicker way of saving them than buying assets. For one thing, it makes transparent how much money they are being given, without hiding it in the fog of asset valuation.

There is a second reason to give money directly to banks and other potentially leveraged buyers, as suggested in 3(a), rather than spending it directly on securities as in 3(b). By giving the banks \$1, the hope is that they would be induced to spend \$11 on securities. The reason for hope is that the banks have access to a large number of deposits in savings accounts. In order to protect depositor money, banks must put their own equity ahead of depositor money when they make a risky loan to some business, or buy a risky asset. On average they put something like \$1 of their own money ahead, to take the initial losses, of every \$10 of depositor money. If the banks lose \$1 of their own money, they may not be able to loan the \$10 of depositor money. Thus by giving \$1 to the banks, the government may engineer \$11 of spending on risky securities, which will have a much bigger impact than the government would get by spending \$1 directly on securities.

Various studies have shown, however, that when bank equity goes up or down by small amounts like \$1, their lending and investing changes not by \$11 but by \$1 or even less. Presumably these studies examined historical periods during which bank capital moved by small amounts; banks tried not to recall loans just because their capital changed a little bit. But the lesson is that the government cannot expect a big multiplier like 11 unless it puts in a great deal of new equity.

The need for gigantic infusions of equity can be put in a different way. If these banks are really in danger of going bankrupt, then an infusion of new money will go mostly to raising the value of their bonds, and only raise their equity a little. Suppose for example that there is a  $2/3$  chance the firm will go bankrupt. An extra \$1 will then raise the bond values by 67 cents, and raise the equity by only 33 cents.

There is yet another way of seeing the problem with the multiplier. The remaining banks now know that if they survive this crisis they will have a bonanza in the future, freed from the competition of those who will have gone out of business. Their first goal now is to hunker down and preserve cash. Thus the government injections might just sit there, unless there is some compulsion to increase bank activity in exchange for the money.

Directly injecting capital into institutions that have nearly bankrupted themselves through their own bad judgment also poses problems. How much equity should the government take? How much profit should these institutions be allowed to reap from the bailout? What control will the government have? How should the government decide which institutions to bail out?

The emergency legislation just enacted has at its core the idea that government purchases of mortgage backed securities and derivatives through mechanisms, like reverse auctions, will clarify what the assets are worth and thus make the assets liquid again, and also raise their prices. It is a variation of Prong 3(b). The biggest problem with that plan, aside from deemphasizing the more important points (stemming the tide of bad news, decreasing collateral margins, and injecting capital directly into failing institutions), and aside from the fact that holding a huge portfolio of the riskiest securities on Wall Street would expose the taxpayers to huge potential losses, is that the securities are very complicated and heterogeneous. How will the government decide which to buy and how much to pay? And through what process? Even with legions of advisers, the government may easily get fleeced.

Designing and administering the auction mechanisms and executing the purchases will take considerable time. After they were designed, and even assuming they elicit fair prices for individual securities, the government would still have to decide how much to spend on each type of mortgage security. Then the government would have to decide what to do with the securities, and when to sell them. Complicating matters further, market participants might well have wondered whether the government will use its various powers to improve the value of its own securities. Uncertainty about these matters may undermine the certainty that the auctions were designed to restore.

Buying troubled assets addresses potential insolvency in a haphazard and inefficient manner. If it is to be done at all, I would recommend doing it through Wall Street fund managers, taking advantage of the government size and power to negotiate small fees, as in Prong 3(b). There are many conflict of interest problems that would have to be addressed before that could be done responsibly and which may in the end pose too great a risk to this part of the plan. Of course, similar conflict problems exist in the approach of direct purchase of assets by the government, given the government will have to rely on advisors to determine what to buy, through which process, and at what price.

Furthermore, price transparency at the security level may not bring relief for many important victims of the current crisis. Some banks own whole loans – loans that have not been securitized. Many of these loans have been compromised by the falling housing prices and rising defaults, but the banks have not marked their value down yet in their books. If they were sold to the government at fair hold-to-maturity values, then the banks would have to take another loss. This again raises the question of what prices the government should be paying.

In what follows I explain the leverage cycle, and why Steps One and Two are the simplest and most natural. I show how the government could best go about buying securities if it must. That includes limiting the kinds of securities it buys. I conclude with a list of recommendations about managing the leverage cycle in its ebullient period that might prevent the next cycle from reaching such a devastating crisis stage.

### **Margins, the Leverage Cycle, and Asset Prices**

Traditionally economists, as well as the general public and the press, have regarded the interest rate as the most important variable in the economy. Whenever the economy slows, the press clamors for lower interest rates from the Fed, and the Fed often obliges. But sometimes, especially in times of crisis, collateral rates (equivalently margins or leverage) are far more important than interest rates. The Fed should be managing collateral rates all through the leverage cycle, but especially in the ebullient stage and the crisis stage.

The use of collateral and leverage is widespread. A homeowner (or a big investment bank or hedge fund) can often spend \$20 of his own cash to buy an asset like a house for \$100 by taking out a loan for the remaining \$80 using the house as collateral. In that case we say that the margin or haircut is 20%, the loan to value is  $\$80/\$100 = 80\%$ , and the collateral rate is  $\$100/\$80$  or 125%. The leverage is the reciprocal of the margin, namely the ratio of the asset value to the cash needed to purchase it, or  $\$100/\$20 = 5$ . All of these *ratios* are different ways of saying the same thing.

In standard economic theory, the equilibrium of supply and demand determines the interest rate on loans. But in real life, when somebody takes out a loan, he must negotiate two things: the interest rate, and the collateral rate. A proper theory of economic equilibrium must explain both. Standard economic theory has not really come to grips with this problem for the simple reason that it seems intractable: how can one supply equals demand equation for a loan determine two variables, the interest rate and the collateral rate? There is not enough space to explain the resolution of this puzzle here, but suffice it to say that the common sense conclusion that supply and demand does also determine collateral rates is true.

A second critical insight is that for many assets there is a class of natural buyers or optimists who are willing to pay much more than the rest of the public. They may be more expert in the intricacies of the assets than the public, and they may know better how to hedge their exposure to the assets. They may simply be more risk tolerant. If they can get their hands on more money through borrowing, they will spend it on the assets and drive those asset prices up. If they lose wealth, or lose the ability to borrow, they will be able to buy less of the asset, and the asset will fall into more pessimistic hands and be valued less.

It is well known that a reduction in interest rates will increase the prices of assets like houses. It is less appreciated, but more obviously true, that a reduction in margins will

raise asset prices. Conversely, if margins go up, asset prices will fall. A potential homeowner who two years ago could buy a house by putting 5% cash down might find it unaffordable to buy now that he has to put 25% cash down, even if the Fed managed to reduce mortgage interest rates by 1% or 2%. This has diminished the demand for housing, and therefore housing prices. What applies to housing applies much more to the esoteric assets traded on Wall Street (such as the mortgage investments targeted by the Treasury), where the margins (i.e. leverage) can vary much more radically.

Economists and the Fed ask themselves every day whether the economy is picking the right interest rates. But one can also ask the question whether the economy is picking out the right equilibrium margins. At both ends of the leverage cycle, it does not. In ebullient times the equilibrium collateral rate is too loose, that is equilibrium leverage is too high. In bad times equilibrium leverage is too low. As a result, in normal times asset prices are too high, and in crisis times they plummet too low. This is the leverage cycle.

The policy implication of the leverage cycle is that the fed should manage system wide leverage, curtailing leverage in normal or ebullient times, and propping up leverage in anxious times, and especially in a crisis.

The leverage cycle is no accident, but a self-reinforcing dynamic. In ebullient times competition drives leverage higher and higher. For example, an investor comes to a hedge fund and says “the fund down the block is getting higher returns.” The fund manager counters that the competitor is just using more leverage. The investor responds, “well whatever he's doing, he's getting higher returns.” Most important, with markets stable and the horizon looking clear, lenders are happy to reduce margins and provide more cash. Pretty soon both funds are leveraging more. Housing prices rise in the same way. When some families borrow a lot of money to buy their houses, even conservative homeowners are forced to borrow and leverage so they too can live in suitable houses.

Declining margins, or equivalently increasing leverage, are a consequence of the happy coincidence of universal good news and the absence of danger on the horizon. Good, safe news events by themselves tend to make asset prices rise. But they also encourage declining margins which in turn cause the massive borrowing that inflates asset prices still more.

Similarly, when the news is bad, asset prices tend to fall on the news alone. But the prices often fall further if the margins are tightened.

Sudden and dramatic increases in margins are relatively rare. They seem to happen once or twice a decade. Bad news arrives much more often than that, so it is not bad or even very bad news alone that drastically raises margins. Bad news lowers expectations, and like all news usually clarifies the situation.

Every now and then, however, bad news increases uncertainty and disagreement about the future. It is this scary kind of bad news that increases margins. For example, two years ago people disagreed whether losses from defaults on prime mortgages would be

1/4% or 1/2%, and whether losses on subprime mortgages would be 1% or 5%. Now after the scary news of the last year, people disagree about whether some subprime losses will be 30% or 80%. Even from their current low prices, many lenders are afraid the assets could lose all their value.

The upshot of the increased uncertainty and disagreement is that margins go up drastically. The lenders are typically more pessimistic than the buyers. Otherwise they too would be buying, instead of lending. Even if the optimists are not much worried about more losses, the lenders are, and they will demand high margins. When the lenders are worried about 80% losses from current levels, they will lend only if margins are at least 90%, or not lend at all.

As we are seeing again today, the rapid increase in margins always comes at the worst possible time. Buyers who were allowed to massively leverage their purchases with borrowed money are forced to sell. But when margins rise dramatically, more modestly leveraged buyers are also forced to sell. Tightening margins themselves force prices to fall. We enter the crisis stage I discuss below.

The dynamic of the leverage cycle cannot be stopped by a tongue lashing of greedy Wall Street investors or over-ambitious homeowners in the ebullient stage of the cycle, or by exhortations not to panic in the crisis stage. The cycle emerges even if (in fact precisely because) every agent is acting rationally from his individual point of view. It is analogous to a prisoner's dilemma, where individual rationality leads to collective disaster. The government must intervene. And the intervention becomes all the more necessary if agents are also prone to short-sighted greed and panic.

The observation that collateral rates are even more important outcomes of supply and demand than interest rates, and even more in need of regulation, was made over 400 years ago. In the Merchant of Venice, Shakespeare explained that to take out a loan one had to negotiate both the interest rate and the collateral level. It is clear which of the two Shakespeare thought was the more important. Who can remember the interest rate Shylock charged Antonio? But everybody remembers the pound of flesh that Shylock and Antonio agreed on as collateral. The upshot of the play, moreover, is that the regulatory authority (the court) intervenes and decrees a new collateral level very different from what Shylock and Antonio wanted: a pound of flesh, but not a drop of blood. The Fed too should sometimes decree different collateral levels (before the fact, not after the fact as in Shakespeare).

### **The crisis stage**

The crisis stage of the leverage cycle always seems to unfold in the same way. First there is the bad news. That causes asset prices to fall based on worse fundamentals. Those price declines create losses for the most optimistic buyers, precisely because they are typically the most leveraged. They are forced to sell off assets to meet their margin restrictions, even when the margins stay the same. Those forced sales cause asset prices to fall further, which makes leveraged buyers lose more. Some of them go bankrupt. But

this loss spiral typically seems to stabilize. Then it becomes apparent that there is widespread uncertainty and disagreement about what will happen next; suddenly the lenders increase the margins. This is the fatal blow. Then even modestly leveraged buyers are forced to sell, and the prices plummet. The assets eventually make their way into the hands of the public that will take them only at rock bottom prices.

During a crisis, margins can increase by 50% overnight, and by more over a few days or months. New homeowners might be unable to buy, and old homeowners might similarly be unable to refinance even if the interest rates are lowered. But at least they do not have to put up more cash. For Wall Street firms the situation is more dire. They often borrow for one day at a time. If the next day the margins double, then they have to double the amount of cash they hold for the same assets. If they don't have all that cash on hand, they will have to sell the assets. This is called de-leveraging.

All this would happen even if traders were completely rational, processing information dispassionately. When we add the possibility of panic and the turmoil created by more and more bankruptcies, it is not surprising to see lending completely dry up.

The crisis stage of every leverage cycle is bad. But the current crisis is far worse than the crises we saw in the two previous leverage cycles. In the graph at the end of the paper one can see the margins faced by one hedge fund over the last 11 years, including the crisis stage in 1998 of the previous cycle. Note that the spike in margins has lasted for nearly one year, whereas in 1998 it was all over in two months.

The most dramatic change in margins has come from assets that were rated AAA, and which now are downgraded, or are about to be downgraded. Previously one could borrow 90 or even 97 cents on a dollar's worth of AAA assets, and now one cannot borrow anything at all using many of these assets as collateral. According to Moody's, AAAs are supposed to have a 1 in 10,000 risk of default over a 10 year period. We are now seeing over 50% of all Alt-A and subprime AAAs partially defaulting, and we will see virtually 100% of all CDO AAAs partially default. Even when some assets have little or no chance of losing more than a few percent of their value, the market no longer trusts the AAA rating, and lenders will not lend even one percent of their current price.

There are a number of reasons why this cycle is worse than all previous cycles after the Depression.

First, the mildness and shortness of the crisis stage of the last two cycles led many people, perhaps including the regulators, to ignore the phenomenon altogether. The abrupt tightening of margins in 1998 was explained by the irrationality of lenders, who reacted after the fact to a fall in prices. It appears that virtually no lenders lost money on loans against mortgage securities in that crisis. The run-up in asset prices and home prices during the current cycle was attributed mostly to irrational exuberance, instead of being regarded mostly as an inevitable consequence of the increase in leverage.

Second, leverage on houses got to be much higher this time. In the past year many homeowners were borrowing with basically no money down, or 5% down. New mortgages like option arms were invented which also permitted homeowners to get to near zero equity.

Third, many new kinds of assets became usable as collateral. Even if margins had not declined on old collateral, the leverage of the economy as a whole increased because there was more borrowing on previously unusable collateral.

The process of pooling and securitization has been a crucial source of new collateral and increased leverage. Imagine a single subprime mortgage loan. Even in the days when it was believed that the expected loss from such a mortgage was between 1% and 4%, people still recognized that there was a non-trivial chance of a much bigger loss on a single loan. Pessimistic lenders would not have considered lending using a single subprime mortgage as collateral. But now consider a pool of subprime mortgages from around the country. If one believed that the loans were independent, so that a housing price decline in Detroit did not imply a housing price decline in California, then on a big enough pool of loans, the chance for more than 30% defaults might be considered less than 1 in 10,000. Even a very pessimistic lender who believed in a 4% expected loss per loan would be willing to lend 70% of the value of the entire pool, provided that he got paid before anyone else. Thus a buyer of the pool of mortgages could imagine borrowing 70% of their collective value, when it was impossible before to borrow anything on the individual loans.

Securitization took this borrowing on pools one step further by converting the loans into long term loans. The underwriter of the pool typically issued different bonds, whose payments depended on the homeowners' payments on their loans. Consider for example a bond structure with just two "tranches" or bonds. The senior tranche might pay interest slightly above the riskless government rate on the best 70% of the loans. As long as losses on the pool are below 30%, the senior tranche holder continues to get paid his interest and eventually his principal. The junior bondholder receives what is left from the pool after the senior bond holder is paid. The whole securitized structure can be interpreted as if the buyer of the junior piece actually bought the whole pool, using a long term loan from the buyer of the senior piece, collateralized by the whole pool. The rapid spread of securitization over the last 30 years, but especially over the last 10 years, dramatically increased the leverage in the system.

Fourth, the leverage on the old assets increased to more than the highs from the previous cycle. One reason for this is that the long lull since the previous leverage crisis included a period of especially low volatility, which has led margins to sink lower and lower. That can be seen in the history of Ellington margins (haircuts) in the iA second reason is that Fannie Mae and Freddie Mac grew bigger and bigger. The presumed government guarantee on their promises enabled them to leverage their assets to 30 or more.

Fifth, the current cycle is really a double leverage cycle: not only are the mortgage securities subject to the leverage cycle, but their ‘fundamental’ cash flows (namely homeowner mortgage payments) are also subject to the leverage cycle. The same may have been true in 1998. But in 1994 the shock to payoffs stemmed from a sharp move in interest rates, which was created by moves of the Fed, not evidently connected to changes in margins.

Sixth, the current cycle has been more violent because of the creation of the derivative credit default swap (CDS) market, which is a kind of insurance market for bond defaults. Suppose a homeowner default of \$1 leads to a loss of capital of \$1 in some BBB bond. The CDS losses could be much more, because one company might have agreed in the CDS market to pay another company \$4 for every \$1 somebody else lost on the BBB security. In theory these CDS insurance losses would just be balanced by the insurance recipient’s gain, so there is no increase in net losses. But there can be a tremendous magnification of gross losses by firms making bad bets.

As bad as the gross size of the losses in CDS is the fact that these gains and losses are not netted. So a firm F that was neutral, betting one way against firm A on tranche BBB, and betting the opposite way on the same tranche against firm B could come out a loser anyway. If firm A defaults then F will be unpaid by A but still on the hook for paying B. This risk, which naturally greatly increases as a crisis draws near, makes CDS price discovery difficult.

There is a further problem with CDS that I will discuss at the end.

Seventh, the expansion of the mortgage market into less credit worthy households made it more likely that a shock would someday be big and bad and scary, creating more uncertainty and more disagreement. This danger was dramatically exacerbated by a foolish faith many investors put into the rating agencies. The investors forgot the incentives the rating agencies faced. In the face of a long history of low defaults, and with billions of dollars of deals waiting on their blessing, it would have been astonishing if their ratings had been as tough as it is now clear they should have been. The same lesson applies to the mortgage brokers who were able to collect fees for signing up borrowers without facing any losses themselves if the borrowers defaulted.

### **The Solution to the Crisis: A Multi-Pronged Approach**

Once the economy is plunged into circumstances as dangerous as today's, the government has no choice but to act boldly. The correct course of action is to reverse the final stages of the crisis as we said earlier, and to stop the panic.

Suppose the original asset prices were 100 before the bad phase of the cycle. In the absence of the leverage cycle, bad news might reduce their price to 80. The effects of the leverage cycle might be to further reduce the prices to 40. By undoing the effects of the leverage cycle, the government can bring security prices back to 80.

First the government has to announce what its goals are, and what its comprehensive plan is. If that is believed by the public, the panic should subside and the price should rise to 50 even before the concrete actions are implemented. Unfortunately, the government's first bailout plan was not transparent, and not clearly thought through; the public did not believe in it, and prices fell further.

Next the government must simultaneously push forward on the multi-pronged approach I summarized earlier and will shortly describe in detail.

In prong one the government should do something for housing prices and homeowners. The biggest social losses come from the displaced homeowners. The biggest reason for the tumbling mortgage security prices is fear that housing prices will keep falling. By ameliorating the margin problem for the homeowners the government can stabilize housing prices. This should bring mortgage security prices up to 60.

The second prong involves the government restoring more permissive margins at the security level. That should bring the security prices back to 70.

The third prong involves the government putting more optimistic capital back into the system, by bailing out individual firms with firm specific transfers of cash, in exchange for their stock. If individual bailouts are not enough, the government might want to put still more of the optimistic capital that was lost by the leveraged investors back into the system by directly buying securities. This is the stage the government bailout plan has concentrated on. It is the most difficult to implement, and the riskiest. But after the other moves, it could bring prices back to 80, or even higher.

### **Government goals**

Who or what is the government trying to save? Is it trying to keep homeowners in their houses? Is it trying to prop up housing prices? Is it trying to save holders of mortgage loans and mortgage securities from bankruptcy? Is it trying to prop up the value of mortgage securities? Is it trying to prop up the value of mortgage insurance (called CDS)? Is it trying to save the writers of mortgage insurance?

Keeping homeowners in their houses and stabilizing housing prices are the two clearest, least controversial goals. Moreover, achieving them will necessarily go some distance, albeit perhaps not far or fast enough by themselves, to achieve all the other potential goals I have stated. But, given the severity of the crisis and the fact that panic in the mortgage securities markets still threatens major financial institutions whose serial failure would create more panic, the second two goals: heading off some bankruptcies of financial institutions and propping up the value of mortgage securities are important too. On the other hand, propping up huge bets (CDS) that sometimes represent four times or more the value of the underlying assets does not seem warranted or wise. This gambling by Wall Street should, as I explain below, be prohibited, not encouraged or supported, so an important part of my plan for a solution includes the government making clear that any asset buying program will not include these instruments. Netting these contracts

through a central clearing house, and placing limits on their size, will make them much more transparent in the future.

### **A Floor to Housing Prices**

The government undoubtedly gets the biggest bang for its buck by spending money to stabilize housing prices. If housing prices held firm, homeowners would have a bigger incentive to make their payments. That would keep them in their homes. Second, firm housing prices would staunch the losses on mortgage securities even if there were foreclosures. Third, once there is a floor to housing prices, pessimistic lenders would be relieved of the disaster scenario for many mortgage securities, and margins on mortgage securities would come tumbling down, enabling optimistic buyers to purchase them using leverage, pushing up the price of mortgage securities.

Fourth, the leverage cycle is less severe for housing than for mortgage securities, since home buyers generally lock in their loans and leverage for 30 years. Only new buyers of homes, and those who want to change homes or are forced out of their current homes in foreclosures, need to confront the tougher margins. New home buyers must now make a 25% downpayment on their homes, whereas two years ago they could buy making a 5% downpayment. But old buyers sitting in their homes cannot be forced to put more money down. By contrast, almost all mortgage security holders who borrowed have found that they now face tougher margin requirements that require putting more money down. They are fewer homes in play than there are mortgage securities.

The toughening margins have affected housing prices, because many homeowners can no longer put up the cash payment needed to buy new homes. The government could stimulate demand for new purchases, and also mitigate the margin problem, by offering to buy a 20% equity stake in any new home purchase (under some maximum price, as with agency conforming loans). Thus suppose a house is purchased for \$100. The government pays \$20 and gets a 20% equity piece, which it collects whenever the homeowner sells. If down the line the house sells for \$200, the government gets \$40. The government is thus earning the home price appreciation on its piece, without having to bear the expense of maintaining the house. The homeowner gains because he gets to live in the whole house while paying for only 80% of it. If the home buyer needs a loan to get the house, the government equity piece reduces the downpayment the buyer must make, and the ongoing mortgage payments he must make. And if we make the equity piece the second loss piece, it leaves the lenders in a very, very safe position, encouraging lending. In effect it lowers the margin to the borrower, and raises the margin of safety to the lender. Here is how it works.

Under this plan the home buyer who wanted a loan to purchase the house would be allowed to borrow at most 80% of the \$80 of the house he bought, or \$64. He would have to put up  $20\% \times \$80 = \$16$  of his own cash. The homeowner would have a big incentive to make his payments. If he walks away from his debt, he can save \$64, but he has to give up living in a \$100 house on which he had an \$80 ownership share. But if the borrower does default, and if the lender has to foreclose, the lender would be able to

collect his debt out of the house sale proceeds ahead of the government equity piece. The government would collect next, and lastly the buyer would get any left over cash. If the house sold in foreclosure for \$82, the lender would get his \$64, the government would get \$18, and the homeowner nothing. The effective margin for the homeowner is thus 16% on the asset price of \$100, but the margin of safety for the lender is 36%. This should make the lender feel very safe and encourage lending on mortgages. The homeowner's downpayment of 16% on the total home price is about 3/5 of the 25% downpayment that lenders are demanding now. On top of that, the new buyer's mortgage payments would be 20% lower than before, because he would be paying on a loan of \$64 instead of \$80.

Last year there were 5.5 million new home purchases, down from a high of 7 million. Even if the government had to buy the equity in the whole 7 million, at an average price of \$200,000, it would cost \$280 billion. But the government would own equity, and be protected by the homeowner's downpayment. Housing prices would need to fall another 16% before the government lost equity value. As housing prices stabilized, the government would gradually phase out the program over the next year.

A smaller version of the same plan might accomplish nearly as much. Simply restrict the government equity plan to home buyers who do not currently live in houses.

Many people have suggested that the government put equity into the markets to make up for the losses. They typically mean at the firm level. But for the three reasons mentioned above, putting the equity into the houses seems like the best bang for the buck. And hopefully housing prices would stabilize, and the government actually would not be spending anything in the long run.

### **Saving the Homeowners**

One of the saddest stories in this financial meltdown is that homeowners are being thrown out of their homes for defaulting on their mortgages. One reason this has happened, as I said, is that increasing margins have kept homeowners from refinancing and have also contributed to the fall in home prices, reducing the incentives of homeowners to pay.

Throwing somebody out of his home is tragic for the homeowner, but also very expensive for the lender. The markets are anticipating very bad recoveries for the lenders from forced home sales in a year or so, when there will be a torrent of evicted homeowners further depressing housing prices. Nobody gains when the homeowners are thrown out and the lenders don't recover the money anyway.

Tougher margins have also caused losses. Many subprime borrowers who normally would have refinanced at the end of their second or third year, just before their rates reset to higher levels, have been unable to do so because they could not afford to put the extra money down required by the higher margins. And as we saw, the falling housing prices,

due in no small part to the tightening lending, has reduced the incentive of homeowners to fight to save their homes.

In a rational world, this would never happen. The lenders would renegotiate the loans so the homeowners could pay less and stay in their homes, and the lenders would actually get more by avoiding the losses from legal fees and bad home price sales. That would have the further benefit of keeping many homes off the market and stabilizing home prices, as discussed above.

The renegotiation of loans is not happening, at least not nearly fast enough. In the case of subprime borrowers, many of the loans have been pooled in a trust, and their principal has been tranching into many different bonds, each held by a different investor. The lenders are the bondholders, but they do not have the legal right to talk to the homeowners. That legal right to make modifications has been passed on to the master servicers, who are supposed to act in the interests of the bondholders in the trust. This arrangement has at least three major problems.

First, modifying loans is a time consuming and expensive operation. The servicers who have the legal right to make modifications do not get paid directly for improving the cash flows to loans. It is generally cheaper for them to move into foreclosure.

Second, modifying the loans has different effects on different bondholders. It has proved difficult to modify loans in a way that pleases everyone. The servicers are terrified of lawsuits from the bondholders if their modifications help most bondholders but hurt others.

Third, the servicers often (through their parent companies) own some of the bonds in the trust themselves, or their counterparties own those bonds, or the CDS written on those bonds. They have a direct interest in making modifications, or more likely, no modifications, in order to benefit their own bonds.

In the case of the next highest category of Alt A Option Arms, the lenders might be a single bank, but the bank has been unwilling to modify the loans because then it would have to recognize the loss on its books.

The government has a remarkable opportunity to clean up the process of reworking loans. I suggest (see my proposal with Susan Koniak on the blind trustee) that the government take the reworking process out of the hands of the servicers and put the decision into the hands of government hired trustees. The trustees would be told only about the homeowners, and would be blind to the bonds lying above the loans. Their job would be to choose modifications or foreclosure, whichever they judged would lead to higher payments. They would thus be carrying out the duties of the servicers exactly as they were intended, but free from the conflicts of interest and perverse incentives which has prevented the servicers from carrying out their mission.

If the government handled this correctly, most homeowners who were unable to pay the original loan but were willing and able to pay a modestly lesser amount would get to stay in their homes, the bondholders collectively would get more payments than they are currently expecting (though some tranches would be hurt), and the government would not have to invest any capital. Furthermore, the ongoing mortgage payments would be at fixed rates, and the looming problem of resetting mortgage rates would be fixed once and for all. Some of the lenders would need to recognize the losses on their books, and possibly go out of business. We shall come to them later. For the loans that have been securitized, such as the subprime loans, these losses have already been recognized.

### **A Fed Lending Facility**

The most immediate step the Fed could take is to lend money using the targeted securities as collateral. To do this the Fed does not have to choose what prices to pay, as the government would have to if the Treasury directly bought securities. Restoring leverage is the thematic solution to the leverage cycle crisis. It is not some stop gap band aid invented only under the pressures of the moment. Lending puts taxpayer money at far less risk than buying. Every dollar the government lends using the targeted assets as collateral will necessarily be matched by money the investor spends on those assets. The government can say its money is being leveraged. The investors who avail themselves of the government lending will still have their money at risk. Because these investors will do the buying, and not the government, there is no chance that this action will push prices to outrageous levels and enrich undeserving sellers.

The Fed has boldly gone a long way in this direction, further than any previous Fed. But it has not been enough. First, it should extend lending on more kinds of collateral. As more and more mortgage securities get downgraded below investment grade status, they lose their ability to be used as collateral. Lending against the most toxic securities is actually necessary to maintain their value. Second, the Fed needs to lend directly to more people. In theory the Fed could lend only to a few banks, who would turn around and relend to everyone else. But the investment banks are nervous about showing too much lending on their books, and so the Fed must reach out directly to more borrowers.

The mechanics of such a massive lending program would require some careful thought, but nothing compared to the difficulties of directly buying. The Fed could simply announce that any arm's length buyer of any designated security could, at the moment of purchase, take that security to the Fed and receive a 5-year loan of 50% of the price in exchange for putting the security up as collateral. The Fed would not need to price the security itself. The market would be doing the pricing. With a 50% margin, the government money is still quite safe. Remember, the 50% loan is against the price the securities will be traded at, not against the original price. The government could make the loans safer still by monitoring prices and periodically demanding more cash from the borrower to maintain its 50% margin. Monitoring the collateral price is a much easier job than deciding the price to buy, since there is a 50% margin of error: the price monitoring only has to be half right. If the government wished, it could even charge a slightly higher interest rate than it does today, thereby potentially making a profit for taxpayers.

Buyers would then be able to purchase securities using only half the cash they need to put up now. Aside from allowing their own cash to go further, it allows investors to earn leveraged returns. If they think the security trading for 50 might only rise to 55 in the near future, they can buy it with 25 down and earn a return of 20% when it rises to 55 instead of a return of 10%.

The government could even arrange all this lending without having to come up with the money. The government could loan slightly less, say 40%, and give up the right to make margin calls. This loan could then be securitized and guaranteed by the government, and then sold off to the private sector. With the government guarantee, the money would easily be raised. Of course, on some securities the government might be able to lend much more than 40% and still regard the money as safe.

Competition among buyers who can earn leveraged returns should bring the prices in our hypothetical example back to 70.

### **Restoring Optimistic Capital**

Lending will not by itself bring the prices back to their old levels. The most optimistic buyers, unfortunately including some of the biggest and most prominent financial institutions in America, have irretrievably lost a huge amount of capital. Not only is their capital no longer available to spend on these securities, but so has the money they borrowed to spend on these securities also disappeared.

If the government wants to bring the prices back above the 70 that we just saw could be achieved by lending, it has to find some more optimistic capital. The easiest way to do that would be to sell stock in optimistic American companies to foreigners. That started a while back, but the foreigners saw that they were losing money and stopped investing.

The next most obvious thing the government could do is to inject money and new management into failing firms in exchange for their stock. That way the firms continue to function as optimistic buyers and their workers do not need to be fired, but the old management team is fired and shareholders are punished for their poor judgment by losing their equity. In many cases they would lose all their equity.

### **Bailouts with Punishment**

It is likely that even after the lending facility is established, and capital is injected into the system, many firms will still fail. In general that is what we should want. The financial system has become bloated by the artificially high prices maintained by the excess leverage from the ebullient stage of the leverage cycle. Too many people were drawn into the financial sector by the resultant artificial profits. Failures will remove many of these excesses.

However, some firms the government does not want to see fail may still go down. For these firms the Treasury can continue its case by case rescue operations. The shareholders will have to give up their shares and the bondholders might lose all their value, and new management can be put in place.

Many of these failures will be banks who are currently holding individual loans that they are internally marking at 40 points higher than they are actually worth. Raising the price of securities to what they are worth will not save these banks. Perhaps one example of such a bank was Washington Mutual, which went bankrupt recently.

### **Government Purchases of Assets**

The government could buy mortgage securities itself. In effect the Treasury would take conservative and pessimistic taxpayers' money, that would never be invested in these securities, and invest it precisely there. This appears to be the plan that is getting the most attention in Washington.

This policy, however, must be undertaken with great care, because it is the riskiest and the most difficult to implement. On the good side, security prices are terribly depressed, so the government might be making some good investments. It is likely that the general taxpayer is too conservative, and by transforming pessimistic capital into optimistic capital, the government might even be directly helping the taxpayer, while at the same time staunching the collapse of security prices.

But caution must be the watchword. The lending mentioned earlier will probably raise security prices, so the government purchases will not be at rock bottom prices. Private investors, knowing that the government will be buying, will rush to buy first, reducing potential government profits. Of course that is what the Treasury hopes will happen, because it will then more quickly raise security prices.

The biggest obstacle is deciding what to buy, and at what price. Since the distressed mortgages are very heterogeneous, it is not at all clear how the government acting alone could figure out what prices to pay. Indiscriminately buying assets at a fixed percentage premium over the internal prices given to the assets by the firms that hold them is a terrible idea. It rewards the firms with the largest number of bad assets and especially those with the most distorted internal prices. But how else could the government decide what to buy, and at what prices?

One suggestion is by reverse auction. The government would divide the securities into different categories, and then buy those securities from each category that the current asset holders are willing to sell for the lowest price. But how will the government decide what the categories are, and how much to spend on each? The lobbying in Washington promises to be intense. And worse than that, it is a sure thing that the cheapest securities the government gets in each category will be of the lowest quality. If the purchases are to be made by an auction mechanism, I would suggest a variation in which private bidders are allowed to enter the auction, not just private sellers. The government would commit

to buying half the winners' purchases, at their winning prices. That way the government can ride on the expertise of the private buyers.

The dangers of government buying look so profound that it would seem better for the government to invest through professional money managers. The money managers would buy the securities, like they do for their other clients, and be rewarded for how well those securities perform. The government could take advantage of its enormous size and a patriotic sense of duty to negotiate small fees for the managers. Of course it is absolutely crucial that the managers have incentives to perform well. Otherwise they might be tempted to spend the taxpayers' money buying portfolios sold by the failing companies of their cronies.

One way to provide incentives would be to make the investments and returns of these companies very public. These managers would be competing with each other on a world stage to see how their investments performed. A more conventional incentive device would be to say that a manager gets no fees until the return on the assets passes some hurdle. Only after the tax payers make money would the managers earn any fees.

There is, however, yet another problem the government will have once it holds a large portfolio of mortgage securities. The public might well see its investment losing money. By modifying loans and so on the government could have a big effect on its portfolio value. Other investors would then constantly need to gauge the government's intentions, and this might introduce more uncertainty into security prices.

For these reasons, and because it will have a smaller effect, the capital injection route is less valuable than the lending route. On the positive side, at least it is also a thematic response to the leverage cycle. The loss of capital by the leveraged optimists definitely lowers the price of assets, at least in the short run.

The replacement of the optimistic capital, on top of the leverage facility, should bring back the price in our hypothetical scenario to 80. Prices higher than that distort the economy and simply enrich the owners of companies that made financial blunders. However, a price of 80 is still a big loss and still means that many companies will go under.

### **Moral Hazard**

It is often said that every bailout causes a moral hazard which leads to a bigger problem the next time. The problem would be that bailing people out in this crisis would lead to higher leverage in the next cycle. There really is only one reliable antidote to that, and that is regulation of leverage.

One observation, however, which I have made with Felix Kubler (and which Jeremy Stein has apparently independently come to), is that that bailouts are not always counterproductive in the long run. Surviving a crisis means tremendous profit opportunities in the good phase of the next cycle. If a bailout gives a chance for the

prudent firms to survive, rather than all going under, then firms will have increased incentive to be prudent.

### **Managing the Ebullient Stage of the Leverage Cycle**

The first step is to monitor leverage. Every newspaper prints the interest rates every day, but none of them mentions what margins are. The Fed needs to settle on a menu of different haircuts, and monitor them daily, and make them public.

The leverage of money managers should also be public.

The mere transparency of these numbers should bring a great deal of discipline to the market, and warn investors of impending trouble. Attached is a history of haircuts faced by the hedge firm Ellington Capital Management over the last 11 years, including the end of the 1998 leverage cycle and this leverage cycle. One can see the tremendous spikes during the crisis stages of the last two cycles. One can also see a drift down in haircuts in the ebullient stage of the last cycle.

Some investors will not curtail their leverage, no matter how much the public scrutiny, and how far out of line with recent practice they become. It is imperative that the Fed limit this behavior. Limits need to be put on leverage. There are two basic externalities. First the manager of the borrowing fund typically does not fully internalize the costs to society (especially to his own workers) that his bankruptcy will cause. Second, that manager almost surely does not internalize the fact that his recklessness makes it more likely that another firm will go bankrupt, because when he is forced to sell it will make for greater losses at other leveraged firms.

Many people have argued that setting margin limits is difficult, since the securities are so heterogeneous. But I believe this problem will be solved once the haircut data history becomes more public.

A third critical step is to reform the CDS markets. There needs to be a central clearing house, so that losses are netted. I have already observed the chaos that comes from not knowing whether your counterparty is defaulting or not. A more general point is that complexity always increases markedly in the crisis stage of the cycle. Securities that some people can understand and trade in the ebullient or normal phases of the cycle become incomprehensible in the crisis stage. These must be monitored and discouraged.

Even more important for the CDS market should be a limit on the size of the CDS positions people hold. In theory rational agents should be allowed to make bets of arbitrary size on exogenous events. But the CDS events are far from exogenous. Consider a credit default swap for a trillion dollars on a corporate bond promising a billion dollars. The writer of the insurance has every incentive to buy the whole failing corporation and pay off its bond holders for one billion dollars rather than pay the trillion dollars of default insurance. Thus the holders of insurance can never be sure they will get their money.

There should be a prohibition against writing insurance for more than the underlying promise, and also a prohibition against holding more insurance than the underlying promise.

