

Oliver Hart and Luigi Zingales

November 2009

### **How to Avoid a New Financial Crisis**

Suppose you are woken up in the middle of the night by a police officer telling you that your teenage son is at the hospital in an alcohol-induced coma. You are shocked and start to search for reasons. You blame his friends and their wild parties. You blame the bar tender who broke the law and served alcohol to a minor. You blame the latest sweet cocktails which disguise alcohol content and get people drunk quickly. You blame your spouse, who gives him too much freedom. You blame the greedy alcohol industry that is profiting from your son's pain. You even blame the media for making the attraction of alcohol transparent.

Certainly all these players share some blame. But, if your son is an alcoholic, playing the blame game distracts you from the real problem and from your own responsibilities. You ignored many of the early warning signs, and contributed to the problem by being too complacent and too eager to believe your son every time he came up with an excuse.

The alcoholic son is the financial industry. It's not addicted to alcohol, but to risk. The country received the wake-up call last fall. But since then it has blamed the wild parties (the housing bubble), the bar tender who broke the law (the mortgage brokers with their liar loans), the deceptive latest cocktails (the new derivatives), the permissive spouse (deregulation), greed (excessive executive compensation), and even transparency (the new accounting rules that require mark to market). While all these factors have contributed to the problem, they are not the fundamental cause, and fixing them alone will not avoid more crises down the road.

What really caused the 2008 crisis and will create more crises in the future are the financial industry's distorted incentives. The easiest way to make money on Wall Street is by borrowing and taking on a lot of risk. Either you are lucky and you make a bundle or you are unlucky and you walk away. In other situations, this opportunistic behavior is controlled by creditors, who impose covenants and monitor borrowers. But why bother to monitor if the government is going to bail out the ruined gamblers? Then, loans are profitable for borrowers and lenders alike, albeit disastrous from the point of view of society--the taxpayer.

This bias toward excessive risk taking is not (just) the result of bad executive pay practices: shareholders love it too. So aligning managers' incentives with those of shareholders will not fix the problem. In fact, it will exacerbate it.

The implicit policy of bailing out large financial institutions –known in the jargon as “too big to fail” (TBIF) –will become explicit government policy if the current administration's reforms are approved. Neil Barofsky, special inspector general of Treasury's Troubled Asset Relief Program, responding to a question about whether the situation has improved since last year, said : “I think actually what's changed is in the other direction. These banks that were too big to fail are now bigger. Government has sponsored and supported several mergers that made them larger. And that guaranteed that implicit guarantee of moral hazard. The idea that the government is not going to let these banks fail, which was implicit a year ago, it's now explicit.”<sup>1</sup>

### *The Costs of a Too Big To Fail Policy*

In the absence of offsetting regulation, the TBTF policy is going to cost us dearly by encouraging risky activity. In fact its negative consequences are already visible. As a recent study shows, large banks, which before the crisis could borrow at 29 basis points below the rate of small banks, can borrow today at 78 basis points below.<sup>2</sup> This 49 bps reduction in the spread is the market estimate of the benefit of the implicit insurance offered to large banks by the TBTF policy. For the 18 bank holding companies with more than \$100 billion in assets, the 49 bps advantage corresponds to a \$34.1 billion subsidy a year.<sup>3</sup> For many years the U.S. government extended implicit insurance to Fannie Mae and Freddie Mac, the large mortgage agencies. In 2008 the Government was forced to back that guarantee. The same is likely to happen with large banks in the future.

This subsidy to large banks distorts the market place by hampering the small banks' ability to compete. The result is more bank concentration, which will further increase the market power of banks at the expenses of depositors and borrowers. The distortion of competition in

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<sup>1</sup> Gretchen Morgenson, “Wall Street Follies: The Next Act”, *New York Times*, October 24, 2009.

<sup>2</sup> Baker, D. and T. McArthur, 2009, “The Value of the ‘Too Big to Fail’ ”, [www.cepr.net](http://www.cepr.net)

<sup>3</sup> Baker, D. and T. McArthur, 2009, “The Value of the ‘Too Big to Fail’ ”, [www.cepr.net](http://www.cepr.net)

favor of large banks also increases the number and size of the banks that will need to be rescued in the future. If in 1998 the Fed only had to coordinate the rescue of Long Term Capital Management, while in 2008 the government had to spend \$700bn to save the financial sector, what will the bill be in 2018?

### *The Origins of This Problem*

If the TBTF policy is so bad, why don't we pass a law that says that the government cannot intervene and save a bank or other large financial institution under any circumstances? The simple answer is that this strategy is unlikely to work. As parents we can proclaim that we are not going to get our children out of trouble. But when our children's lives are in danger, there is no promise that can stop us from intervening and rescuing them. Rationally anticipating parental behavior, the kids will take on too much risk. In economists' jargon this problem is called time inconsistency.<sup>4</sup> Before the kids get into trouble we as parents have every incentive to appear tough and determined not to rescue them, but when the real danger arrives we have no ability to resist an intervention. How many times have we heard policymakers and others say: "Let's worry about the crisis today and about incentives later"? That is exactly the time inconsistency problem.<sup>5</sup>

This problem is not dissimilar from the one governments face vis-à-vis inflation. Every government would like to commit to a low rate of inflation. But when it comes time to raise interest rates to choke off inflation, causing the economy to slow down and unemployment to rise, most governments, if they have full control of monetary policy, will cave in and not raise rates. This is the reason monetary policy has been delegated to central banks, increasingly independent of governments. Would the same strategy work for the TBTF policy?

Unlikely. Monetary policy is set every day. A central banker can quickly acquire a reputation which she can use to lean against the political wind in more difficult moments. Furthermore, monetary policy is made of small incremental decisions. The choice is never between a 5 percentage point increase in rates that would double unemployment overnight and doing nothing. The small incremental steps mitigate the cost and the political pressure to

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<sup>4</sup> See Kydland, F. E., Prescott, E. C. (1977) "Rules Rather Than Discretion - Inconsistency of Optimal Plans", *Journal of Political Economy* 85 (3), 473-491.

<sup>5</sup> One could try to circumvent the time inconsistency problem by passing a constitutional amendment that prohibits the rescue of a large financial institution. This might be too rigid, however; see below.

intervene. Finally, when it comes to raising interest rates the winners and losers are widespread. While banks generally lose out, there are other financial institutions that may benefit.

None of these conditions apply to banking crises. First, banking crises are a relatively rare phenomenon (roughly every 7 to 10 years). In the United States, an administration is almost guaranteed not to be around to face the next one. Even a central banker is unlikely to face it twice. Thus, there are no personal incentives to build credibility. Quite the contrary, all the incentives are in the direction of “never on my watch”. No central bank governor wants to go down in history as the one thought to be responsible for a major bank crisis.

Second, when it comes to financial crises, a government does not have the luxury of small incremental steps. It can make only big decisions: save Lehman or not, save AIG or not, etc. This discreteness increases the political cost of making a decision that, while good in the long-term, has significant costs in the short-term.

The third difference is that the economic costs of not intervening are very concentrated. Dick Fuld alone lost a billion dollars from the collapse of Lehman. It is hard to imagine a single individual losing that amount of money from any individual monetary policy decision. When the gains are so concentrated, lobbying is much more intense (even though in Fuld’s case it didn’t work).

Last but not least, committing never to bail out a large financial institution may be going too far. The economic costs of not intervening may be huge and a well organized intervention can create a lot of short-term value, at the expenses of more risk and pain down the road. A recent paper shows that, even ignoring the potentially large positive systemic effects, the U.S. government intervention to rescue the financial industry in October 2008 increased the value of the nine largest financial institutions by \$131 billion at a taxpayers’ cost of \$25 -\$47 billion, with a net benefit of between \$84bn and \$106bn.<sup>6</sup> Why? Because during a financial crisis asset prices become excessively depressed and an intervention to avoid liquidation can have a large economic payoff for the parties involved. Given this, perhaps a person in power, whether she is a politician or a political appointee, has some justification in not resisting a rescue.

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<sup>6</sup> Veronesi, P. and L. Zingales, 2009, “Paulson’s Gift”, NBER working paper.

### *How To Fix It?*

One solution is to make a bail-out less credible by reducing the cost of alternatives. This is the logic behind the Administration's proposal of a "living will"-- a contingency plan that each institution should prepare to show how to unwind its obligations without creating excessive costs to the system. In principle, this is a good idea. But would it work in practice?

There is an Italian folktale of a criminal sentenced to death by hanging who asked as his last wish that he be able to choose the tree from which he would be hung. Of course, he never found a tree he liked. Living wills are no different. By definition they cannot be tested except in a situation of crisis. The problem is that an institution has an incentive to design its living will to fail, so that the government will have to save the firm. In other words we think that financial institutions will pick a tree where a hanging is impossible.

An alternative approach is to accept the fact that rescues cannot be ruled out and to limit risk taking. This is what parents do with small kids. When the risks are sufficiently small that we can let the kids bear the consequences, we give them the freedom to take these risks so that they can learn. But when the risks are life-threatening and we know that we cannot avoid intervening to rescue the kids, we set an ex ante rule and limit what the kids can do. This is the approach we suggest here.

One version of this approach is to restrict severely the activities in which large financial institutions engage. We think that this would be very costly and doomed to fail. Very costly because it would require preventing large financial institutions from engaging in most financial activities-- from writing derivative contracts to engaging in proprietary trading. Doomed to fail because such regulations are extremely easy to bypass. It takes no time for a clever financier to design a contract that gets around most restrictions<sup>7</sup>.

An alternative version of the approach is to restrict the total amount of risk undertaken. This is what we advocate. Our proposal is very much in spirit of the Basel capital requirements, but with two big differences. First, one of the problems with Basel II is the faith put in the ability

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<sup>7</sup> Mervyn King and Paul Volcker have recently suggested that we should reintroduce something like Glass-Steagall, and require banks to be "conservative" in their investments while allowing investment banks more freedom. The problem with this is that the crisis of 2008 suggests that even investment banks are "too big to fail" and so will be bailed out.

of rating agencies to assess a company's riskiness. Not unlike central bankers, rating agencies find it easy to make small decisions that have small consequences. But when a change in rating can trigger enormous economic consequences, rating agencies cannot be relied on to make the right call. AIG was still rated AA two days before being bailed out by the government.

Second, the regulators suffer from the rating agency problem in spades. There is no political payoff from an early intervention, especially given the uncertainty that surrounds all such decisions. After Washington Mutual was taken over, there were still people complaining that it was too early to act. It is like fighting a preemptive war. There is no credit for the pain avoided, while there is plenty of blame for the pain inflicted.

Thus, we believe that the crucial characteristic of any intervention mechanism is that it should be market driven, i.e., it needs to rely on the market's ability to collect relevant information promptly. The problem is that the market has an incentive to collect information only if there is a payoff. If the debt is always bailed out, the market will be useless.

#### *What Is Systemic?*

How can we use the market, when the market knows that financial institutions will always be bailed out? The secret is in distinguishing between obligations that will always be kept safe and obligations that might not be. The economic logic behind TBIF is that financial institutions are highly interconnected through derivative and repo contracts and the default of one might trigger losses on the counterparties, producing further defaults. This cascade can occur not only for actual losses, but even for potential ones. To function properly the financial system needs to operate under the assumption that certain assets, such as deposits, are "worry free", i.e., depositors do not have to monitor counterparty solvency. This belief saves a tremendous quantity of resources, permitting the system to operate more efficiently. But this belief can be supported only if the prompt and full repayment of "sensitive" or "systemically relevant" obligations is not in question. In this respect, even the risk of some minor bureaucratic delay in repayment can undermine confidence.

Long-term debt, however, is non-systemically relevant. There is no reason for a large financial institution to hold debt in other financial institutions. This debt mostly resides in the

portfolios of mutual funds and pension funds, which can absorb these losses in the same way as the losses from equity investments.

Thus our approach is to protect the systemic obligations in all circumstances but leave open the possibility that the non-systemic obligations will be unprotected. This means that the market's informational role can be effective. At the same time we do not want non-payment of non-systemic obligations to be a "normal" occurrence since for the reasons just given a default on any obligation can create uncertainty about the whole institution.

### *A Multilayer Protection System*

The system we envision is based on two layers of protection for systemic obligations.<sup>8</sup> One layer is equity, not much different from a standard capital requirement, except for the fact that its size is determined not by an accounting number, but by a market assessment of the risk of the second layer. The second layer is made of junior long-term debt. Being junior this debt is designed to absorb the potential losses that exceed the equity cushion, providing extra protection for the systemic obligations.

The novelty of our approach is to have a market-based trigger to signal the fact that the equity cushion is thinning and the debt is potentially at risk. If the warning mechanism provides accurate signals and the regulator intervenes on time (two big ifs), even the long-term debt will be paid in full. If either of these two conditions does not occur, we might burn through some of the debt layer, but if this second layer is sufficiently large, the systemic obligations will never be at risk.

Before describing the market-based warning mechanism, let's see roughly how our mechanism will work. It is very similar to a margin call system. In a margin account an investor buys some stock, putting down only part of the cost. When the stock price drops, the broker who extended the loan asks the investor to post additional collateral. The investor can choose between posting new collateral (and in so doing re-establishing the safety of the position) or having his position liquidated (which allows the creditors to be paid in full). In other words, with

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<sup>8</sup> Our description is based on our paper "A New Capital Requirement for Large Financial Institutions", to which the reader is referred for all technical aspects.

a dynamic system of margin calls, the broker minimizes the amount of collateral posted by the investor, while at the same time ensuring that the debt is always paid.

Our system works in a similar way. Large financial institutions (LFIs) will post enough collateral (equity) to ensure that the debt (all the debt, not just the systemic debt) is paid in full. When the fluctuation in the value of the underlying assets puts debt at risk, the equityholders of these financial institutions are faced with a margin call and they must either inject new capital or lose their equity.

A prompt intervention will protect even the long-term creditors. If the intervention is slow, the long-term creditors can be at risk, but as long as the delay in intervention is not too extreme the systemic obligations are always shielded. Thus, it becomes crucial to rely on the market both as a warning mechanism and as an enforcement mechanism to prevent excessive delays. The good news is that with this multilayer system we have created a category of debt that can default without triggering a systemic collapse. Thus, we can rely on the market to gather the crucial information about whether this debt is at risk. And here is how.

#### *A Market-Based Warning Mechanism*

In a margin account the broker looks at the value of the investments (which is easily determined since all assets are traded) and compares the value of the collateral posted with the possible losses the position might have in the following days. If the collateral is insufficient to cover an adverse movement in the value of the position, the broker calls for more collateral. In the LFI case, the value of investments (i.e., the value of the LFI's assets) is not easily determinable, because the underlying assets—commercial loans and home equity lines, for example—are not standardized and not frequently traded. Thus it is not easy to determine when the margin is too thin to protect the existing debt. In addition, debtholders are often dispersed and so unable to coordinate a margin call. If a margin call approach is to be followed, we need to find an easily observable trigger.

The ideal characteristic of a trigger is that it is market-based, i.e., based on the price of a traded security, so that it incorporates all the information available in the market, which traders gather because this is profitable. A market based signal is hard to corrupt. One can exercise political pressures on a credit rating agency or an organization, but one cannot influence

politically thousands of traders who have their money on the line. To avoid unnecessary fluctuations and false alarms, the market should be sufficiently liquid. It should also be sufficiently deep to prevent any form of manipulation. Finally, the price of the traded security should be closely linked to the event we want information about: i.e., that the long-term debt is at risk.

Equity prices satisfy all the criteria, except the last one. If there is enough variability in future cash flows, equity prices might stay relatively high even if there is a very high risk of the company defaulting. So equity prices are a noisy and faulty signal of whether the long-term debt is in danger.

The right price to look at is the price of junior long-term debt. When the equity cushion is running thin, the long-term debt becomes risky and will start trading below par. Unfortunately, the bond market is highly segmented and illiquid and thus bond prices are not very reliable. There is, however, a security that is linked to the bond price that is liquid: the credit default swap (CDS).

A credit default swap is an insurance claim that pays off if the underlying entity fails and creditors are not paid in full. Since the CDS is a “bet” on the institution’s strength, its price reflects the probability that the debt will not be repaid in full. In essence, the CDS indicates the risk that the equity cushion is being exhausted by losses. In our mechanism, when the CDS price rises above a critical threshold, the regulator forces the LFI to issue equity until the CDS price moves back below the threshold. If this does not happen within a predetermined period of time the regulator intervenes.

CDSs have been blamed as one of the causes of the current crisis. But CDSs are not bad per se; they can be dangerous only to the extent that they are not properly collateralized and traded transparently on an exchange. If these conditions are met, the CDS is a very useful instrument to reduce the exposure to credit risk and its price is just the signal we need.

In the absence of a reliable CDS market, we could instead use the price of junior bonds or their yield to provide a reliable signal of the risk that the equity cushion is running thin. In fact, the thickness of the debt layer could be fine tuned to the precision of the signal adopted and the rapidity of the regulator’s intervention. Which bring us to the second delicate point of our

mechanism. To function the mechanism requires a prompt intervention by the regulator. How to ensure it? And what should the form of intervention be?

The risk of empowering a regulator with the right to intervene is twofold. On the one hand, the regulator can arbitrarily close down well-functioning financial institutions for political reasons. On the other hand, the regulator, under intense lobbying by the regulated, can be too soft, a phenomenon known in the banking literature as “regulatory forbearance”. Our mechanism, which bases intervention on a market-based signal, removes most of the regulator’s discretion. The regulator cannot intervene if the market prices do not signal a situation of distress. On the other hand it is hard for the regulator to avoid intervention when they do. How can the regulator fail to act when she has a mandate to do so and everybody observes that she is in violation? But just in case this is not enough of an inducement, we envision that the bondholders will have the right to sue the regulator in case she fails to intervene. Since the intervention stabilizes the value of the bonds, bondholders would have a legitimate cause of action.

#### *The form of intervention*

When the mechanism is triggered, the regulator is forced to carry out a stress test to determine whether the LFI debt is at risk. If the debt is not at risk (i.e., the CDS prices were inaccurate), then the regulator declares the company adequately capitalized and to prove it injects some government money. If the debt is at risk, the regulator replaces the CEO with a receiver (or trustee), who recapitalizes and sells the company, ensuring in the process that shareholders are wiped out and creditors receive a haircut. This haircut should be assessed any time the regulator finds that the debt is at risk. The haircut is crucial in ensuring that, if the LFI is in trouble and the regulator is expected to intervene, the CDS rate will be high, so that intervention is indeed triggered.

The regulatory receivership is similar to a milder form of bankruptcy, and it achieves the goals of bankruptcy (discipline on the investors and management) without imposing any of the costs (systemic effects). It is very similar to the way the FDIC intervenes currently when banks are in trouble.

In designing our mechanism we face a problem that arises every time we take away regulatory discretion and rely on market signals: we bear the risk of making the wrong decision if market signals are not perfect. Our mechanism minimizes this risk by giving the regulator the option to limit her intervention to an audit. Clearly, this option reintroduces the risk of regulatory forbearance. Nevertheless, we think that this risk is substantially reduced in comparison with the current state of affairs because the regulator has to stick her neck out and assert that a firm that the market thinks is at risk of default is in fact perfectly safe. This risk is further reduced by the requirement that the regulator must invest some money in the LFI if she declares it to be adequately capitalized. This requirement has some additional benefits. First, it decreases the likelihood of bear raids on a well-functioning LFI, since if the LFI passes the stress test and the regulator injects funds the CDS price will drop. Second, it makes the system robust to regulatory mistakes. If the regulator incorrectly concludes that the LFI is adequately capitalized, the LFI's solvency will be improved through the injection of liquidity.

Our choice of making new government debt pari passu tries to balance two opposing forces. On the one hand, we want to make it politically costly for the government to validate as adequately capitalized firms that are not. This cost would be maximized by making the government claim junior with respect to everybody else's. On the other hand, we want to make it difficult to succumb to the industry pressure to bail out the LFI, which would be very strong if the regulator could inject funds in exchange for a junior claim on the LFI. Pari passu debt strikes a reasonable balance. If the firm is insolvent pari passu debt does help the existing creditors, but it is sufficiently junior to make the government suffer some pain.

#### *Would Have This Rule Worked in The Past?*

Our mechanism is predicated on the idea that the market is able to identify and signal the problem of large financial institutions before this is too late. Yet, the current view is that the market failed to do this during the last crisis. So it is relevant to test whether our proposed trigger would have worked in preventing the last crisis had it been in place back then.

#### **Table 1: 1-year CDS rates of the main financial institutions at key dates during the crisis**

(Bps of premium to insure against default)

Financial Institution	8/15/2007	12/31/2007	3/14/2008	9/29/2008
BoA	11	29	93	124
WELLSFARGO	23	45	113	113
JPMORGAN	19	32	141	103
CITI	15	62	225	462
WACHOVIA	14	73	229	527
WAMU	44	422	1,181	3,305
GOLDMAN	28	78	262	715
MORGAN	31	129	403	1,748
MERRILL	29	159	410	666
LEHMAN	38	100	572	1,128
BEAR STEARNS	113	224	1,264	118
AIG	31	59	289	821

While it is true that the market did not anticipate any problem until the summer of 2007, after that the CDS market provides a pretty accurate indicator of the eventual fate of the major financial institutions. In Table 1 we report the one-year CDS rates for the major investment banks and commercial banks at various key dates.<sup>9</sup> It is clear from the Table that the market had already singled out Washington Mutual and Bear Stearns as the two most problematic institutions. In fact, if we had to pick the five institutions that would go under first on the basis of the CDS in August 2007 we would be right with four out of five. The data at the end of 2007 show a decisive relative worsening of the situation for the investment banks and Washington Mutual. At the end of December the market was attributing a (risk neutral) probability of Washington Mutual defaulting within a year of 10%. By March that estimate had risen to 30% , but the regulator waited until September 25, 2008 to take over the bank. Even then there was huge political resistance. “The seizure and sale were conducted in secret while Washington Mutual Bank was still well capitalized, liquid” ,wrote a web site protesting the takeover of Washington Mutual.<sup>10</sup>

So even in the last crisis, when the market was considered to be doing a bad job in predicting the level of risk, the CDS market was a very accurate predictor of the risk of various financial institutions.

<sup>9</sup> We use the one-year CDS rates because they are the most sensitive to the short-term probability of bankruptcy. The five-year CDS rates, which are more liquid, will not exhibit a very different picture. The dates we chose are the beginning of the crisis; the end of 2007; the date of the rescue of Bear Stearns; and the date the initial TARP proposal was rejected by Congress. The CDS rates are from Bloomberg.

<sup>10</sup> <http://www.wamutruth.com/>.

## *How To Implement It*

Once the key signal has been chosen, it would be sufficient to specify two parameters to implement our mechanism: the trigger threshold and the size of the debt cushion. Notice that it is not necessary to specify the size of the equity cushion, because this is implicitly defined by the trigger threshold.

To arrive at the determination of these two parameters the last crisis could be of great help. If the goal is to intervene well before the situation is dire, then we can look historically at how long it took between the time an LFI had a CDS above a certain threshold and the time its situation was irremediably compromised. Let's say that the goal is to intervene between 6 and 9 months in advance. Then, we can go back and see how high the CDS of the failed institutions were 6-9 months before they failed. We can then determine the false positive by looking at how many stable institutions would be called into question by a similar rule.

Table 2 presents a one-month average of 1 year CDS rates six months and nine months before the "failure" of major institutions. We use failure in quotes because Bear Stearns, Merrill Lynch, AIG, and Citigroup did not fail, but were rescued, either by a shotgun wedding or by the intervention of the government (Citigroup and AIG). The classification here is open to debate, since Goldman and Morgan Stanley could also be said to have been saved by the government. Yet it corresponds to what key players thought at the time. For example, just before the Lehman Brothers filing Jamie Dimon, CEO of JP Morgan, is quoted as saying "We need to prepare right now for Lehman Brothers filing." Then he paused. "And for Merrill Lynch filing." He paused again. "And for AIG filing." Another pause. "And for Morgan Stanley filing." And after a final, even longer pause he added: "And potentially from Goldman Sachs filing."<sup>11</sup>

As we can see all the "failed" institutions had CDS rates above the 100 bps threshold six months before their demise; only Lehman and Wamu, though, had a CDS rate above 100 nine months before their failure. Except for Bear Stearns, all the institutions had CDS rates above 40 nine months before their demise.

In the second panel of Table 2 we look at the false positives. For the institutions that did not fail, we look at when they first would have triggered the intervention. For commercial banks

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<sup>11</sup> Andre Ross Sorkin, *Too Big to Fail*, Viking Penguin, 2009, p. 3.

the 100 threshold would have been triggered only after the Lehman failure. For the two investment banks it would have been triggered in February 08 and in November 07. It is unclear whether these are false positives, however. Ex post it is easy to argue that these two institutions needed more capital back then. The 40 bps threshold, by contrast, seems to generate too many false positive, since it would have triggered an intervention in Wells Fargo back in November 07.

**Table 2: Simulation of different trigger rules**

The CDS rates are in basis points. The averages are over a calendar month 6 months or 9 months before the “default” date. The trigger date is the first date when the previous month average of CDS rate exceeded the threshold.

"Failed" institution	Date of Default	Average CDS	Average CDS
		6 months before	9 months before
BEAR STEARNS	3/14/2008	121	10
LEHMAN	9/15/2008	288	106
WAMU	9/25/2008	957	430
WACHOVIA	9/30/2008	176	45
MERRILL	9/15/2008	282	177
AIG	9/16/2008	234	70
CITI	9/30/2008	162	44
"Surviving" Institutions	False Positive Date with a Trigger at		
	100	40	
BoA	9/22/2008	1/22/2008	
WELLSFARGO	9/18/2008	11/23/2007	
JPMORGAN	9/29/2008	2/15/2008	
GOLDMAN	2/14/2008	8/20/2007	
MORGAN	11/13/2007	8/22/2007	

With the benefit of this information, we can now think about setting the appropriate junior debt cushion. Given our trigger rule and the potential delays in acting, the junior debt layer should be sufficiently thick to provide full protection to the systemic claims. Thus, suppose that we fear a maximum delay of six months. Then, we want a cushion such that, conditional on having fully exhausted the equity layer, the probability of running through the junior debt layer

in six months is less than 5%. If asset volatility is around 8% per year, this implies a junior debt layer of 11% of assets.

This value is not high by today's standards. In the top 8 banks, the long-term debt to asset ratio in September 08 was 19%.<sup>12</sup> It is true that existing long-term debt is not explicitly junior to the systemic obligations, but de facto it is, given that all the systemic obligations are short-term. Thus, a rule having a CDS below 100 and a debt layer of at least 11% would not represent a great burden to banks today. The key to our mechanism is not the toughness of the initial rules, but the promptness of the corrective action triggered by a market signal.

### *Advantages of Our Mechanism*

Our mechanism has several advantages. One is that the system is simple and intrinsically not that different from the two-tier system of capital requirements existing today. It is more refined in several ways. First, it introduces a market-based trigger for intervention. Second, it requires the long-term debt to be explicitly junior, allowing it to be treated differently from the other debt claims outside of bankruptcy. Third, it implements an intervention different from bankruptcy to deal with the restructuring of the LFI.

The second advantage of our system is that it is easily applicable to diverse financial institutions, such as hedge funds, insurance companies and the like. Many mechanisms explicitly designed for banks could not easily be applied to other financial institutions. Our system is based on three simple concepts that are easily portable: an equity cushion, a junior debt cushion, and a CDS trigger.

The third advantage is that our system is able to overcome the natural tendency of regulators to forbear by introducing a market trigger and by reducing the cost of intervention.

Last but not least, our mechanism does not rely on taxpayers' money. While we envision that the regulator would have an investment budget to back up any positive assessment of an LFI, an investment would be made only when it is safe and thus it should not lead to losses. In fact, the regulator's right to assess a haircut on junior debtholders, even when the company is

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<sup>12</sup> Veronesi, P. and L. Zingales, 2009, "Paulson's Gift", NBER working paper.

solvent, provides a source of revenue for the regulator. Thus, in equilibrium the regulator should raise money, not spend it.

This feature is particularly appealing in the European context, where regulators face the problem of dealing with pan-European institutions without a pan-European fiscal authority. Our mechanism can be applied even in the absence of such an authority.

### *Conclusions*

The biggest legacy left by the crisis of our financial system is the perception that some institutions are too big to fail. This perception distorts competition and the allocation of capital, favoring risk-taking and incubating the conditions for the next crisis. Ignoring the problem will only make it bigger, while accepting a TBTF policy without any countermeasures will lead to severe distortions today and more dramatic crises tomorrow.

We propose a new capital requirement for large financial institutions to deal with this problem. While not departing much from current regulation, our rule has the advantage of providing a timely mechanism for intervention that is market based. This requirement could be easily introduced today without causing any capital crunch and with minimal new legislation. By eliminating the need for a massive bailout, our mechanism can easily be applied also to the European Union, where there is no central fiscal authority. By eliminating the distortion created by the TBTF policy, our capital requirement also re-establishes competitive conditions in the financial industry.