

Credit Default Swaps: The Key to Financial Reform

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“Sir, George Soros (“The false belief at the heart of the financial turmoil”, April 3) suggests establishing a credit default swaps clearing house or exchange as an institutional mechanism for reducing counterparty risk in this \$45,000 bn (notional) market. We have been here before also.

Walter Bagehot’s Lombard Street explains how a bank’s acceptance of a bill of exchange (in effect a CDS) turned an illiquid asset into a liquid one. The key to the system, as Bagehot made clear, was the central discount facility at the Bank of England. In Bagehot’s time, the CDS was bundled with the bill, and the entire bundle was eligible for discount. In our time, the two instruments trade separately, and the CDS part has no access to the lender of last resort.”

Perry Mehrling, Financial Times, April 7, 2008

Commentary about the credit crisis has identified a wide range of culprits: faulty risk models (both at banks and at rating agencies) that relied on historical frequencies during a time of changing practice; faulty underwriting driven by the skewed incentives of the new originate-to-distribute model; faulty regulatory oversight based on imagined effectiveness of private policing of counterparty risk; faulty monetary policy that kept interest rates too low for too long, so sparking a credit-fueled asset bubble that was bound to collapse. Deeper causes have also been suggested: a capital adequacy regulatory regime that did not encompass the burgeoning shadow banking system; a pattern of global imbalances that was sustained in the short run by sending the best dollar assets (Treasuries and GSEs) to Asia, leaving a vacuum on the balance sheets of American and European financial intermediaries that was filled by the new untested products of structured finance.

All of this commentary is well-taken, but for my taste little of it goes to the heart of the matter. In my view, the current crisis is best seen in broad terms as a test of the brave new world that we’ve been building in the image of the theory of modern finance. Here is one early and remarkably prescient characterization of the world that could be:

“Thus a long term corporate bond could actually be sold to three separate persons. One would supply the money for the bond; one would bear the interest rate risk; and one would bear the risk of default. The last two would not have to put up any capital for the bonds, although they might have to post some sort of collateral.”

This is Fischer Black writing in 1970, and the world he is imagining is very much the world that has come to be, some forty years later. The instruments he is suggesting are

what we know today as interest rate derivatives and credit derivatives, and more specifically interest rate swaps and credit default swaps. It is this world that is now being tested.

In its efforts to put a floor under the downward spiral that began in August 2007, the Federal Reserve soon found that standard interest rate policy did little, not even when augmented by a new Term Auction Facility (introduced December 12, 2007). It was only when the Fed announced its readiness to swap bona fide Treasury securities for private name mortgage backed securities that markets stabilized (technically the swap was structured as a collateralized loan). However the significance of this new Term Securities Lending Facility (introduced March 11, 2008) was not widely noted, perhaps because it was overshadowed by the immediately subsequent failure of the investment bank Bear Stearns. Attention focused instead on the new Primary Dealer Credit Facility (March 16, 2008) and on the unprecedented acquisition by the Fed of \$30 billion of Bear Stearns' least attractive assets.

Even this stabilization proved to be only temporary. On September 7, the Treasury nationalized Fannie Mae and Freddy Mac, in effect swapping Treasury bills for all existing GSE bonds, but also (and more significantly) taking over all of their mortgage guarantees in return for equity ownership of both entities. Subsequently the Treasury refused to step in to save Lehman Brothers, preferring instead merely to widen the range of collateral acceptable at both the TSLF and the PDCF (September 14) in an attempt to limit the fallout from Lehman's failure. But the fallout nevertheless soon threatened the insurance company American International Group, and on September 16 the Fed stepped in to take over its wide-ranging book of credit derivatives in return for an 80% equity stake in the company. This deal seems to have provided a model for the subsequent handling of the failure of Wachovia by the FDIC. Much like the Fed's AIG deal, the FDIC took over the downside risk of Wachovia's portfolio in return for an equity position in Citigroup, which purchased the portfolio (September 29).

The significance of this new form of government intervention—credit insurance in return for equity participation—has not been widely noted, perhaps because it was overshadowed by the \$700 billion “bailout” proposed by Treasury Secretary Paulson and turned into emergency legislation by Congress.¹ The ensuing political drama in which the bill was defeated in the House, resurrected in amended form in the Senate, and then successfully passed in the House (October 3) has overshadowed examination of both the AIG and Wachovia deals. No press accounts seem to have noticed, but the structure of those earlier deals is explicitly authorized in the legislation, in Section 102 “Insurance of Troubled Assets” which follows immediately after Section 101 “Purchases of Troubled Assets” which authorizes Paulson-style outright purchases.

Stepping back from the political drama and thinking about the economics of the interventions, I would suggest that the Fed has been muddling its way toward a kind of discount facility for credit default swaps, without perhaps even realizing that it is doing

¹ But see Kotlikoff and Mehrling, “Bagehot plus RFC: The Right Financial Fix” (September 25, 2008), <http://blogs.ft.com/wolfforum/2008/09/bagehot-plus-rfc-the-right-financial-fix/>

so. Since March 11, the Fed has been swapping AAA mortgage-backed securities for Treasuries, and since September 14 it has broadened the swap facility to encompass all investment grade debt securities. Back in March, the Fed sold credit insurance on the most toxic assets of Bear Stearns, also lending JP Morgan the money to buy the insurance. In the subsequent September intervention in Fannie, Freddie, and then AIG, the Treasury and Fed respectively took over credit insurance contracts written by others and accepted equity shares as payment. There can be no question that the government is in the credit insurance business.

What is needed now is recognition of why this kind of intervention has proven necessary and, building on that analysis, the construction of a less haphazard system for determining which insurance policies the government will issue and which it will not, in order to create appropriate tiering in the market. So far, government interventions have been focused on supporting individual institutions rather than markets, and on insuring specific portfolios of assets rather than general categories of risk. So far, government interventions have been focused on fighting fires rather than systematic intervention, and on the immediate crisis rather than permanent institutional reform. In this respect, a careful examination of how the system of structured finance works will make clear both why credit insurance is the answer to the crisis, but also why credit insurance must be part of any lasting financial reform.

Brave New World

Suppose that some person buys a corporate bond and then engages in the following balance sheet entries. Bracketed items are “mirror” bonds that offer the same cash flow as some other bond, but with a different counterparty.²

Person 1		Person 2		Person 3	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Corp. Bond					
[Treas. Bond]	Corp. Bond]	[Corp. Bond]	Treas. Bond]		
[Treas. Bill]	Treas. Bond]			[Treas. Bond]	Treas. Bill]

The second line represents a kind of credit default swap, in which Person 1 commits to make all the payments that the corporation makes on its bond, while Person 2 commits to make all the payments that the U.S. Treasury makes on a bond of the same maturity. Thus, after the swap of IOUs Person 2 is now bearing the risk of default on the corporate bond.³

² The following explication of the economics behind the credit default swap owes inspiration to Duffie and Singleton (2003, p. 180). See also Lando (2004) and Meissner (2005).

³ It will be recognized that the Fed, by lending Treasuries for mortgage-backed securities, has in effect been behaving something like Person 2. The MBS are supposed merely to be collateral for the loan, so the credit risk remains in principle with the borrower not with the Fed, but if there are any problems with repayment the Fed is on the hook for the credit risk in the collateral.

The third line represents a kind of interest rate swap, in which Person 1 commits to make all the payments that the U.S. Treasury makes on a long term bond, while Person 3 commits to make all the payments that the U.S. Treasury makes on a short term bill (rolled over at maturity until the maturity of the long term bond). Thus Person 3 is now bearing the interest rate risk on the corporate bond.

Although Person 1 still holds title to the corporate bond, in effect he has swapped the cash flows on that bond for the cash flows on a sequence of Treasury bills. He is the one funding the corporate borrowing, but Person 2 and Person 3 bear the credit risk and interest rate risk respectively, just as Fischer Black imagined. If the bond defaults, then Person 2 is on the hook for the loss. If short term interest rates rise above the fixed long term rate, then Person 3 is on the hook for the loss.

Now, actual credit default swaps and interest rate swaps operate just like this swap of IOUs, except that the bilateral payments are netted. Market convention treats Person 1 as the “buyer” of a credit default swap, and the “buyer” of an interest rate swap, so we treat these long swap positions as assets and rewrite our balance sheet relationships as follows:

Person 1		Person 2		Person 3	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Corp. Bond			CD Swap		
CD Swap					IR Swap
IR Swap					

This market convention can be a bit confusing since being long a swap means being short the associated risk exposure. It is helpful to think of the long swap as an insurance policy. For Person 1, short positions in credit risk and interest rate risk exactly hedge the long exposures embedded in the bond, so the net exposure to both risks is zero. By means of the swaps, credit risk has been transferred to Person 2 and interest rate risk to Person 3. They are short their respective swaps, but long the underlying risk.

It is straightforward to extend this analysis to other kinds of fixed income claims, such as mortgages. In this case the interest rate exposure is a bit more complicated because of the right of the mortgage borrower to prepay—the system of MBS tranches was originally developed to manage this problem. Also the credit risk exposure is a bit more complicated because individual mortgages are so heterogeneous and small—the system of pooling mortgages into mortgage-backed securities was developed to handle this problem. (In practice, these two adaptations got a bit muddled, as the tranche system got used for default risk as well as interest rate risk. Clarification of this muddle is likely to be one consequence of the crisis.⁴)

The devil is in the details in these matters, and we can expect that many details will be revised as a consequence of the current crisis. For our purposes the important point to

⁴ Paul Davies, “BIS report heralds demise of key security behind subprime crisis,” [Financial Times](#) (April 2, 2008).

hold on to is that all this apparatus exists essentially to carve off the interest rate risk and credit risk and sell them separately. This is the brave new world of modern finance, and I take it as a maintained hypothesis that this world is here to stay, modulo a certain amount of tinkering.

Counterparty Risk

This system of risk distribution depends crucially on each of the counterparties fulfilling their commitments. For example, in the credit default swap Person 1 promises to make payments that match the payments on the underlying corporate bond. So long as Person 1 actually holds the bond, this commitment could be iron-clad, since it involves nothing more than transferring a payment received. But if Person 1 sells the bond, or even has the right to do so, then there will be counterparty risk.

Similarly, in the interest rate swap, Person 1 promises to make payments that match the payments on a Treasury bond. Here again, Person 1 is in line to receive exactly the same payments (as the other side of its credit default swap), but in this case the payor is Person 2 not the Treasury, so we can hardly say that Person 1's commitment is iron-clad since Person 2 may fail to pay. And there is the further problem that Person 1 might sell the credit default swap, so there is counterparty risk in this transaction as well.

In both cases, appropriate margin requirements might mitigate counterparty risk. This is the “collateral” that Fischer Black imagined might be necessary in order to ensure performance. In practice, the vast majority of credit default swaps that were written were hedged with another credit default swap going the other way, and perhaps with yet another written on the immediate counterparty exposure. The result was a chain of linked exposures in which no one knew exactly who all the links were between them and the ultimate insurer.⁵

What was widely known however was that, in general, the system moved credit risk away from banks, including investment banks such as Lehman Brothers, and onto the balance sheets of insurers such as the monolines and AIG (IMF 2008, p. 79). Thus, when the crisis reached AIG, there was really no choice but for the government to step in. So many chains of linked exposures ended there that the cascade of defaults could not have been contained. The U.S. government now stands behind all those chains, so there is no more risk that a failure somewhere in the middle can bring down the whole system.

But that is true only for existing contracts. Now that AIG is gone, there is no party writing new contracts at the base of the chain, and this poses a problem for the survival of the entire system of structured finance, which depended crucially on credit derivatives as a means of controlling risk. Credit derivatives were used to hedge underlying credit risk—you might have trouble selling your complicated Collateralized Debt Obligation but you could always put a floor on your losses by buying credit insurance. And they

⁵ Here is the reason behind the push to set up a central clearinghouse to net exposures, or perhaps even an exchange to be the central counterparty to all CDS contracts (CRMPG 2008, Soros 2008 Ch. 8).

were used to hedge the counterparty risk involved in the CDS contract itself. But the CDS mechanism only passes the risk along to someone else, and it only works if there is someplace in the system where that risk finally comes to rest.

The lack of an ultimate insurer has produced predictable consequences. Everyone wants to buy insurance and no one wants to sell, so the result is upward pressure on the price of insurance. In a mark to market accounting system, that consequence has a way of becoming self-fulfilling since the rising price of insurance seems to indicate a falling value of the insured asset. And falling values only redouble the demand for insurance to put a floor under losses, and so the downward spiral proceeds. Note well that this channel of contagion depends not at all on irrational waves of panic, but only on the interlinked character of balance sheets.⁶

The point to hold on to is that, as in any scramble, liquidity can be a problem, and prices can be pushed rather far from underlying values. I take it that one of the central reasons for lender-of-last-resort intervention is to set outer bounds for such liquidity-driven price distortions. The classic Bagehot Principle recommends lending freely at a penalty rate against collateral that would be good in normal times. The central problem facing us today is how to extend this principle to the instruments at the core of modern financial markets. It seems that we need a kind of discount window backstop for credit default swaps.

Regulation and Structured Finance

Basel I (and II as well) required banks to maintain capital reserves against their risky asset portfolio, in proportion to the riskiness of that portfolio. Critics always emphasized the pro-cyclical character of this regulatory framework. In good times, bank capital increases and so also does the bank's ability to expand its balance sheet, both by making more loans and by making more risky loans. In bad times, the same effect works in reverse. What the critics feared would happen is what in fact did happen.

Indeed, if anything, the critics underestimated the procyclical character of the regulatory framework, because of the way that the capital adequacy regulations created incentives for off-balance sheet expansion. The consequence of these incentives was that effective capital cushions actually fell during the boom (leverage increased), as credit expanded on balance sheets that the Basel regulations did not reach. One possible direction for reform is to extend the Basel framework to include these new balance sheets, so it is important to understand why that extension has not been done previously.⁷

⁶ One way to avoid this self-fulfilling death spiral is to avoid marking to market, but one man's "fair value" accounting is another man's "number juggling." Just so, observes Charles Morris (2008, p. 132): "Midquality subprime CDO tranches are carried at 90 at the Swiss bank UBS and 63 at Merrill, while the ABX, a widely used index of such CDOs, trades at 40. Similar indexes on CMBS, leveraged loans, and credit default swaps all suggest that internal marks should be much higher."

⁷ This is the general direction being pushed by the Financial Stability Forum.

One way to avoid the capital adequacy requirement is to do your lending off balance sheet, by establishing a Special Purpose Entity to hold the loans, which vehicle issues its own debt and equity to fund the holdings.⁸ SPEs are not banks and so not subject to the Basel regulations. This loophole was intended, one supposes, to provide a way for new capital to flow to finance banking activity without diluting existing ownership. It was imagined that the buyers of the debt and equity would be long term investors.

The balance sheet below shows how this worked. Mortgages are packaged into Residential Mortgage Backed Securities, with various tranches, and then those securities are further packaged into a Collateralized Debt Obligation with various tranches of its own. To fix ideas, we can stipulate that the AAA tranche was held by banks and insurance companies, the AA tranche by pension funds, and the equity tranche by hedge funds.⁹

Regulatory Arbitrage

	Assets	Liabilities
Bank	Mortgages	Deposits Equity capital
Special Purpose Entity	RMBS	AAA CDO tranche AA CDO tranche Equity tranche

The balance sheet makes clear how this method of financing mortgage loans evades the capital adequacy restrictions of Basel. When people speak of the “shadow banking system”, they are usually emphasizing that capital adequacy regulations are no obstacle to expansion of mortgage (and other) lending, indeed quite the contrary they provide an incentive to move that lending off balance sheet.¹⁰

The key point to emphasize is that, in practice, the credit default swap was absolutely key to making this system work. Regulators might look askance at a bank that was investing in CDOs, even the AAA tranche, but once AIG wrote credit insurance on that CDO it was deemed to pass muster.¹¹ The same concerns played out in a similar way for

⁸ Another way to avoid capital adequacy regulations is to do your lending on your trading account, where assets attract much lower capital requirements. The analysis of this section applies directly to that case as well, and so is omitted. The practice of funding these trading account assets in the short term money market by using them as collateral for repurchase agreements met the same fate as the SIVs (see footnote 11).

⁹ The best available source on the system of credit risk transfer is the report of the Basel Committee on Bank Supervision (2008), especially Appendix A, B, and C. See also JP Morgan (2006).

¹⁰ This is the origin of proposals by FASB/IASB to require stricter accounting for off-balance sheet exposures.

¹¹ If the regulator continued to look askance, another way to avoid capital adequacy regulations was to set up a Structured Investment Vehicle to buy the AAA paper, funding the purchase by using the paper as collateral for issue of so-called Asset Backed Commercial Paper. In this way, the SIV created a short term asset that could be bought by money market mutual funds, and so ultimately held by businesses, households, and government entities who were looking for a higher-yielding alternative to a bank deposit account. These SIVs also required a kind of insurance to make them work, most importantly a backup line

investors in the lower tranches, and the credit default swap was the grease that made the whole system work.

CDS and system liquidity

Given this analysis, it is really not surprising that government intervention has increasingly taken the form of writing credit insurance, or taking over insurance contracts written by others. By providing this insurance, the government is in effect putting a floor under the price of the referenced assets, and so stabilizing the balance sheet of the institution holding the assets. Call this the Paulson-Bernanke CDS put.

The problem with the Paulson-Bernanke CDS put is that it is both too broad and too narrow, both too temporary and too permanent. It is too broad insofar as it provides a floor under the value of portfolios containing a very wide range of securities, and too narrow insofar as it is focused on portfolios held by particular market participants rather than on the markets themselves. It is too temporary insofar as it envisions no continuing support for markets, and too permanent in that it envisions long-term government exposure to the referenced assets.

The underlying problem is that the Fed is operating on the securities themselves, rather than on the relevant swap. No doubt one reason is a fear of supporting swaps that do not arise from any real funding operation—this is the modern equivalent of the ancient banker’s idea that confining discount to “real bills”, and avoiding “finance” bills, was the way to ensure safety. What is needed is a recognition that swaps are here to stay, and need their own discount facility.¹²

The general outlines of such a facility are clear, although there will be myriad operational details to fill in. The key point to appreciate here is that the risk in the AAA tranches of credit and their derivatives is not diversifiable; it is systemic risk.¹³ It follows that government involvement in credit insurance should focus here. Perhaps we want a standing facility, with a rather wide bid-ask spread, in order to allow room for some private insurance of the first loss. The bounds of the facility might operate to make sure that insurance does not get too cheap, so facilitating an unsustainable credit expansion, but also that it does not get too expensive, so sparking a spiral in the other direction. The model, obviously, is the standing facility through which modern central banks provide liquidity to the money market.

In Bagehot’s day, the bill of exchange was the significant instrument for short term borrowing, and acceptance of the bill by a bank or bill broker provided a kind of credit

of bank credit in case it proved impossible to roll over the commercial paper at maturity. These structures proved to be weakest link in the system, and as of this writing they have all been unwound, with the assets finding their way onto the balance sheet of the sponsoring bank where they prove to be a continuing source of funding challenge.

¹² Even more, what is needed is a recognition that the proposed Paulson-style outright purchase of troubled assets using Section 101 is in fact a kind of credit default swap, since the fund winds up long credit risk and short Treasuries. We could do the same thing more efficiently using Section 102.

¹³ See Basel Committee on Banking Supervision (2008, Appendix C) for details.

insurance that made it possible to discount the bill for current cash. In Bagehot's day, the credit default swap traveled with the bill, and the entire package was the asset acceptable for lender-of-last-resort discount at the Bank of England. Since Bagehot's day, we have learned the value of extending discount eligibility to long term bonds—no one today argues “bills only”. But long practice of confining central bank activity to government liabilities has gotten us out of the habit of thinking about credit risk as appropriate for discount. We have gotten over “bills only” but not “Treasuries only”.

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