

Credit Default Swaps and the Financial Crisis

I. Introduction

The financial crisis that struck in early 2007 shook the US economy and that of the world. In the run-up to the crisis, financial markets bore witness to rapid innovation and the increasing prevalence of financial instruments that had hitherto been used relatively infrequently. One such example is credit default swaps (CDS). One the first CDS contracts was negotiated in the mid-1990s. Since then, the CDS market has grown enormously in size and organizations, such as the International Swaps and Derivatives Association (ISDA), have provided frameworks for contract standardization (Stulz, 2010).

Credit default swaps (CDS) act like an insurance contract. In the simplest case, the buyer of CDS pays a premium to the seller in return for protection against a credit event—usually a default—of a company, which is referred to as the “name” or the “reference entity.” In response to a credit event, the seller of protection is obligated to make the buyer whole. In this respect a CDS should transfer risk to those most willing to bear it. However, there are competing accounts as to their contribution to and role in the recent crisis. While many have vilified them for alleged market distortions, others assert that CDS should not introduce additional risk because they essentially transfer existing risk from one party to another (Wallison, 2008).

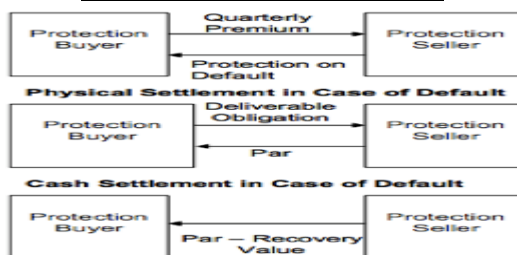
In this paper, I try to further gauge the multifaceted and evolving role CDS played in the recent financial crisis. In the next section, I will further explore credit default swaps and the growth of the CDS market. In Section III, I look at potential counterparty risk and resulting systemic risk that this instrument threatened, and consider a case study of American International Group (AIG). In Section IV, I examine the repercussions of the empty creditor problem when

creditors over-insure the debt they hold and will explore the bankruptcy of General Motors (GM). Section V describes how exposure to the subprime mortgage and asset-backed securities markets was expanded by way of synthetic collateralized debt obligations (CDO). Finally, in Section VI, I conclude with an assessment of credit default swaps in the run-up to and during the crisis, asserting that while having beneficial qualities, they effectively exacerbated the crisis. More rigorous regulation is required to prevent the introduction of additional risk into the economy.

II. Credit Default Swaps: Growth and Evolution of the CDS Market

Credit default swaps are attractive investment tools because they enable market participants to transfer risk to those parties that are best equipped and most willing to bear it. Holders of a company's bond, for example, can use CDS as a hedging mechanism by purchasing protection for that entity. The buyer of CDS is made whole in case of default via one of two means, as illustrated in Figure 1 below—physical settlement or cash settlement. Under physical settlement, the protection buyer delivers the debt security to the seller of protection in exchange for its par value. Cash settlement, the more popular method, entails the protection seller delivering to the buyer the difference between the par and recovery values of the security.

Figure 1: CDS Cash Flows



Source: Morgan Stanley

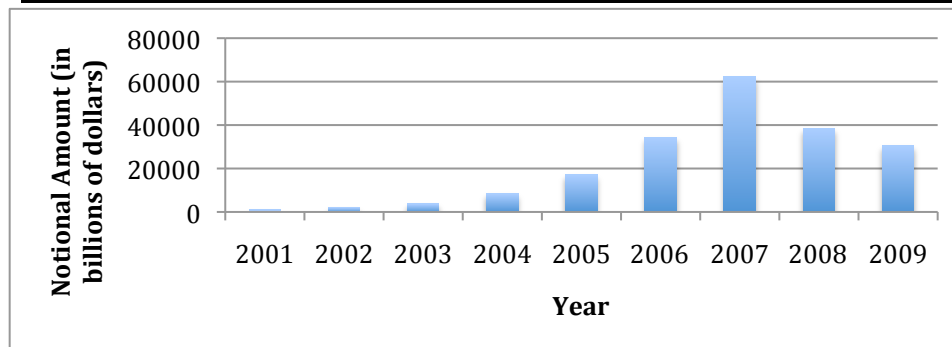
Nonetheless, CDS have built-in leverage, which makes it possible for investors to take on riskier positions than they might otherwise. For example, during the crisis, financial institutions chose

to make and hold loans they likely would not otherwise have originated, namely subprime mortgages (Stulz, 2010). They also took advantage of the lower capital requirements that came with holding CDS and opted to purchase senior tranches of asset-backed securities.

Buying CDS protection confers the same economic benefit as shorting debt. However, the process is much more feasible and more liquid with CDS. An important aspect of the CDS market is that an investor can choose to hold CDS protection without owning the protected security. This is referred to as a naked position in CDS. Therefore, both hedgers and speculators, have the ability to incorporate their opinions regarding credit risk into the market.

Credit default swaps are traded over-the-counter (OTC) and mainly between dealers. Thus, only limited data is available. Organizations such as The Depository Trust & Clearing Corporation (DTCC) do have publicly available data, including statistics on outstanding notional CDS amounts, but historical data from even 18 months ago is difficult to obtain. I rely on CDS market data available through the Bank of International Settlements (BIS) and ISDA.

Figure 2: Total Credit Default Swap Notional Amounts Outstanding



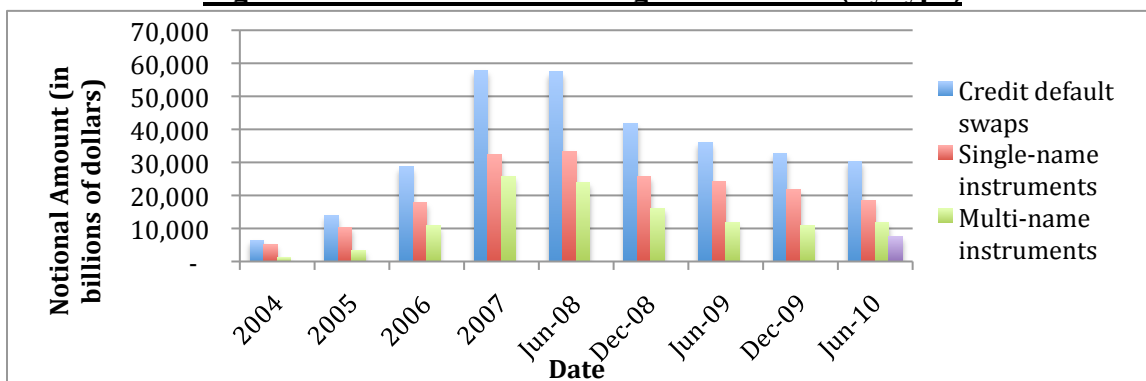
Source: International Swaps and Derivatives Association, Inc.

From Figure 2 we see that the notional amounts outstanding of CDS increased exponentially in the run-up to the financial crisis. In 2001, the total notional amount outstanding was just shy of \$920 billion. In just four years it had increased to \$17.1 trillion and peaked at around \$62 trillion in 2007. This underscores how prevalent this instrument became. The subsequent precipitous

decrease to the 2009 level of \$30.4 trillion is the direct result of the crisis, when some CDS contracts were triggered, others matured, and fears of counterparty risk, which I discuss in the next section, made them less attractive.

The growth in the CDS market served as an impetus for further innovation and differentiation among the contracts. For example, a single-name CDS insures against the default risk of a single firm. A multi-name CDS is a contract that provides protection against the default of many firms or forms of debt, such as a pool of subprime residential mortgage-backed securities (RMBS).

Figure 3: Amounts Outstanding of OTC CDS (by type)



Source: Bank of International Settlements

Figure 3 above shows the changes in the CDS market since 2004, when single-name instruments accounted for 80 percent of all CDS contracts. By 2007, they composed only 56 percent of the market. This shows that not only were the notional amounts outstanding increasing, but also that CDS contracts were becoming increasingly complex.

This is related to the growth of CDS written referencing subprime RMBS. An investor holding a tranche of a RMBS or CDO can buy CDS protection against it. However, CDS functions differently in this case. When one asset in the underlying asset pool defaults, the CDS is triggered to compensate for any reduction in payments to the tranche's holder. Even after being triggered, the CDS will continue to exist, protecting against further defaults among the

pool's assets until maturity. The process for taking positions on the subprime market was facilitated by the introduction of the ABX indices in 2006. These indices allowed investors to take views on the subprime market without owning the mortgages. Investors were also able to obtain more exposure to subprime mortgages than there were such mortgages (Stulz, 2010).

III. Counterparty and Systemic Risks

Dealers wanted to meet the high demand for CDS, but also strove to hedge their exposure. They utilized “daisy chains” in entering their credit default swap contracts, wherein they hedged protection sold with equivalent protection purchased from another dealer or insurance company, which may do the same. Thus, they would act as intermediaries between the ultimate buyer and seller of protection (Wallison, 2008). The proper functioning of the daisy chain depends on each counterparty fulfilling its contractual obligations.

For the most part, counterparty risk was not a large threat because protection sellers posted collateral on a mark-to-market basis. So, any drop in value of an asset would be covered by the collateral posted by the protection seller. Interestingly enough, the amount of collateral posted as a percentage of notional CDS outstanding decreased in the run-up to the crisis, as captured in Table 1 below.

Table 1: Posted Collateral as Percentage of CDS Notional Amount Outstanding

<u>Year</u>	<u>Collateral as Percentage of CDS Notional Amount Outstanding</u>
2001	47.56%
2003	26.91%
2005	7.77%
2007	3.42%
2009	10.36%

Source: ISDA Margin Survey, 2010

This may simply be indicative of the optimistic attitude toward the economy at that time. However, collateral in circulation is a key measure of the total amount of collateral used to mitigate the credit risk of OTC derivatives (ISDA, 2010), and seeing it drop from 26.91 percent

of CDS notional amount outstanding in 2003 to just 3.42 percent in 2007 hints at the risk of there being insufficient ability to fulfill contractual obligations in the event of an economic downturn.

Counterparty risk did exist, then, in the event that the ultimate seller of protection failed to post an adequate amount of capital. This could potentially impact the entire daisy chain. If the ultimate seller of protection had written a substantial number of contracts, the counterparty risk can easily transform into systemic risk. This was the case for AIG and its subsidiary, American International Group Financial Products (AIGFP).

III.1 AIG Case Study

Financial institutions have certain capital requirements that they must abide by. Since financial institutions had lower capital requirements if they held CDS, especially CDS insuring their subprime investments, demand for CDS grew quickly. AIG met a significant portion of this demand. Credit default swaps were not regulated like insurance contracts are—a regulatory oversight on monolines—so AIG sold swaps on \$72 billion worth of CDOs to counterparties without holding the reserves necessary to cover potential losses (SIGTARP, 2009).

Essentially, AIG had too much exposure to the subprime market. Unlike other financial institutions that would often hedge the protection they sold by buying equivalent protection from a different entity, AIG sold credit derivatives without hedging. Furthermore, AIG was overly optimistic about the subprime mortgage market and held subprime CDO tranches. When the CDO tranches were downgraded, it was not long until AIG was as well.

The CDS that AIGFP sold provided that AIG would post collateral if either it or the referenced CDOs were downgraded. Beginning in 2007, AIG began experiencing a significant drain on its finances, when the company began to post increasing amounts of collateral to counterparties that had purchased CDS because of the precipitous drop in market value of the

named CDOs. On September 15, 2008, the rating agencies downgraded AIG and bankruptcy loomed because the financial giant was unlikely to meet additional calls on collateral payments resulting from the downgrade. Table 2 below captures the upward trend in AIG's collateral postings on portfolios it had written protection for.

Table 2: AIG Collateral Postings (in millions of dollars)

Collateral Posting by Portfolio	Collateral posting during quarter ending			
	December 31, 2007	March 31, 2008	June 30, 2008	September 30, 2008
Foreign Regulatory Capital	-	212	319	443
Multi-sector CDO	2,718	7,590	13,241	31,469
Corporate	161	368	259	902
Total Collateral Postings	2,879	8,170	13,819	32,814

Source: SIGTARP

This table shows that the financial strain on AIG jumped from a collateral posting of \$2.9 billion in December 2007 to a \$32.8 billion posting in September 2008. It being the case that AIG is a global organization conducting business in over 130 countries and ranking as the largest life insurer and second largest property/casualty insurer in the US (SIGTARP, 2009), its failure presented systemic risk beyond the breakdown of the CDS daisy chains. So, on September 16, 2008, the Federal Reserve Bank of New York (FRBNY) was authorized to lend up to \$85 billion to AIG to prevent its bankruptcy.

FRBNY determined it critical to address AIG's CDS portfolios to prevent further drain on its liquidity. So, on November 10, 2008, FRBNY created the special purpose vehicle (SPV) Maiden Lane III to purchase CDOs underlying the CDS contracts. Maiden Lane III paid AIG's CDS counterparties fair market value of \$27.1 billion for the CDOs. This amount, in addition to the \$35 billion AIG had posted in collateral payments, meant that AIG's counterparties ended up receiving par value for their CDOs.

AIG ran into trouble because its portfolio of subprime mortgage CDOs was losing value and led to its downgrade and requirement to post additional collateral. However, the thing that

nearly drove the financial giant into bankruptcy was its contractual obligation to post collateral in the event of its own downgrade. This contractual provision acted as a positive feedback loop, wherein one downgrade predisposed the corporation for another downgrade because of higher collateral requirements. FRBNY realized that it had to assume liability for the CDS portfolio of AIGFP in order to prevent AIG's bankruptcy. Since then, FRBNY has unwound significant portions of AIG's CDS, as shown in Table 3 below.

Table 3 Changes to Value of AIGFP's CDS Portfolio (in millions of dollars)

	December 31, 2008	March 31, 2009	June 30, 2009	September 30, 2009
Total	\$302,201	\$258,356	\$231,066	\$205,959
Percentage Decrease since 2008		15%	24%	32%

Source: SIGTARP

IV. Empty Creditor Problem

Since credit default swaps allow for naked buying, there exists the possibility that the overall notional amount outstanding for CDS can be greater than the sum of the face values of the assets they reference. Furthermore, investors may choose to actually hold both CDS and the asset that it insures as a means of hedging their position. Bolton and Oehmke find, however, that in equilibrium, investors tend to purchase more protection than they need to fully hedge their investment. This gives rise to a unique situation known as the empty creditor problem.

Empty creditors are holders of both debt and CDS who no longer have an interest in the efficient continuation of the debtor, and who may push the debtor into inefficient bankruptcy or liquidation (Bolton and Oehmke, 2010). This situation alters the debtor-creditor relationship, especially in the event of financial distress. If a lender stands to make more money from a debtor's default, which would trigger CDS, than the lender would receive as a result of renegotiating debt, which would not trigger CDS, then renegotiation may become impossible. Essentially, the debtor would have to compensate the creditor up to his level of credit protection in order for the latter to agree to a restructuring. Thus, CDS protection can make creditors

tougher negotiators in out-of-court restructurings, even going so far as to prevent renegotiations completely.

A company may attempt to restructure its debt for either liquidity reasons or strategic reasons (Bolton and Oehmke, 2010). An attempt to renegotiate debt for liquidity reasons occurs when the firm does not have the capital required to pay its debt. A strategic renegotiation, on the other hand, is characterized by a firm having sufficient capital to make whole its debtors but deciding that it would be advantageous to try to restructure its debt and retain whatever money creditors forego by agreeing to the process. Renegotiating debt is a costly process. Pursuing restructuring for strategic reasons is therefore inefficient because the debtor is capable of making whole its creditors (Bolton and Oehmke, 2010). When creditors hold enough credit protection, they may disincentivize a firm from pursuing strategic restructuring. This is the case because these creditors would be worse off if they agreed to a restructuring; they stand to gain more from the company defaulting. Thus, the company will not pursue this route because the CDS holders would rather force it into bankruptcy than forego profits. Therefore, CDS can stave off this inefficient process and be welfare-enhancing.

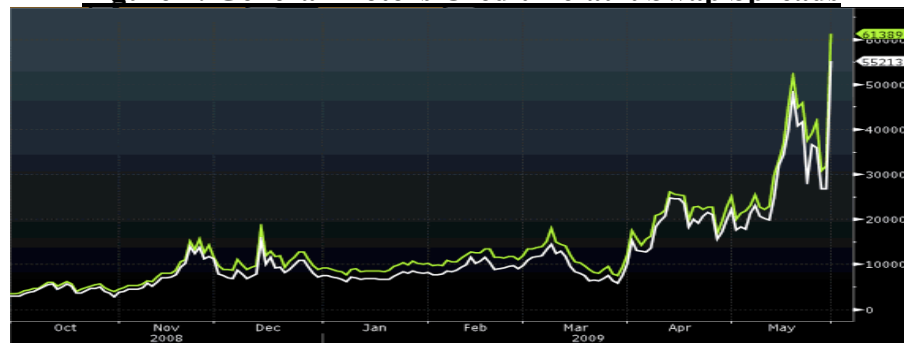
Furthermore, CDS can add value to a company's assets by acting as a commitment device for borrowers to make whole its debtors, especially since any attempts to strategically restructure would be blocked. As a result, investors are more likely to purchase the company's debt and therefore increase the overall investment in that company. While this is a beneficial aspect to holding CDS, creditors' propensity to over-insure results in the negative empty creditor problem. For instance, even when a company has good reason to restructure, i.e., liquidity reasons, the empty creditors may, nonetheless, force it into bankruptcy in order to profit. This is what happened to General Motors during the financial crisis.

IV.1 General Motors and the Empty Creditor Problem

The precursor to General Motors's financial crisis woes was Standard & Poor's downgrading the company on May 5, 2005 to below investment grade. As with other automobile companies, GM's positive beta value indicated that when the economy took a major negative shock as a result of a deteriorating housing market, GM would also be adversely affected. On November 19, 2008, GM unsuccessfully appealed to both the Treasury and Congress for a financial rescue. Chairman Rick Wagoner claimed that failure by GM would endanger the US auto industry: "The societal costs would be catastrophic — three million jobs lost within the first year, U.S. personal income reduced by \$150 billion and a government tax loss of more than \$156 billion over three years."¹

In December 2008, the Bush administration gave GM a \$13.4 billion bridge loan to keep the company afloat. This was followed-up on March 30, 2009, when the Obama administration gave the company 60 days to create a plan to survive. Trying to persevere, in April 2009, GM pared its American workforce, however its CEO acknowledged that bankruptcy was a growing possibility. GM's circumstances did not improve and following its stock price falling to 75 cents on May 29, 2009, it filed for bankruptcy just three days later. GM's CDS spreads, the premium payment protection buyers pay to protection sellers, captured this information.

Figure 4: General Motors Credit Default Swap Spreads



Source: Bloomberg

¹ Herszenhorn, David M., and Bill Vlasic. "Detroit Chiefs Plead for Aid." The New York Times. 18 Nov. 2008.

The spikes in CDS spreads for 5 year and 10 year protection contracts, as illustrated in Figure 4 above, correspond to the news that surfaced about GM, as outlined above. The CDS market quickly integrates this new information and can thus be used to ascertain credit risk.

Prior to filing for bankruptcy, GM attempted to restructure its debt obligations. In May 2009, its debt holders held bonds with aggregate par value of \$27 billion while, according to the DTCC, investors held \$34 billion in credit default swaps on GM. Hedge funds and other “CDS holders would make a net profit of \$2.4 billion if GM were to default.”² These profits that would have been foregone if a restructuring plan were agreed to, which complicated efforts to renegotiate GM’s debt. This illustrates the empty creditor problem. GM had liquidity reasons for trying to renegotiate its debt, which would have been the efficient step to take. However, the empty creditors pursued an inefficient route by forcing GM to default.

The case of GM shows how CDS can have a negative impact on a company’s attempts to restructure and avoid bankruptcy. By over-insuring, empty creditors have an incentive to drive a company to default. This creates an inefficiency problem and downside to CDS. Even though CDS can be vilified through the empty creditor problem, the fact still remains that this instruments has benefits. CDS swiftly react to news and integrate new information into the market through changes in CDS spreads, which make them good indicators of the credit risk associated with a certain security. Furthermore, investors with credit protection feel more confident in purchasing a company’s debt and can therefore assist in meeting its financing needs.

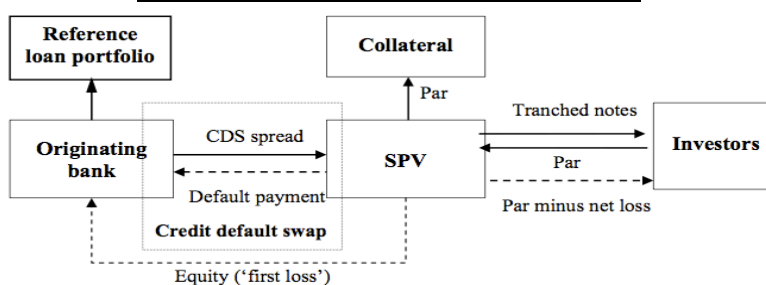
V. Synthetic Collateralized Debt Obligations

Credit default swaps took on another dimension in their forming the foundation for synthetic collateralized debt obligations. Synthetic collateralized debt obligations or

² Sender, Henny. "Credit Insurance Hampers GM Restructuring." Financial Times [London] 11 May 2009. ProQuest.

collateralized synthetic obligations (CSOs) are a particular form of structured security. A CSO is constructed by investing in credit default swaps referencing a portfolio of fixed income assets. During the recent crisis, this portfolio usually consisted of RMBS. While the sponsor or arranger of the CSO may not actually own the referenced RMBS, CSOs enable investors to gain exposure to those securities. Investors taking the long position in a CSO sell protection via the credit default swaps. Those investors taking the short position in the CSO buy protection against the referenced portfolio of RMBS. In exchange for protection against default in the underlying asset portfolio, the short-side investor would pay the long-side investor regular premium payments designed to match payments the long-side investor would receive from the underlying pool had he been holding a cash CDO. A pictorial representation can be seen in the figure below.

Figure 5: Diagram of Synthetic CDO



Source: Mengle, 2007

An important difference between cash CDOs and CSOs is that the latter do not require an arranger to create subordinated tranches. Synthetics can thus be customized to include only the highest rated super senior and senior tranches. This customizability makes the asset attractive and its use greatly expanded in the run-up to the crisis.

Table 4: Overall Volumes of Cash CDO Issuance

Year	2004	2005	2006	2007	208 (thru September)
Value of tranches issued (in billions of dollars)	137	216	482	412	72

Source: Asset-Backed Alert

From the above table we can see how rapidly cash CDO issuance grew from \$137 billion in 2004 to \$482 billion in 2006. It began to dip in 2007, after the start of a tumultuous experience for the mortgage market and its deterioration. By 2008, the value of outstanding CDOs was about half of what it had been four years earlier.

According to data from Creditflux and JP Morgan, the value of funded tranches of CSOs in 2004 was \$260 billion dollars, which means that CSOs represented a major portion of the overall CDO market. According to Dealogic, from 2005 to 2007, at least \$108 billion in these securities was issued. The actual volume was likely much higher because CSOs are customized trades and were largely unregulated and not reported to any financial exchange or market.³ It is clear then that CSOs significantly expanded the breadth of the structured security market.

Synthetic CDOs, just like the credit default swaps that they are constructed from, effectively allowed investors to bet on the performance of securities they did not own. With standard, cash CDOs based on RMBS, the market is contained to the size of the subprime mortgage market. With synthetics, however, parties can simply reference a pool of mortgages without actually owning them, thereby effectively increasing overall exposure to RMBS in the economy beyond the size of the subprime market. Thus, the widespread use of synthetic CDOs expanded the market of structured securities derived from RMBS and exacerbated the subprime mortgage crisis.

VI. Conclusion

Credit default swaps became prevalent and widely used instruments during the run-up to the recent financial crisis. The growth of the CDS market in terms of notional value experienced an unprecedented increase between the years of 2001 and 2007, when it peaked. The growing

³ Morgenson, Gretchen, and Louise Story. "Banks Bundled Bad Debt, Bet Against It and Won." The New York Times. 23 Dec. 2009.

demand for CDS generated by investors and financial institutions contributed to the expansion of the market. This demand also resulted in CDS contracts evolving and becoming more complicated, and the role of CDS evolving throughout the years before the onset of the crisis. CDS took on a multifaceted role.

Although CDS is essentially a transfer of risk and in theory should not introduce additional risk into the economy, the above discussion shows that these contracts did in fact introduce perhaps unanticipated risk into the economy. They were used not only to hedge investments but to also speculate as to the performance of certain securities, such as RMBS. For investors to voice their opinions in terms of credit risk, they would oftentimes chose to take a position in CDS without a position in the security referenced for protection—naked positions.

While CDS are useful in theory, their ubiquity can present a great deal of counterparty and even systemic risk. This is what we saw in the case of AIG's highly levered position in both subprime CDOs and CDS. The threat of AIG not being able to post sufficient amounts of collateral posed counterparty risk in that the daisy chain might have collapsed. The prospect of an AIG bankruptcy also presented systemic risk because it was America's largest insurer. Furthermore, the tendency of investors to over-insure with CDS carries the risk of creating empty creditors, who can force companies to undergo inefficient bankruptcy when it would have been better for them to restructure their debt, as we saw in the case of GM.

The fact remains that CDS markets do react quickly to emerging news. This new information becomes integrated into the market via shifts in the CDS spreads and suggests that CDS markets are important in terms of gauging credit risk. Creditors holding both CDS and debt may also have a socially positive role when they disincentivize corporations from trying to

restructure for strategic reasons, a costly and inefficient process if done for a reason other than lack of sufficient liquidity to make the debtors whole.

Overall, however, credit default swaps did add risk to the economy during the run-up to the financial crisis. Aside from the counterparty and systemic risks and threat of an empty creditor problem, the growth in and importance of CSOs increased exposure to subprime mortgages. Credit default swaps were used to make bets on the performance on subprime mortgages that the parties did not necessarily own. This effectively expanded, albeit synthetically, the subprime market beyond the mortgages in the economy. The result was that CDS and CSO actually exacerbated the financial crisis.

This highlights the need for solutions that will help solve the problems with the way that credit default swaps have been utilized while allowing for investors to take advantage of their benefits. Some steps have been made to convert CDS trading from OTC to an exchange. This will help introduce more transparency into the market and offset possible counterparty risk by having a central clearinghouse as counterparty to all the parties. Potential systemic risk can be addressed by requiring those entities considered “too big to fail” to not take on un-hedged positions in the CDS market and require them to post sufficient collateral to cover their positions.

The empty creditor problem can be ameliorated if holders of both debt securities and CDS were required to disclose their investments during restructuring negotiations in order to make their incentives known. Another possibility is to require approval from the debtor for the creditor to over-insure his debt holdings. Finally, more transparency is needed in the CSO market. The parties were often misled by the high ratings, which were not indicative of performance. I think that if capital requirements were increased on CDS and CSO investments, they would become less attractive and experience smoother demand growth.

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