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Strategic conduct in credit derivative markets ☆

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ABSTRACT

This paper reviews recent research at the intersection of industrial organization and corporate finance on credit default swap (CDS) markets. These markets have been at the center of the financial crisis of 2007–09 and many aspects of their operation are not well understood. The paper covers topics such as counterparty risk in CDS markets, the "empty creditor problem," "naked" CDS positions, super-senior status of credit (and other) derivatives in Chapter 11 bankruptcy, and strategic behavior in CDS settlement auctions.

1. Introduction

One of the most significant changes in financial markets during the decade preceding the crisis of 2007–09 was the creation and subsequent exponential growth of the market for credit insurance, particularly credit default swaps. From relatively small beginnings of around $180 billion in 1997,[1] the CDS market has grown, according to BIS statistics, to over $32 trillion in notional amount in mid-2011. At its peak in 2007 the CDS market exceeded $58 trillion in notional amounts and has since shrunk in size partly due to the impact of the financial crisis and partly due to new netting rules.[2]

A *credit default swap* (CDS) is essentially an insurance contract against losses incurred by creditors in the event that a debtor defaults on its debt obligations. The contract is between a "protection buyer" and a "protection seller." As part of the contract, the protection buyer pays a premium (the CDS premium) to the protection seller, in exchange for a payment from the protection seller to the protection buyer if a "credit event" occurs on a reference credit instrument within a predetermined time period. Common credit events are bankruptcy, failure to pay, and, in some CDS contracts, debt restructuring or a credit-rating downgrade. However, while a CDS is similar to an insurance contract, a fundamental difference between a CDS and a traditional insurance contract is that a CDS offers a payment from the protection seller to the protection buyer even when the buyer is not a holder of debt referenced in the CDS contract. In contrast, a traditional insurance contract typically offers coverage only for damages incurred (the insuree must have "insurable interest"). In other words, in contrast to traditional insurance, a CDS contract can be "naked" (i.e., it provides payment in case of a credit event even without any underlying credit exposure on behalf of the insuree).

Credit default swaps were at the heart of the financial crisis of 2007–09, and they have continued to be a major focus of attention in the aftermath of the crisis, in particular in the context of the European banking and sovereign debt crises. One major issue is the fact that credit default swaps are typically traded in opaque over-the-counter markets and the financial crisis has revealed the hazards involved in the buildup of systemically important risks in a few undercapitalized institutions under the radar screen of regulators charged with maintaining financial stability.

Prior to the recent financial crisis, the finance literature on CDS markets mostly focused on the pricing of CDS contracts. Typically, in these pricing models CDS markets are (essentially) frictionless and competitive. The general view of this literature is that CDS are a valuable financial innovation, because they provide new or cheaper forms of value-enhancing risk-sharing opportunities (see Jarrow, 2011). However, given that CDS pricing models, like most other derivative pricing models, value the CDS via a replicating portfolio comprising a long position in the underlying bond and a short position in a Treasury bond (with similar coupons, maturity, and notional value), it is

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[1] See Acharya et al. (2009).

[2] The BIS survey data is available from 2004 at http://www.bis.org/statistics/derstats.htm. For an analysis of the determinants of net CDS positions at the reference entity based on recently available CDS position data, see Oehmke and Zawadowski (2012).

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not clear that the CDS offers risk-sharing opportunities that were not available before. In fact, in the frictionless pricing model, the CDS is a redundant security. Once trading frictions are introduced, as with other financial derivatives, the main added value of the CDS is to lower transaction costs in building a hedged position. However, beyond the potential reduction in transaction costs, CDS contracts usually do not affect economic outcomes in these pricing models.

Indeed, one of the main benefits of CDS is that they make it easy and rather safe to short a risky debt instrument. Unlike a short position in a stock, which subjects the holder of the position to potentially large losses should the underlying stock price move up rather than down, a CDS contract limits the exposure of the protection buyer to the payment of the running premium. The worst outcome for a CDS protection buyer is that there is no default on the underlying debt instrument. In that case he would have paid for protection, which in the end was not needed. In contrast, a short seller of stocks risks losing the difference between the price at which he must purchase the stock (to be able to deliver it) and the price at which he sold the stock. This price difference can be huge in the event of a *short squeeze* (a recent example is the Volkswagen–Porsche short squeeze of 2008, in which short sellers incurred substantial losses).[3] This limited downside risk for CDS protection buyers is particularly attractive when the buyer purchases protection over long maturities.

The crisis of 2007–09, however, has shown that CDS markets are far from frictionless and that considerable strategic conduct has been present in these markets. A growing recent literature on CDS markets thus attempts to explore the economics of CDS markets using models with frictions, in which the CDS is not redundant and in which there may be significant scope for strategic behavior. Rather than frictionless and competitive, this literature thus examines frictions in CDS markets and allows for strategic conduct (or misconduct).

The most egregious misconduct arguably took place at the AIG Financial Products (AIGFP) unit in London, which sold default protection on a massive scale to the point of building a net exposure of $411 billion in CDS on super-senior tranches of securitized loans and mortgages, all rated AAA by June 30, 2008 (see Stulz, 2010). AIGFP was able to take on such an exposure without posting a commensurate amount of collateral (to reduce counterparty risk for the protection buyers) due to the fact that AIG had an AAA rating. Although AIGFP could avoid posting collateral by relying on the AIG AAA rating, it were still exposed to the risk of collateral calls in the event that AIG were to lose its AAA rating. However, while the pricing model used by AIGFP for its CDS positions "harnessed mounds of historical data to focus on the likelihood of default…as AIG was aware, [the] models didn't attempt to measure the risk of future collateral calls or write-downs, which have devastated AIG's finances."[4]

In light of the AIG debacle, it is not entirely surprising that the post-crisis literature on credit derivatives has focused attention on the moral hazard problems involved in writing credit default insurance. We thus begin with a discussion of this issue in Section 2. We then turn to another form of moral hazard created by CDS insurance – the "empty creditor problem" – in Section 3. In Section 4, we address potential strategic concerns arising from the fact that the buyer of CDS protection may have a "naked" position in the CDS. In Section 5, we discuss the highly concentrated, oligopolistic nature of over-the-counter CDS markets and the considerable market power that the handful of investment banks dealing in this market seems to wield. In Section 6, we point to the special treatment for CDS and other derivative contracts in bankruptcy and discuss the implications of this special status for financial stability. In Section 7, we discuss how CDS contracts are settled in the event of a credit event, with a focus on the complex strategic bidding considerations that arise in CDS settlement auctions, which have become the standard settlement procedure for CDS contracts. Finally, Section 8 offers some concluding comments on the regulation of CDS markets and points to some current policy questions that warrant further research.

2. Dealing with counterparty risk

While there is an extensive principal-agent literature that analyzes the trade-off between risk sharing and incentives on the part of the agent, the moral hazard problem on the side of the principal insuring the agent has not been considered until recently, presumably because insurers were thought to be sufficiently capitalized to be able to meet any promised payments, such that counterparty risk is zero.[5] Two recent papers have taken up the problem of counterparty moral hazard.

Thompson (2010) considers the moral hazard problem of a protection seller dealing with a privately informed buyer. The seller can hold more or less liquid capital. The more he holds in liquid capital the lower the counterparty risk he imposes on the buyer. But more liquid capital also generates lower returns. There is a moral hazard problem for the seller to the extent that insurance premia do not vary with the underlying risk of the seller's portfolio. If a seller imposing higher counterparty risk on a buyer gets the same premium payments as a seller imposing lower counterparty risk, then sellers will have an incentive to be undercapitalized. Thompson, however, argues that there is a mitigating effect when the protection buyer has private information about the risk exposure he seeks to insure. The buyer trades off lower-cost insurance against higher counterparty risk. The buyer understands that if he purchases cheap insurance from a poorly capitalized seller he takes on high counterparty risk, especially if he knows that the bond he is seeking to insure has a high probability of default. Accordingly, Thompson shows that a unique separating equilibrium may be obtained in which protection buyers with high risk exposure purchase expensive insurance from well-capitalized sellers with low counterparty risk and buyers with low risk exposure choose to purchase cheap insurance from sellers with higher counterparty risk. Thus, the very presence of a moral hazard problem for the protection seller helps mitigate a lemons problem on the side of protection buyers.

Biais et al. (2012b) characterize the optimal insurance contract between a risk-averse protection buyer and a risk-neutral protection seller with limited liability. As in Thompson (2010), the seller can hold more or less risky assets to back his obligations toward the buyer. The key trade-off they consider is a form of risk-return trade-off: The insurance contract could be secured with a lot of safe collateral earning a low return, but then the insurance premium would have to be higher to compensate the seller for the opportunity cost of investing in low-return assets.

Their model has three dates, with the buyer and seller agreeing to an insurance contract at the initial date. The contract specifies an insurance premium, damage payments, and also margin (or collateral) requirements for the seller. The buyer holds a risky asset (say, a risky bond) and seeks to hedge some of the risk of the asset (say, in the form of a CDS). The seller also has risky asset holdings $A > 0$ generating an expected unit return of $\overline{R}$ at the final date. At an interim date, the seller can rebalance his portfolio of assets so as to increase or decrease the overall riskiness of his portfolio. He can do so after observing a (public) signal on the likely required payment on the insurance contract. When this signal indicates that the insurance contract is under water, the insurance seller may choose to increase the riskiness of his portfolio in order to gamble for resurrection. This generates endogenous counterparty risk, since now the insurer's assets

[3] See Floyd Norris, "Porsche reinvents the short squeeze," *New York Times*, October 30, 2008.

[4] *Wall Street Journal*, October 31, 2008: "Behind AIG's Fall, Risk Models Failed to Pass Real-World Test."

[5] *Counterparty risk* is the risk that an undercapitalized protection seller may be unable to make all contractual payments on a derivative or other financial contract.