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Good and bad credit contagion: Evidence from credit default swaps ☆

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Abstract

This study examines the intra-industry information transfer effect of credit events, as captured in the credit default swaps (CDS) and stock markets. Positive correlations across CDS spreads imply that contagion effects dominate, whereas negative correlations indicate competition effects. We find strong evidence of contagion effects for Chapter 11 bankruptcies and competition effects for Chapter 7 bankruptcies. We also introduce a purely unanticipated event, in the form of a large jump in a company's CDS spread, and find that this leads to the strongest evidence of credit contagion across the industry. These results have important implications for the construction of portfolios with credit-sensitive instruments.

Introduction

In recent years, the financial industry has made tremendous progress in credit risk modeling. Building on advances in market risk models, financial institutions are now developing quantitative tools to manage the credit risk of their overall portfolios. The key insight of these models is that financial risk needs to be measured in the context of a portfolio, instead of on a stand-alone basis. Their main difficulty, however, is the measurement of correlations for extreme credit events, which are by definition relatively rare but nevertheless drive the tails of the credit loss distributions.

Often, credit events seem to cluster. For example, Moody's reports that default rates reached 3.7% in 2001, which is a “statistical extreme.” In the previous 30 years, the average default rate was only 1.2%. There is also industry clustering: in 2002, the telecommunication sector accounted for 56% of all corporate bankruptcies in terms of dollar debt defaulted, or 31% of all issuers. Such positive correlations can be defined as “credit contagion,” but surely must depend on the characteristics of the credit event, as well as of the company and industry. Credit contagion has important consequences for the construction of credit-sensitive portfolios for the banking and investment management industry. For example, the pricing and risk measurement of collateralized debt obligations (CDOs) requires quantifying correlations among underlying credits, and in particular, accounting for the heavy tails possibly induced by contagion dynamics. Indeed, investors in CDOs

incurred large losses in May 2005 when Standard & Poor's downgraded General Motors and Ford to speculative grade. These unexpected losses were due to deficient assumptions about credit risk correlations.

Once portfolio risk is measured, it can be managed. The heightened interest in credit risk explains the phenomenal growth of the credit derivatives market, which now exceeds $26,000 billion in notional amount, up from $40 billion in 1996, according to the June 2006 survey by the International Swaps and Derivatives Association (ISDA). Single-name credit default swaps (CDSs) are the most popular credit derivatives products. These new instruments allow institutions to exchange their credit risks and are essential tools for the management of credit risk.

At the same time, the CDS market provides a high-quality data source for the measurement of credit risk, heretofore not available. Previous studies on contagion have relied exclusively on stock prices, which are useful for some purposes but have only limited applications to the risk measurement of corporate debt portfolios. This study uses the recently developed and increasingly liquid CDS market to assess intra-industry credit contagion.

A better understanding of credit contagion is crucial to the proper specification of default correlations in second-generation credit risk models.[1] In current portfolio credit risk models, default correlations across obligors are introduced through dependencies on common risk factors only. Financial distress across companies is driven by *common economic factors*, such as negative shocks to cash flows across the industry. In particular, reduced-form models can incorporate correlations between defaults by allowing hazard rates to be stochastic and correlated with macroeconomic variables.

One issue, however, is whether such models can generate sufficient dependencies across obligors to fit the observed default patterns.[2] Das, Duffie, Kapadia, and Saita (2007) find evidence of excess clustering of credit events conditional on their set of common factors. More recent models try to account for the observed clustering. Some models add *counterparty risk*, which occurs when the default of one firm causes financial distress on other firms with which the first firm has close business ties (Davis and Lo, 2001; Jarrow and Yu, 2001). Yet another class of models focuses on the *updating of beliefs*, which arises when investors learn from other defaults. For example, the failure of Enron led investors to reassess their views of the quality of accounting information from other firms. Collin-Dufresne, Goldstein, and Helwege (2003) and Giesecke (2004) show that this can lead to a contagion risk premium. Generally, a “contagion effect” implies positive default correlations.

There could be cases, however, of negative default correlations. As an example, Bethlehem Steel benefited from the demise of its major rival, LTV Corporation. This “competitive effect” arises because, with a fixed demand for the product, remaining firms can capture new clients from the displaced firms, or generally gain market power. Even before liquidation occurs, financial distress can generate competitive effects if customers become reluctant to do business with the affected firms, perhaps because of a loss of reputation for supplying high-quality products (Maksimovic and Titman, 1991).

These two effects, contagion and competition, can coexist and the observed effect will be the net result of the two. This paper provides cross-sectional evidence on these two effects. A unique feature of this study is the use of the CDS data in addition to stock price data. We use a comprehensive CDS daily spread dataset spanning the period from 2001 to 2004. A CDS seller provides insurance against default risk of a reference entity. In return, the protection buyer makes periodic payments. The annual payment, expressed as a percentage of the notional value of the contract, is called the CDS spread. This provides a direct measure of credit risk for the underlying reference entity from a very liquid market.

Moreover, CDS spreads are superior to the spread between corporate and Treasury bond yields, which are sensitive to the choice of the benchmark risk-free rate and can reflect other factors that are not related to default risk, such as tax differences between Treasury and corporate bonds.[3] Chen, Lesmond, and Wei (2006), for example, find that the cross-section of yield spreads is strongly related to liquidity indicators such as bond bid-ask spreads, which suggests that liquidity is an important component of bond yield spreads. Recent research by Blanco, Brennan, and Marsh (2005) and Zhu (2006) also provides empirical evidence that the CDS market leads the bond market in terms of price discovery. The CDS market is also complementary to the stock market because some credit events imply differing movements across these markets. An increase in leverage, for example, leads to higher credit risk or wider CDS spreads but can create a wealth transfer to shareholders, in which case the stock price appreciates. In this situation, stock prices cannot be good measures of credit risk, unlike the CDS market.

The previous literature has used bankruptcy filings as credit events, although credit rating agencies include various events in their definition of default. Moody's, for example, includes bankruptcy, failure to pay interest and/or principal, and a distressed exchange, that lowers the financial obligation or helps the borrower avoid defaults. In the United States, bankruptcies include Chapter 11 reorganization and Chapter 7 liquidation. Chapter 11 protects a firm from its creditors while it works out a formal plan of reorganization and is designed to save economically viable firms that are in temporary distress. In contrast, Chapter 7 forces the liquidation of the distressed firm. Under Chapter 11, the bankrupt firm might reemerge with lower costs, as a result of debt forgiveness or concessions from unions, for example, which is unfavorable to competitors. As a result, we would expect stronger competitive effects under Chapter 7 than Chapter 11.

Our study significantly extends the work of Lang and Stulz (1992), who examine the intra-industry effect of Chapter 11 bankruptcies in the stock market. They report significant contagion effects from Chapter 11 bankruptcies based on 59 filings over the period 1970–1989. Chapter 7 bankruptcies seem to lead to competitive effects, but the sample size of six filings is too small to draw strong conclusions. Our sample is much larger, with 272 Chapter 11 bankruptcies and 22 Chapter 7 bankruptcies. This gives more precise estimates of bankruptcy effects. In addition, the observed effects are much stronger with CDS data than the usual equity data.

Another major advantage of CDS markets is that we can directly identify major credit events by jumps in CDS spreads. This paper defines credit events more generally than those that trigger payments on credit derivatives (using the formal ISDA definition, this includes bankruptcy, failure to pay, and restructuring.) Here, jumps in the CDS spread are also defined as credit events even though they would not trigger payment on CDSs. This is because bankruptcy filings are often anticipated by markets. This mutes the reaction of market prices to the final event. By definition, extreme upward jumps in CDS spreads, which we call *jump events*, must be largely unanticipated credit events and, as a result, could give rise to stronger effects across industry competitors. We examine the effect of bankruptcies and jump events on the stock prices and CDS spreads of industry competitors. Our study is the first to examine credit events using jumps in the CDS market.

This paper makes a number of contributions to the literature. We find widely different patterns of industry CDS spread and stock price responses to these three credit events (Chapter 11 bankruptcies, Chapter 7 bankruptcies, and jump events). Our cross-sectional analysis also reveals that contagion and competition effects are reliably associated with industry characteristics. Such results can be used to further our understanding of credit correlations. In addition, we provide evidence that contagion effects are better captured in the CDS market than the stock market. Finally, our work adds to the growing empirical research on credit default swaps, an interesting market in its own right.[4]

The remainder of this paper is structured as follows. Section 2 presents the research framework and hypotheses. Section 3 describes the data and explains research methods. Section 4 then presents the empirical findings. The conclusions are summarized in Section 5.

Section snippets

Research hypotheses

The major concern of our study is whether a marked deterioration in the underlying creditworthiness of an issuer will negatively or positively affect the credit risk of its industry peers. Presumably, the effect will depend on the type of credit event, company, and industry. Because we want to focus on the tail of the credit risk distribution, we identify extreme credit events, selected as bankruptcies and large jumps in CDS spreads.

Bankruptcies are indeed severe credit events but can be…

The credit default swap dataset

A credit default swap contract is the simplest type of credit derivative. The buyer of the contract makes periodic payments over the life of the contract, in exchange for protection against default or other credit events specified in the contract. The seller agrees to compensate the buyer for the difference between the par value and the market value of the reference bond if the reference entity (the obligor) experiences a credit event. Essentially, the CDS market allows the exchange of credit…

CDS market reactions of industry rivals to credit events

The main contribution of this paper is a detailed comparison of industry reactions to credit events conditional on event types. The principal results are presented in Table 4. Panels A, B, and C report industry rivals' CDS spread reactions around Chapter 11 bankruptcies, Chapter 7 bankruptcies, and jump events, respectively. The left panels report the distribution of spread changes, CSCs; the right panels report the distribution of abnormal spread changes, CASCs. For each case, the table…

Conclusions and implications

Das, Duffie, Kapadia, and Saita (2007) indicate that it is particularly important to check whether current credit risk models are consistent with observed contagion dynamics. To provide a solid empirical foundation for such models, this paper examines information transfer effects within industries around different types of credit events.

Using a novel database of CDS spreads, the paper shows that intra-industry effects depend on the type of credit event. Chapter 11 bankruptcies create contagion…

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