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How the Subprime Crisis went global: Evidence from bank credit default swap spreads

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A B S T R A C T

How did the Subprime Crisis, a problem in a small corner of U.S. financial markets, affect the entire global banking system? To shed light on this question we use principal components analysis to identify common factors in the movement of banks' credit default swap spreads. We find that fortunes of international banks rise and fall together even in normal times along with short-term global economic prospects. But the importance of common factors rose steadily to exceptional levels from the outbreak of the Subprime Crisis to past the rescue of Bear Stearns, reflecting a diffuse sense that funding and credit risk was increasing. Following the failure of Lehman Brothers, the interdependencies briefly increased to a new high, before they fell back to the pre-Lehman elevated levels – but now they more clearly reflected heightened funding and counterparty risk. After Lehman's failure, the prospect of global recession became imminent, auguring the further deterioration of banks' loan portfolios. At this point the entire global financial system had become infected.

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1. Introduction

One enduring question about the financial turbulence that engulfed the world starting in the summer of 2007 is how problems in a small corner of U.S. financial markets – securities backed by sub-

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prime mortgages accounting for only some 3 per cent of U.S. financial assets – could infect the entire U.S. and global banking systems. Moreover, while the banking system became affected in a generalized fashion by the crisis, the fortunes of banks differed substantially in terms of the market assessment (e.g. differentials in the impact on their share prices) and on the scale of government intervention received. In particular, whether the decision to let Lehman Brothers fail was a critical mistake that unleashed a global economic and financial tsunami will be debated for years. Some say that the authorities should have known that investors perceived banks' fortunes as intertwined, so that letting one fail was bound to undermine confidence in the others. Others say that Lehman Brothers was unique and everyone knew it.¹ The crisis that affected the global financial system, in this view, did not reflect the decision to let this one institution fail. Rather it reflected deteriorating global economic and financial conditions that undermined the position of banks as a class.

This paper seeks to shed further light on these issues. We analyze the risk premium on debt owed by individual banks as measured by banks' credit default swap (CDS) spreads, focusing on the CDS spreads of the 45 largest financial institutions in the U.S., the U.K., Germany, Switzerland, France, Italy, Netherlands, Spain and Portugal.²

We use principal components analysis (PCA) to extract the common factors underlying weekly variations in the CDS spreads of individual banks. If the spreads for different banks move independently, then we can infer that the risk of bank failure is driven by bank-specific factors. If they move together, then we infer that banks are perceived as subject to common risks. This provides us with the first bit of evidence on how the crisis spread. In addition to estimating the importance of common factors, we attempt to ascertain what they reflect. We examine the association between the common factors on the one hand and real economy influences outside the financial system, transactional relationships among banks, and transactional influences between banks and other parts of the financial system on the other hand.³

We reach the following conclusions. The share of common factors was already quite high, at 62 percent, prior to the outbreak of the Subprime Crisis in July 2007. Banks' fortunes rose and fell together to a considerable extent, in other words, even before the crisis. These common factors were associated with U.S. high-yield spreads – the premium paid relative to Treasury bonds by U.S. corporations that had less than investment grade credit ratings – which we take as an indicator of the perceived probability of default by less creditworthy U.S. corporations, and in turn reflects economic growth prospects.⁴ For obvious reasons, those defaults and the growth performance that drives them have major implications for the condition of the banking system even in normal times.

The share of the variance accounted for by common factors then rose to 77 percent in the period between the July 2007 eruption of the Subprime Crisis and Lehman's failure in September 2008. This is

¹ Among other things, whereas other institutions could be saved because they had adequate collateral against which the U.S. Treasury and Federal Reserve could lend, Lehman did not.

² These swaps are insurance contracts. The buyer of the CDS makes payments to the seller in order to receive a payment if a credit instrument (e.g. a bond or a loan) goes into default or in the event of a specified credit event, such as bankruptcy. The spreads are, in effect, a measure of the credit risk or the insurance premium charged. This measure has several advantages over the traditional measures which are based on banks' balance sheet information. First, the CDS spreads are forward looking since they encompass available information with respect to expected default risk. Balance sheet data only reflects ex-post information on the institutions' performance. Second, CDS spreads are timely updated without the need to rely on (subjective) interpolation techniques, whereas balance sheet data are only available at quarterly frequency. The CDS spreads also offer advantages over other market measures of risk based on, e.g. bond spreads and stock returns. They are the most actively traded derivatives and lead bond (Blanco et al., 2005) and stock (Acharya and Johnson, 2007) markets in price discovery. Also, bond spreads may reflect factors other than the ones related to default risk (due to, for example, different tax treatments) and are sensitive to the choice of the benchmark risk-free rate (Jorion and Zhang, 2007). However, there has been a recent concern that speculative pressure within the CDS market sometimes causes the swaps to become delinked from their function of hedging against default (Soros, 2009). See also Longstaff et al. (2010), who analyze spreads on sovereign CDS, and Zhang et al. (2009), who examine the determinants of spreads on corporate CDS spreads.

³ To be clear, we do not attempt to identify causality. However, the association measures offer a rich set of stylized characterizations. These characterizations are likely to be the basis for defining and probing more subtle hypotheses.

⁴ These high-yield spreads have been found to be good predictors of U.S. GDP growth at horizons of about a year, reflecting a financial-accelerator interaction between credit markets and the real economy (Mody and Taylor, 2003; Mody et al., 2007). Because European high-yield spreads are closely correlated with U.S. spreads and, as such, offer no additional information, U.S. high-yield spreads are also a measure of global prospects.

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