Journal of Financial Stability 9 (2013) 269–286

Contents lists available at ScienceDirect

Journal of Financial Stability

journal homepage: www.elsevier.com/locate/jfstabil

Understanding the market reaction to shockwaves: Evidence from the failure of Lehman Brothers

Nicolas Dumontaux[a,1], Adrian Pop[b,*]

[a] Banque de France, French Prudential Supervision Authority, Banking Studies Division, 61 rue Taitbout, 75436 Paris Cedex 09, France
[b] University of Nantes (LEMNA), Institute of Banking & Finance, Chemin de la Censive du Tertre, BP 52231, 44322 Nantes Cedex 3, France

ARTICLE INFO

Article history:
Received 22 August 2012
Received in revised form 12 January 2013
Accepted 2 April 2013
Available online 10 April 2013

JEL classification:
G21
G28

Keywords:
Bank failures
Systemic risk
Too-big-to-fail
Contagion
Market discipline
Credit default swap

ABSTRACT

The spectacular failure of the 150-year-old investment bank Lehman Brothers on September 15th, 2008 was a major turning point in the global financial crisis that broke out in the summer of 2007. Through the use of stock market data and credit default swap (CDS) spreads, this paper examines investors' reaction to Lehman's collapse in an attempt to identify a spillover effect on the surviving financial institutions. The empirical analysis indicates that (i) the collateral damage was limited to the largest financial firms; (ii) the institutions most affected were the surviving "non-bank" financial services firms; and (iii) the negative effect was correlated with the financial conditions of the surviving institutions. We also detect significant abnormal jumps in CDS spreads that we interpret as evidence of sudden upward revisions in the market assessment of future default probabilities assigned to the surviving financial firms.

1. Introduction

The spectacular failure of the 150-year-old investment bank Lehman Brothers has been perceived by many to be a major turning point in the global financial crisis that broke out in the summer of 2007. The specter of systemic risk sparked widespread fears of a full-scale collapse of the US financial sector due to financial contagion and concerns about significant disruption in international financial markets outside the United States. According to the bankruptcy petition #08-13555, filed on Monday, September 15th, 2008, Lehman's total assets of $639 billion made it the largest failure in US history, about six times bigger than the largest previous failure (see Table 1).[2]

There has been considerable debate among academics and researchers about the nature, triggering events, and extent of systemic risk during the recent global financial crisis. This debate undoubtedly reflects more general difficulties in properly defining the concept of systemic risk and the absence of a broad consensus in the financial literature.[3] The various definitions place at the core of the concept of systemic risk the notion of *contagion*, which describes the propagation mechanisms of the effects of shocks from one or more financial firms to others. The phenomenon of contagion is widely perceived as being more dangerous in the financial sector than in other industries because (i) it generally occurs faster; (ii) it spreads more broadly within the industry; (iii) it results in a

* Corresponding author. Tel.: +33 2 40 14 16 54; fax: +33 2 40 14 16 50.
E-mail addresses: nicolas.dumontaux@acp.banque-france.fr (N. Dumontaux), adrian.pop@univ-nantes.fr (A. Pop).
[1] Tel.: +33 1 42 92 66 18; fax: +33 1 42 92 60 23.

[2] Financial media extensively discussed the case during the week that followed the bankruptcy announcement, often using a broad array of metaphors and bombastic terms: "a tsunami sweeping the financial industry" and "sending tremors worldwide"; "a financial Armageddon" having "a massive effect on hundreds of other businesses, from real estate to restaurants"; "a perfect storm" sparking "a chain reaction that sent credit markets into disarray"; "the biggest economic firestorm since the Great Depression" that "presented too great a threat to the financial system and the economy" and "set off a cascade of events around the globe"; "a devastating blow to the global financial world" (excerpts from articles published by leading financial newspapers in the United States on days following September 15th, 2008).

[3] Kaufman (1994, 2000), De Bandt and Hartmann (2002), and Kaufman and Scott (2003) propose excellent surveys of contagion and systemic risk in banking and financial systems. Taylor (2009a) provides an updated and interesting discussion of systemic risk in the context of the current financial crisis and highlights the urgent need for an *operational* definition of the concept.

1572-3089/$ – see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.jfs.2013.04.001

Table 1
The largest US public company bankruptcy filings (1980–2009).

No.	Company name[a]	Description	Bankruptcy date	Assets[b]
1	*Lehman Brothers Holdings Inc.*	Investment Bank	09/15/2008	691,063
2	*Washington Mutual, Inc.*	Savings & Loan Holding Co.	09/26/2008	327,913
3	WorldCom, Inc.	Telecommunications	07/21/2002	103,914
4	General Motors Corporation	Manufactures & Sells Cars	06/01/2009	91,047
5	*CIT Group Inc.*	Banking Holding Company	11/01/2009	80,448
6	Enron Corp.	Energy Trading, Natural Gas	12/02/2001	65,503
7	*Conseco, Inc.*	Financial Services Holding Co.	12/17/2002	61,392
8	Chrysler LLC	Manufactures & Sells Cars	04/30/2009	39,300
9	*Thornburg Mortgage, Inc.*	Residential Mortgage Lending Co.	05/01/2009	36,521
10	Pacific Gas and Electric Company	Electricity & Natural Gas	04/06/2001	36,152
11	Texaco, Inc.	Petroleum & Petrochemicals	04/12/1987	34,940
12	*Financial Corp. of America*	Financial Services & Savings and Loans	09/09/1988	33,864
13	*Refco Inc.*	Brokerage Services	10/17/2005	33,333
14	*IndyMac Bancorp, Inc.*	Bank Holding Company	07/31/2008	32,734
15	Global Crossing, Ltd.	Global Telecommunications Carrier	01/28/2002	30,185
16	*Bank of New England Corp.*	Interstate Bank Holding Company	01/07/1991	29,773
17	*General Growth Properties, Inc.*	Real Estate Investment Company	04/16/2009	29,557
18	Lyondell Chemical Company	Global Manufacturer of Chemicals	01/06/2009	27,392
19	Calpine Corporation	Integrated Power Company	12/20/2005	27,216
20	*New Century Financial Corporation*	Real Estate Investment Trust	04/02/2007	26,147

Source: New Generation Research, Inc., Boston, MA.
[a] Financial services firms in italic text.
[b] Pre-petition total assets, expressed in US$ million.

greater number of failures and larger losses to creditors; and (iv) it can affect otherwise solvent financial institutions (see Kaufman, 1994). For all these reasons, it is widely considered that systemic risk is the strongest argument justifying the intervention of public authorities in the financial sector.

Since the onset of the global financial crisis in August 2007, many large institutions at the core of the financial systems in developed and developing countries have been bailed out by public authorities in the name of contagion and systemic risk. In the United States, for instance, financial institutions (FIs) like Bear Stearns, Fannie Mae, Freddie Mac, American Insurance Group, and Citigroup were all considered systemically important or "too big (or interconnected) to fail" (TBTF) and the government decided to protect them from failure by injecting huge amounts of taxpayers' money. However, in the particular case of Lehman, the outcome was drastically different: the government allowed the nation's fourth-largest investment bank to collapse when no viable private-sector solution could be found.[4] The government justified its decision on the grounds that, unlike in the case of Bear Stearns, market participants had sufficient time to prepare themselves to absorb the collateral damage that would potentially be caused by the imminent collapse of Lehman. Moreover, in contrast to Bear Stearns, Lehman had direct access to short-term facilities from the Federal Reserve.[5] Top government officials also pointed out that they viewed Fannie Mae and Freddie Mac as far more systemically important than Lehman because the two mortgage giants own or guarantee about half of home loans originated in the US.[6]

For many observers, however, the failure of Lehman was an event triggering systemic risk and panic in financial markets. For instance, Acharya et al. (2009) mention Lehman's failure as a clear example of systemic risk that materialized during the global financial crisis of 2007–2009. They note, with the benefit of hindsight, that Lehman contained "considerable systemic risk" and led to "the near collapse of the financial system." Portes (2008) takes a more sanguine view suggesting that the government decision not to rescue Lehman was a policy error that exacerbated the adverse effects of the financial crisis. The critics generally share the view that the systemic crisis that emerged in the aftermath of Lehman's failure could have been mitigated if the government had intervened.

Other influential economists espoused the opposite view, arguing that it was not Lehman's failure but the uncertainty surrounding the ill-conceived 2½-page draft proposal for the Troubled Asset Relief Program (TARP) released several days afterwards that effectively triggered the global panic of autumn 2008 (see e.g. Taylor, 2009b; Cochrane and Zingales, 2009). They use event studies based on graphical analysis to show that basic risk indicators of stress in the financial sector, such as the LIBOR-OIS and CDS spreads, reacted apathetically to Lehman's collapse. By contrast, the same stress indicators exhibited very strong negative responses just after the Federal Reserve Board Chairman Ben Bernanke and Treasury Secretary Henry Paulson testified to the Senate Banking Committee about TARP several days later, on September 23rd and 24th, 2008. In the same vein, Rogoff (2008) contends that in the case of Lehman the government applied the right medicine at the right time and approves its decision to deny taxpayers' money to rescue the troubled investment bank. Mishkin (2011) acknowledges that the collapse of Lehman was followed by other events, among which was the struggle to get TARP approved by the US Congress, that were at least as important in causing the subprime crisis to

[4] During the days leading up to September 15th, 2008, there were a number of rescue packages being discussed aimed at finding an "industry solution" in an attempt to stabilize Lehman and calm the markets. For instance, on September 13th, Timothy F. Geithner, then president of the New York Federal Reserve, called a 6 p.m. meeting on the future of Lehman, which discussed the possibility that the government would need to orchestrate an orderly liquidation of its assets (*New York Times*, September 13th, 2008). The failure to find a white knight ready to assume Lehman's liabilities is clearly due to the government decision to refuse any financial facilities to potential interested parties, as was the case for instance in March 2008 when JP Morgan Chase acquired the troubled investment bank Bear Stearns.

[5] Immediately after the near-failure of Bear Stearns, on March 17th, 2008, the Federal Reserve created an exceptional lending facility (the Primary Dealer Credit Facility, PDCF) that for the first time enabled investment banks and other primary dealers to access liquidity in the overnight loans market for short-term needs. The PDCF was intended to mitigate adverse effects from future failures of investment banks (see Adrian et al., 2009, for further details).

[6] In his press conference on Monday, September 15th 2008, the US Secretary of the Treasury Henry M. Paulson Jr. clearly stated: "The actions with respect to Fannie Mae and Freddie Mac are so extraordinarily important, not only to our capital markets, but to making sure we have plenty of finance in housing, because that is going to be the key to turning the corner here" (*Dow Jones Newswire*, September 15th, 2008).