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The collateral squeeze of 2008

William Allen and Richhild Moessner analyse data from US commercial banks and Morgan Stanley in the months before and after Lehman Brothers' collapse.

Following Lehman Brothers' bankruptcy on September 15, 2008, the funding pressures that had affected financial firms since 2007 reached a new pitch. Lehman Brothers was a 158-year-old institution that had survived the panic of 1907 and the Great Depression. After it declared bankruptcy, concerns about counterparty risk escalated, and the financial crisis intensified to become the worst since that of 1931, which had led to the Great Depression.

Events earlier in 2008, notably JPMorgan's purchase of Bear Stearns with the help of a loan from the Federal Reserve, had reinforced a prevailing belief in financial markets that, when push came to shove, the US authorities would rescue any large, systemically important financial firm that was threatened with bankruptcy. The failure of Lehman Brothers shocked the market by invalidating this belief, and concerns about counterparty risk became widespread and very serious. This precipitated an intensified collateral squeeze in US financial markets, which drew in large amounts of dollar funds from other countries. This article tells how this collateral squeeze affected US financial firms, and in so doing highlights how the effects of the large increase in concern about counterparty risk following the failure of Lehman Brothers spread from the US to elsewhere.

A year in the offing The collateral squeeze had begun in 2007 when it became clear that many of the mortgage-backed securities that had been used as collateral in financial markets were much less valuable than had been assumed. This resulted in leveraged firms, including broker-dealers and other kinds of shadow banks, facing an increase in the haircut of surplus collateral required by counterparties in exchange for loans. Demands for larger haircuts were accompanied by an increase in the cost, and a decrease in the availability, of unsecured borrowing, as evidenced by a widening in Libor-overnight indexed swap spreads for all major currencies.

Shadow banks typically use their assets to collateralise their borrowing. To do so, they have to pledge a margin of surplus collateral over the value of the

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loan, known as a haircut. In principle, the maximum amount of assets a shadow bank can hold is determined by its capital and unsecured liabilities, and by the haircuts to which it is subject. Increases in haircuts can have a dramatic effect. For example, if average haircuts increase from 5% to 10%, then the maximum amount of assets that a shadow bank can theoretically hold falls from 20 times capital and unsecured liabilities to ten times. In other words, it can halve.

*Lehman Brothers,
New York*

In a collateral squeeze, therefore, there is a risk of shadow banks having to make extremely large asset sales, thereby aggravating their plight by sparking falls in securities prices. After Lehman Brothers failed, many shadow banks were subject to the same pressure to sell assets, and the buyers were likely to be unleveraged so-called “real-money investors”, who paid for the assets by drawing down commercial bank deposits. The funds withdrawn by real-money investors from banks were then transferred to shadow banks in payment for securities. The shadow banks could then use the proceeds to repay collateralised loans to the commercial banks. The assets and liabilities of the commercial banks, therefore, could fall in parallel. The deleveraging of the shadow banking system was matched by deleveraging of the commercial banking system.

As our case study shows, the deleveraging of the shadow banking system became much more intense after the failure of Lehman Brothers. Not only did collateral margins increase, but also market participants became much less tolerant of unsecured exposures to their trading counterparties. Why? Because the bankruptcy caused financial market participants to reassess the credit standing of other firms that they had previously assumed were either too big, or too important, to fail. Trading counterparties demanded larger surplus margins of collateral against secured exposures, and were less willing to place surplus collateral with others.

Table 1: Condensed balance sheet of Morgan Stanley, 2008 (\$ billion)

	End–Nov 2007	End–May 2008	End–Aug 2008	Sep, 29 2008 (1)	End–Nov 2008	End–Dec 2008
Assets						
Liquidity reserves	118	169	179	–	130	147
Other assets	927	862	808		529	530
<i>(Of which pledged to Fed as collateral for PDCF and TSLF loans)</i>	–	20	8	225	36	15
Total assets	1,045	1,031	987	–	659	677
Liabilities						
Capital	31	34	36	–	52	49
Deposits and uncollateralised securitised liabilities	256	270	253	–	217	241
Payables	216	304	325	–	121	129
Other liabilities, including collateralised borrowing	542	423	373	–	270	258
Total liabilities	1,045	1,031	987	–	659	677
<i>(Borrowings from PDCF and TSLF)</i>		3	2	100	20	11

Sources: 10-K and 10-Q reports, information released by Federal Reserve about use of credit and liquidity facilities (see www.federalreserve.gov/newsevents/reform_transaction.htm).

Note: (1) Date of peak usage of the PDCF and TSLF. See text for more details. (2) End of September. Source: FCIC report, chapter 20, page 363.

The case of a large broker-dealer A case in point was Morgan Stanley, which, like Lehman Brothers, was a large broker-dealer, but not a commercial bank – although it became a bank-holding company on September 23, 2008, which improved its access to Federal Reserve funds. Nevertheless, Morgan Stanley, though seriously affected by the crisis, negotiated it successfully.

Some of the effects of the crisis can be illustrated by reference to Morgan Stanley's experiences, notably the impact of Lehman Brothers' failure on unsecured lending. Relevant information is summarised in the condensed balance sheets shown in table 1. Between the end of August and November 2008, Morgan Stanley experienced a massive withdrawal of unsecured funding. The main element in this was an outflow of \$203 billion on account of payables, which we surmise included reductions in collateral provided by trading counterparties to Morgan Stanley, and notably by the hedge funds to which Morgan Stanley provided prime brokerage services. Prime brokerage clients also exercised their contractual rights to borrow from Morgan Stanley.¹

Morgan Stanley, like any prudent financial company, had contingency plans. It maintained a Contingency Funding Plan, and it held liquidity reserves, which it described as follows (end-August 10-Q report, page 93):

These liquidity reserves are held in the form of cash deposits with banks and pools of unencumbered securities. The parent company liquidity reserve is managed globally and consists of overnight cash deposits and unencumbered US and European government bonds and other high-quality collateral. All of the unencumbered securities are central bank eligible.

In the same report (page 93), Morgan Stanley disclosed that:

During the month of September 2008, the credit markets experienced significant disruption. In response to the market disruption, the Company implemented certain Contingency Funding Plan actions to further support its liquidity position. These actions included, but were not limited to: (i) hypothecation of previously unencumbered collateral; (ii) selective reduction in certain funding and balance sheet intensive businesses; (iii) selective asset reduction through sales; and (iv) pledging collateral to federal government-sponsored lending programs. The Company's total liquidity reserve levels subsequent to August 31, 2008 declined, but remain at levels well in excess of those observed on average for 2007.

Morgan Stanley's total unsecured funding fell by \$239 billion between the end of August and the end of November 2008. The company drew down \$49 billion of liquid assets, so that its liquid assets met about a fifth of the loss of unsecured funding. The company reduced its other assets by \$279 billion, or 35%, in the three months, so that its total assets decreased by \$328 billion. It also raised new capital from investors. The company could use its liquid assets to buy time, while selling other assets. The reduction in total assets was about one-and-a-half times the reduction in capital and unsecured borrowing – much less than the maximum multiplier indicated above. This suggests that Morgan Stanley had surplus collateral at the beginning of the crisis, in addition to its liquidity reserve, which it was able to deploy with the help of the facilities provided by the Fed.

The Federal Reserve's large array of emergency financial support facilities provided considerable relief, even to broker-dealers that were not regulated by the central bank and were therefore not usually eligible for such support. The facilities most relevant to the collateral squeeze were:

- the Primary Dealer Credit Facility (PDCF), which was an overnight collateralised loan facility for primary dealers in US government securities. The total amount that the Fed lent to all borrowers through the PDCF peaked at \$155.8 billion on September 29, 2008; it had fallen to just \$8.8 billion by the end of November;
- the Term Securities Lending Facility (TSLF), under which primary dealers could borrow Treasury securities, which they could repo for cash, in exchange for less liquid securities. The total value of Treasury securities borrowed under the TSLF peaked at \$270.0 billion from September 26 to October 1, 2008; it had fallen to \$218 billion by the end of November; and
- the commercial paper funding facility (CPFF), under which the Fed bought asset-backed commercial paper directly from eligible issuers.

Morgan Stanley used all these facilities. The firm's borrowings from the PDCF and TSLF taken together peaked at \$100.5 billion on September 29, at which time it had pledged \$224.5 billion of assets to the Fed. By the end of



Morgan Stanley,
New York

Americasroof

Table 2: US commercial banks: changes in selected balance sheet items: September 3, 2008 to end-December 2008 (\$ billion)

	Domestically-chartered banks	Foreign-related institutions	All commercial banks
Total assets	+1,093	+225	+1,319
Cash assets	+515	+236	+751
Deposits	+653	-258	+415
Borrowings from others	+161	+73	+235
Net due to related foreign offices	+165	+410	+575
Change in deposits with Federal Reserve Banks	–	–	+ 850

Source: Federal Reserve tables H8, H4.1.

November, the date of its 10-Q report, its borrowings under these facilities had fallen to \$20.1 billion. The fact that these borrowings had fallen by four-fifths between 29 September and 30 November suggests that the liquidity pressures on the firm had eased during October and November.

The inflow of funds from abroad After Lehman Brothers failed, there was a large inflow of dollar funds to the US from the foreign affiliates of commercial banks located in the US. Between 3 September and 31 December 2008, the net debt of commercial banks located in the US to their foreign offices increased by \$575 billion, of which \$165 billion was accounted for by US-chartered banks and the remainder, \$410 billion, by foreign-related banks (see table 2).

What was happening in financial markets during this period? Many financial companies were being required to find additional collateral to secure their financing, while it became impossible to use some assets as collateral for loans.² Selling assets was a necessary reaction to the collateral squeeze, but an asset sale generates cash at the expense of an asset that might otherwise have been usable as collateral. Likewise, secured borrowing involves exchanging an asset for cash. The PDCF and TSLF enabled broker-dealers to exchange assets that were no longer usable as collateral in the market for cash (or Treasury securities that were exchangeable for cash).

Unsecured borrowing (or drawing down of unsecured deposits), however, is especially valuable in a collateral squeeze, since it generates cash without any immediate loss of collateral. Unsecured borrowing was difficult during the 2008 crisis, except for financial companies that had foreign affiliates that they could induce to place funds with them in the form of new deposits or loans, or to repay existing debts owed to the US operation as part of intra-group fund transfers.

Against this background, the increase of \$575 billion in commercial banks' net debt to foreign offices between September 3 and December 31, 2008 shown in table 2 is understandable. It is interesting that \$410 billion of the total increase came from foreign banks rather than US-chartered banks; possibly broker-dealers drew down deposits with foreign banks in the US to meet collateral demands (deposits with foreign banks fell by \$258 billion during the period).

In fact, most of the external inflow to the US took place in October and November. Commercial banks' net debt to foreign offices increased by just \$74 billion between September 3 and October 1, but it had increased by a further \$457 billion by December 3. The inflow was facilitated by swap lines provided by the

Federal Reserve to foreign central banks, which enabled the foreign offices of commercial banks located in the US to remit dollar funds to the US.³ It seems, therefore, that the inflow of funds from abroad played a large role in easing the collateral squeeze in US financial markets during October and November, and in financing the large repayments of borrowings from the PDCF.

The sudden market aversion to unsecured exposures to broker-dealers was not the only cause of the post-Lehman collateral squeeze. For example, Pihlmann & van der Hoorn (2010)⁴ suggest central bank reserve managers around the world withdrew about \$150 billion of deposits from commercial banks in September and October 2008. These will have largely been replaced by secured loans provided by the home central banks of the commercial banks concerned. On plausible assumptions about the disposition of the funds withdrawn from bank deposits, the net effect will have been to drain collateral from the commercial banking system, thereby aggravating the collateral squeeze. **Other factors**

We speculate that additional demands for non-dollar collateral were much smaller than those for dollar collateral, so that collateral-driven flows of funds to the US were much larger than those into other countries. We conclude that the additional flow of funds into the US was largely a response to the collateral squeeze in the US and that the funds were largely used, directly or indirectly, to meet additional collateral demands.⁵ It is, therefore, not surprising that they mainly ended up on the balance sheet of the Fed, as table 2 suggests. □

The views expressed are those of the authors and are not necessarily the views of the Bank for International Settlements.

Notes

1. See the report of the United States Financial Crisis Inquiry Commission (chapter 20) for an account of the fortunes of Morgan Stanley immediately after Lehman Brothers failed. The FCIC reports that the cash and securities withdrawn from Morgan Stanley and other non-bank prime brokers were transferred to prime brokers which were in bank holding companies, and to custodian banks (page 360).
2. See Gary Gorton and Andrew Metrick, *Securitized Banking and the Run on Repo*, NBER Working Paper No. 15223, August 2009, and International Monetary Fund, Global Financial Stability Report, October 2010. It seems that margins of surplus collateral demanded by lenders did not change much in the tri-party repo market. For an interesting description of that market and its behaviour during the crisis, see Adam Copeland, Antoine Martin and Michael Walker, *The Tri-Party Repo Market before the 2010 Reforms*, Federal Reserve Bank of New York Staff Report No. 477, 2010, available at http://data.newyorkfed.org/research/staff_reports/sr477.pdf. 2010. However, the FCIC report (page 361) says that, after Lehman Brothers failed, the two clearing banks in the tri-party market became concerned about their intra-day exposures to broker-dealers and demanded more collateral.
3. See William Allen and Richhild Moessner, Central Bank Co-operation and International Liquidity in the Financial Crisis of 2008–09, Bank for International Settlements Working Paper No. 310. 2010. See also Committee on the Global Financial System (CGFS), *The Functioning and Resilience of Cross-Border Friendly Markets*, CGFS Papers No. 37, 2010; CGFS, *Funding Patterns and Liquidity for Internationally Active Banks*, CGFS Papers No. 39, 2010.
4. See figure 6 in Jukka Pihlmann and Han van der Hoorn, 'Procyclicality in Central Bank Reserve Management: Evidence from the Crisis', IMF Working paper WP 10/150, 2010.
5. They could also have been used to replace secured borrowing if access to secured borrowing was curtailed due to lack of acceptable collateral (such as US Treasuries).

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