

Shadow Banking and the Crisis of 2007-08

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ome economists have noted that recessions accompanied by banking crises tend to be deeper and more difficult to recover from than other recessions — even those associated with other types of financial crises. For instance, the bursting of the dot.com bubble in 2001 was a very important financial event that was not accompanied by a protracted recession. The potential of banking crises to do lasting economic harm led policymakers to adopt safeguards in the 1930s that have essentially eliminated traditional banking panics in the U.S. Although the Great Recession of 2007-09 was associated with a protracted financial market disruption — and the failures of some large banks like Washington Mutual and IndyMac — we did not observe widespread withdrawals from commercial banks, as in a traditional banking crisis. However, economists Gary Gorton and Andrew Metrick show that it can be viewed as a banking crisis that originated in the *shadow banking system*. In the last 30 years, institutions very similar in function to traditional banks have grown outside regulatory oversight. One lesson of the financial crisis is that these institutions are as vulnerable to panics as traditional banks because they are subject to similar risks.

ECONOMIC FALLOUT OF BANKING CRISES

Banking crises can harm the economy. Financial crises are usually associated with bad economic outcomes — recessions. One particular kind of financial crisis to which economists have devoted a lot of attention is the type that originates in the banking sector. A *banking crisis* is a widespread withdrawal of funds from depository institutions — that is, a run on the liabilities of a large number of banks.¹ Like other financial crises, banking crises are usually associated with economic

downturns, and there is evidence that banking crises often worsen economic downturns as weaknesses at the banks spill over into financial problems for households and firms. When financial events affect consumption and investment decisions by households and nonfinancial firms, economists say that they have *real effects*.

Many researchers have provided evidence that banking crises can make

¹ A common form of bank liability is the demand deposit contract — a typical checking account that most people have at a commercial bank.

economic contractions more severe and more protracted, with various studies emphasizing different channels.

In a highly influential book providing a systematic account of banking crises in the United States from 1867 to 1960, Milton Friedman and Anna Schwartz identify the reduction in the wealth of bank shareholders and the decline in the money supply that usually follow a business downturn accompanied by a banking crisis as the main causes of a further drop in real economic activity. A decline in the money supply has real effects because households and firms need money to pay for their purchases. Thus, a decline in the money supply leads to a decline in transactions and real economic activity.²

Looking at the banking crises of the 1930s, Ben Bernanke identified the increased cost of intermediation services — the costs that banks incur when assessing the creditworthiness of borrowers — following the recurrent banking crises of the early 1930s as causing a significant reduction in the flow of funds from lenders to borrowers through the banking system. This constricted flow of credit impeded the real economy's recovery from the Great Depression.

Michael Bordo, Barry Eichengreen, Daniela Klingebiel, and Maria Soledad Martinez-Peria provide cross-country evidence of the real effects of banking crises over a period of 120 years. They also find that recessions that are accompanied by banking crises are more severe than those that are



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² For more on this subject, see my 2012 *Business Review* article, "The Optimum Quantity of Money."

not. Moreover, they provide evidence that banking crises plague advanced and developing economies equally, confirming the view that a banking crisis is not just a concern for countries at low levels of economic development.

Anatomy of a banking crisis.

Although every banking crisis is different, those that occurred up to and including the Great Depression follow a similar pattern. Let me briefly describe the typical sequence of events that leads to a banking crisis.

Bad news arrives. Usually at the peak of an economic expansion, bad news about the quality of the assets held by a group of banks (or a major bank) leads to larger withdrawals than usual. For instance, a failed attempt by the Knickerbocker Trust Company to corner the copper market and the subsequent decision of a major bank to no longer clear checks issued by the Knickerbocker triggered a run on the Knickerbocker on October 18, 1907, sparking the Panic of 1907. The fact that it was one of the largest depository institutions in New York contributed to the public's perception that other banks could also be in distress.

Banks sell assets to meet the increase in withdrawals. To meet the higher demand for cash, a bank initially draws down its cash reserves. But its reserves may not be enough if the withdrawal process quickly intensifies. The bank can also sell some of its assets to cover withdrawals.

Selling assets causes asset prices to fall. If many banks are trying to sell assets at the same time, the assets can be sold only at a large discount. Think of what would happen if four neighbors on your block put their houses up for sale on the same day as you did. All else equal, you would have to lower your price to get anyone to buy. Financial asset markets work the same way. For easily marketable fixed-income assets such as Treasury securities or certain corporate bonds traded in large

markets, buyers can still be found by selling at a discount. However, a large fraction of a bank's assets consists of mortgages and commercial and industrial loans made to households and firms whose creditworthiness is unknown to the wider market, which means the bank would probably find few if any buyers. And anyone willing to purchase the loan would demand a substantial discount to compensate for the lack of information about the borrower's creditworthiness. Thus, selling assets on short notice may be extremely costly for a bank.

Depositors begin a run on healthy banks. Banks facing large withdrawals may borrow in the interbank market, where banks routinely borrow reserves

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from each other. But if banks want to borrow more reserves than usual, they must pay a higher interest rate to the lending bank. Larger discounts in asset markets and higher interest rates in interbank markets are usually signs of financial strain. If widespread distrust of banks causes depositors to withdraw their funds even from healthy banks, a line is crossed. The number of banks that want to sell assets increases, resulting in even steeper discounts, and the number of banks that want to borrow in the interbank market also increases, making it harder for each borrower bank to obtain a loan. As this process intensifies, we have a full-scale panic.³

³ We can think of these withdrawals as a way for depositors to monitor their banks. That is, by withdrawing their money, depositors are checking whether the bank is healthy enough to pay. This might explain why people decide to withdraw their funds even from banks initially viewed as safe and sound.

Banks suspend convertibility. The final step comes as banks react to widespread withdrawals. One way to stop the drain on funds is to temporarily suspend the convertibility of deposits into cash — banks may simply lock their doors — in an attempt to preserve capital until depositors calm down and things get back to normal. Strictly speaking, this is a breach of the demand deposit contract.⁴

This description of a typical banking crisis clearly reveals why banks are fragile: They fund illiquid assets with deposits that can be withdrawn at will. Economists usually refer to this practice as *maturity transformation*. It is important to mention that this role played by banks has a value for society.

People have a preference for holding highly liquid assets — assets that are easy to sell without taking a loss — but the most profitable investments take a long time to pay off. Banks offer demand deposit contracts that give people ready access to their funds and a higher rate of return than they would get by holding liquid assets directly. Banks are able to offer a higher rate of return to depositors because they pool resources in such a way that permits them to invest a significant fraction of their assets in higher-yielding, long-term projects such as mortgages and other types of long-term loans. Normally, funding illiquid assets with short-term liabilities works fine. But when depositors begin to worry about losses, a bank run may ensue.

⁴ In the second half of the 19th century, the decision to suspend convertibility was usually coordinated by private bank associations.

U.S. bank runs essentially disappeared in the 1930s. The introduction of federal deposit insurance in 1933 with the creation of the Federal Deposit Insurance Corporation (FDIC) ended the banking crises that had been recurrent events in the U.S. even before the Great Depression. The government's deposit guarantees largely relieved depositors of the need to constantly monitor the health of banks. In turn, the government has undertaken the monitoring of banks through regulation and supervision. But regulations are not costless. FDIC premiums, capital requirements, and regulatory restrictions on bank portfolios increase banks' costs. These costs are informally referred to as *regulatory taxes*. And banks, like any other firm, have a strong incentive to avoid taxes.

THE RISE OF SHADOW BANKING

The Great Recession in the U.S. was associated with a severe financial crisis, but we did not observe people rushing to their banks to withdraw their deposits. However, a closer look suggests that the crisis was not very different from a typical banking crisis, except that it was triggered outside the traditional banking sector. According to Gary Gorton and Andrew Metrick, the financial crisis can be viewed as a banking crisis that originated in the *shadow banking system*.⁵

The shadow banking system is a set of institutions that carry out functions very similar to those of traditional banks but that are largely unregulated. They perform the same kind of maturity transformation traditionally performed by commercial banks. Thus, the shadow banking system, despite its somewhat unwholesome-sounding name, provides a useful service to society. This is to say that

⁵ See also chapter 2 in Gary Gorton's 2010 book.

shadow banking is not necessarily a bad thing. The problem is that, under certain circumstances, these financial institutions can become fragile — that is, subject to panics.

An important fact about the shadow banking system is that it has grown significantly in the last 30 years. For instance, Gorton and Metrick estimate that just before the financial crisis of 2007-08, the assets of the shadow banking system were at least as large as the assets of commercial banks.⁶ Another important fact about the shadow banking system is that it has grown outside the oversight of regulators. Why did this happen? As banking and finance in general have expanded in recent decades, part of that growth has occurred in the shadow system, largely to avoid the costs associated with regulation.⁷

As I will now explain, the shadow banking system works pretty much like a typical commercial bank even though the parties involved in the transactions are not the bankers and depositors that we typically have in mind. For the most part, I will follow Gorton and Metrick and focus on the market for repurchase agreements (or repos) as the main cause of the panic in the shadow banking system and one of the centers of the financial crisis. But the shadow banking system also includes other markets and institutions such as asset-backed commercial paper in which the same basic structure (risky, illiquid assets funded by short-term liabilities) recurs.

The repo market. The repo market is a market for short-term, mainly overnight, collateralized loans. To understand why repos work pretty much

⁶ According to Gorton and Metrick, this is probably an underestimate because this comparison involves the assets of only a fraction of the shadow banking system.

⁷ For more on the rise of shadow banking, see the review by Tobias Adrian and Adam Ashcraft.

like banking and to see why the repo crisis was actually a banking crisis, it is necessary to look at how repo transactions work.

Let me start by identifying the “depositors,” the repo lenders. These are largely institutional investors such as pension funds and large corporations that need some place to invest large amounts of money for short periods. They also want to obtain higher yields than those offered by regulated commercial banks. Most important, these institutional investors want their funds to be safe.⁸

One alternative is the repo market. A firm can make an overnight loan to a borrower. To make the loan safe, the firm receives collateral usually in the form of government bonds, which are liquid and fluctuate little in value over short periods. If the borrower is unable to return the funds, the lending firm will simply seize the collateral. Provided that the value of the underlying collateral does not change significantly over short periods, a repo transaction is safe for the repo lender.

Like a bank depositor, the repo lender has ready access to its money and has the opportunity to reallocate its funds toward some other use on a daily basis. Thus, a repo transaction offers the firm both the convenience of having ready access to its funds and a level of safety not much different from that of a federally insured demand deposit. Until 2011, large commercial depositors could not receive interest on their short-term deposits, another motivation for them to seek an alternative place to park their funds.⁹ When the

⁸ It is also important to mention that the amounts these institutional investors wish to deposit are typically larger than the maximum amount insured by the FDIC.

⁹ As part of the Dodd-Frank Act, the Federal Reserve Board in July 2011 repealed Regulation Q, which had prohibited banks from paying interest on corporate checking accounts.

repo borrower repurchases the security from the repo lender, he or she also pays interest to the lender.

As should be clear by now, the “banker” in the repo transaction is the repo borrower, which typically is an investment bank or the broker-dealer arm of a large bank holding company. These institutions use the funds they borrow in the repo market to finance a wide range of activities, some of them quite risky. As long as the repo is collateralized by a Treasury security, it is not fragile in the same sense as traditional banking because the asset that collateralizes the repo is highly liquid and can be easily sold. If the repo borrower can't repay on time, the repo lender can simply take the collateral and sell it for cash.

This is basically how the shadow banking system works. Depositors (institutional investors and large corporations) need a place to park liquid funds that provides them with ready access to their money, pays an interest rate higher than that offered by traditional banks, and spares them the expense and hassle of managing their own cash.¹⁰ Bankers (investment banks and broker-dealer firms) are willing to provide such a product in the form of repo transactions. Finally, safe collateral such as U.S. Treasury bonds are essential to make this financial transaction work.

The growth of the repo market increased the demand for collateral. The growth of the repo market prior to the financial crisis of 2007-08 was extraordinary. The volume of repo

transactions reported by primary dealers (those who trade directly with the Federal Reserve System) had grown from roughly \$2 trillion in 1997 to \$7 trillion in 2008. This estimate, of course, leaves out unreported transactions. Gorton and Metrick estimate that the overall size of the repo market just before the financial crisis was roughly the same as the size of the traditional banking sector as measured by total assets.¹¹

As we have seen, Treasury securities play an important role in the functioning of the shadow banking system. However, repo markets are not the only source of demand for Treasury securities. They are also used as collateral in derivative markets and settlement systems. Furthermore, many foreign governments, especially the central banks of developing countries such as China, demand Treasury securities because they are safe and highly liquid.¹² For instance, in 2005 only 48.6 percent of total U.S. debt was privately held, according to the Federal Reserve Bank of San Francisco. About a third of that privately held debt was held in reserve by foreign central banks, which means that only about a third of total U.S. debt (or \$2.6 trillion) was available for private transactions.

Unlike for other goods and services, higher demand for Treasury securities doesn't automatically provide an incentive to increase supply. The supply of government bonds is determined by government borrowing, a direct consequence of fiscal policy. For instance, the decision to reduce the fiscal deficit in the U.S. in the 1990s and early 2000s may have contributed to a shortage of government bonds

available for repo transactions.

One piece of indirect evidence that government bonds were in short supply is the practice in financial markets known as rehypothecation, which simply means that traders can use the same collateral to secure more than one transaction. To the extent that this practice had become widespread before the crisis of 2007-08, traders may have had an incentive to develop other methods to conduct a growing number of transactions with a limited amount of good collateral.¹³

Mortgage-backed securities helped satisfy the demand for collateral. The solution to the shortage of good collateral was found in another form of financial innovation that had evolved significantly since the 1980s: securitization. Commercial banks make many loans to consumers and firms. Instead of holding these loans on its own balance sheet, a bank can sell them to a shell company the bank creates and manages for this purpose, called a special purpose vehicle (SPV). The SPV funds the acquisition of these assets (mortgages, car loans, credit card receivables, etc.) by issuing asset-backed securities (ABS) that, as the name implies, are backed by the loans the SPV holds and that become the SPV's liabilities when it sells them to investors in the capital markets.¹⁴ Figure 1 shows how commercial banks fund loans through securitization.

Most important, this organizational form allows financial institutions to increase the scale of their overall operations without increasing their balance sheets, which would require them to increase their regulatory capital. Thus, setting up an SPV is a way of avoiding

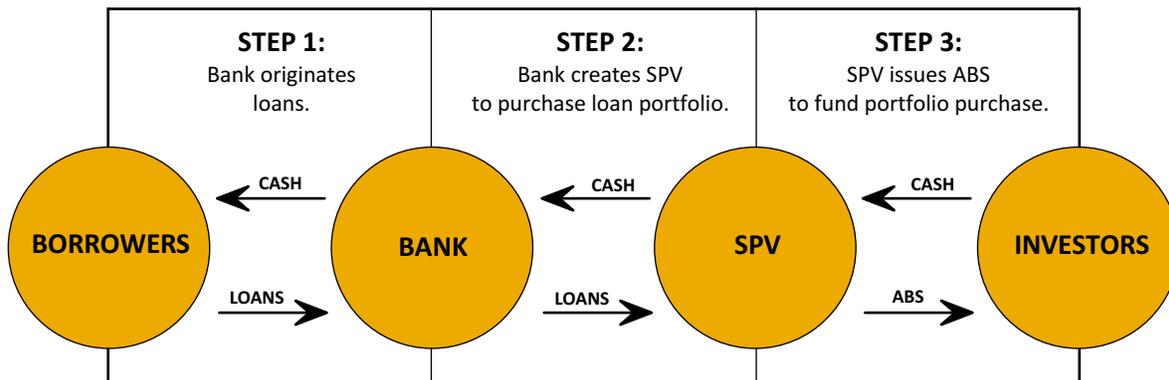
¹⁰ As Robert Lucas puts it: “In a monetary economy, it is in everyone's private interest to try to get someone else to hold non-interest-bearing cash and reserves. But someone has to hold it all, so all of these efforts must simply cancel out. All of us spend several hours per year in this effort, and we employ thousands of talented and highly trained people to help us. These person-hours are simply thrown away, wasted on a task that should not have to be performed at all.”

¹¹ They also cite a range of estimates by other economists of the same order of magnitude.

¹² Foreign demand for Treasury securities increased significantly in the 1990s and 2000s, the flip side of the large trade surpluses run by China and some other developing countries.

¹³ For more on the role of rehypothecation, see the 2011 *Business Review* article by Cyril Monnet.

¹⁴ See the chapter by Gary Gorton and Nicholas S. Souleles.

FIGURE 1**Securitization and Shadow Banking**

capital requirements, which increases a financial institution's overall degree of leverage by raising its total assets relative to its capital.¹⁵

If carefully chosen, a portfolio of loans backing the ABS can be safe and predictable. Thus, by making it possible to bundle individual loans and sell claims on the loan portfolio on the market, this form of financial innovation offers an alternative to using deposits to fund banks' illiquid assets. When carefully executed, securitization is extremely valuable for both banks and investors.

The housing boom in the U.S. in the 2000s was financed in this way. The large increase in the number and size of mortgage loans created a large supply of a particular type of ABS called mortgage-backed securities (MBS). As the name suggests, MBS are ABS that bundle mortgages. Given the growth of the repo market and the relative scarcity of government bonds, the use of ABS as collateral in the repo market seemed to be a reasonable solution to the shortage of collateral. Gorton and Metrick have argued that the use of ABS as collateral in the

¹⁵ In this article, I emphasize avoiding regulatory taxes as a motivation for securitization. See Ronel Elul's article for an account of the efficiency benefits of securitization.

repo market had increased significantly prior to the financial crisis. As I discuss below, this is still a controversial claim. Despite a wealth of anecdotal evidence, we have no precise estimates of the share of repo transactions that used ABS as collateral.

CRISIS IN THE SHADOW BANKING SYSTEM

ABS as repo collateral created the conditions for a banking panic. As long as the repo was collateralized by Treasury securities, lenders (depositors) didn't have to worry about the borrower's risk of default or about the value of the underlying collateral. But this changed when the repo was collateralized by ABS.

In 2007, house prices in the U.S. started to decline, raising concerns that homeowners could start defaulting on their mortgages in large numbers. In turn, lenders with repo collateralized by MBS started worrying about potential losses. What was the reason for their concern? After all, as I have argued, when carefully executed, securitization can generate a safe asset for investors, and indeed many MBS were built to be nearly riskless under normal conditions.

Usually, ABS are designed to be safe. ABS reduce credit risk in two ways: diversification and overcollateralization. For instance, pooling mort-

gages that had been originated in cities all over the U.S. is one way to create diversification. Under normal circumstances, large numbers of homeowners in all regions of the country are very unlikely to default on their mortgages at the same time. Overcollateralization simply involves pooling enough mortgages to guarantee that it can generate enough cash flow to make the promised payments to investors even if some of the borrowers default. The amount of overcollateralization required to make an MBS safe usually depends on certain fundamental market indicators, including the trend in house prices. Significantly, the statistical models used to design, price, and provide credit ratings for MBS estimated default rates based on data collected during periods of generally rising house prices and during periods when housing price declines were localized.¹⁶

Bad news arrived. Now consider a scenario in which investors expect house prices to rise and, contrary to their expectations, house prices begin to fall, and keep falling. That is what happened in the U.S. in 2007. When house prices fell for several consecu-

¹⁶ Indeed, Christopher Foote, Kristopher Gerardi, and Paul Willen have documented that people had overly optimistic beliefs about house prices.

tive months, an increasing number of investors believed that the average rate of default on any given pool of mortgages was going to rise. Their fears became more concrete when in the summer of 2007, two hedge funds sponsored by Bear Stearns that had invested heavily in subprime mortgages filed for bankruptcy and BNP Paribas suspended withdrawals from three money market mutual funds that were exposed to subprime mortgages. An important indicator of their fears was that the ABX index, a measure of the risk of default on subprime MBS, began to rise. This raised concerns that many SPVs were not holding enough collateral to generate sufficient cash flow to make good on the promised payments to investors.

Another reason to have doubts about the true value of MBS was that many investors did not know where the risks were concentrated. Although many MBS were wisely built to be nearly riskless, several classes of MBS contained a disproportionate fraction of mortgages that had been extended to people of dubious creditworthiness. And the risk of these subprime mortgages was particularly sensitive to the decline in housing prices.

Repo lenders ran on repo borrowers, including healthy borrowers. A depositor with serious doubts about the underlying value of the collateral can do two things: either ask for more collateral or simply not renew the repo. Both actions can be interpreted as a decision to withdraw funds from the shadow banking system, much like the decision bank depositors make to withdraw funds from their bank when they believe they might not be able to get all their money out.

Repo lenders initially asked for more collateral, but ultimately they simply refused to renew their loans. In other words, the repo market froze.¹⁷ Because investors could not tell safe MBS from risky MBS in most cases,

they withdrew their funds even from shadow banks that probably had safe MBS to secure repos. This problem was severe enough to turn the initial panic into a systemic event — a banking crisis.

Thus, the financial crisis was not very different from the banking crises of old. Investors in the repo market behaved pretty much like bank depositors did during U.S. banking crises before 1933. And the outcome was certainly very similar. The initial banking crisis spread to other financial markets, and several financial firms either failed or had to be rescued by the federal government to prevent further failures.

A caveat. Gorton and Metrick's explanation for the events that sparked the 2007-08 financial crisis depends on the claim that the fraction of the repo market that used ABS as collateral was large enough to generate a systemic event. But this claim has been a source of controversy among financial economists. For instance, Arvind Krishnamurthy, Dmitry Orlov, and Stefan Nagel have argued that a relatively small share of repo transactions in which money market mutual funds and securities lenders were the repo lenders was collateralized by ABS prior to the 2007-08 crisis. However, these authors focus on a relatively small segment of the repo market, the triparty repo market, while Gorton and Metrick study the larger bilateral repo market, for which there is as yet no direct evidence about the collateral used in transactions.¹⁸ Furthermore, Krishnamurthy and coauthors note that while the share of the transactions collateralized

¹⁷ See also Yaron Leitner's article explaining why markets freeze. See also Benjamin Lester's article for a discussion of regulatory interventions in response to market freezes.

¹⁸ Triparty repo transactions take place between two counterparties intermediated by a dealer bank. Bilateral repo transactions occur between two counterparties without an intermediary.

by ABS was modest, such transactions were more concentrated among a small number of large banks that experienced significant problems. So focusing on average shares may be misleading. Nonetheless, the details of Gorton and Metrick's account of developments in the repo market will remain a source of controversy until researchers can collect more complete data. Moreover, some evidence suggests that the financial crisis was actually triggered in another part of the shadow banking system. See the accompanying discussion, *Crisis in the ABCP Market*.

SHADOW BANKING PANIC MAY HAVE DEEPENED RECESSION

It is still too early to fully disentangle the relative importance of the various factors that led to a particularly deep recession and a particularly slow recovery. But like many earlier recessions associated with banking crises, the crisis in the shadow banking system may have played a significant role in the depth of the downturn and the slow recovery.

The crisis in the shadow banking system has significantly reduced the ability of commercial banks to originate and renew loans, creating ongoing problems for households and firms that rely on bank loans. Some economists have even argued that the effects of the collapse can persist for an extended period. For instance, Viral Acharya has argued that traditional lenders cannot easily fill the role that shadow banks had played in providing credit to the economy. This void has certainly contributed to the delay in restoring the flow of credit to a volume consistent with that of a recovery from a typical recession that had not been accompanied by a banking crisis.

The shadow banking system has not fully recovered from the financial crisis. Even though it has continued to operate with government support, it is

unclear whether the volume of operations will return to that observed prior to the crisis anytime soon, or whether it should. Since the crisis, the government-sponsored enterprises Fannie Mae and Freddie Mac have carried out nearly all securitizations in housing markets. At this point it is unclear whether the private sector will ever play the same

role in the creation of securitized assets that it had before the crisis.

CONCLUSION

One lesson of the financial crisis is that institutions quite similar to banks tend to rise up outside of regulatory purview. This is an important matter because this shadow banking system

is fragile and subject to panics. And banking panics — regardless of where they occur — have pernicious economic repercussions. This potential for economic harm had led some economists before the crisis to propose tighter regulation of the shadow banking system. In the aftermath, policymakers were working to write new rules. 

Crisis in the ABCP Market

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ome economists have argued that problems in another segment of the shadow banking system can be identified as the prime cause of the 2007-08 financial crisis. For example, in his discussion of Gorton and Metrick's account of the crisis, Andrei Shleifer has provided evidence that the contraction in the asset-backed commercial paper (ABCP) market happened before the contraction in the repo market. Thus, he suggests that problems in the ABCP market may have triggered the financial crisis.

Commercial paper is a short-term debt instrument that both financial and nonfinancial firms use to finance ongoing operations. Financial firms issue commercial paper to fund a wide array of activities, including the purchase of long-term securities such as MBS. One form of funding through the issuance of commercial paper that has increased significantly in the last 20 years is ABCP. A financial firm can set up an SPV to purchase a portfolio of securities by issuing commercial paper on the capital markets. ABCP maturities can vary from one day (as in a typical repo transaction) to 90 days. The typical maturity of ABCP is 30 days. Again, we have something that looks like a bank, but it operates outside the regulatory system.

The main investors in ABCP are money market mutual funds. Similar to the investors in the repo market, money market mutual funds also need a convenient place to invest some of their resources for short periods. These investors also want their investments to be safe and to yield an attractive return. Provided that the assets securing ABCP are of sufficiently high quality, such an investment vehicle is fairly safe, at least under normal market conditions. The short-term duration of ABCP gives investors an opportunity to “withdraw” their funds in case they decide to invest elsewhere or in case they have doubts about the quality of the assets securing ABCP.

The issuers of ABCP are SPVs that are sponsored by large financial institutions, including traditional commercial banks.^a The SPVs allow these institutions to fund a wide array of securities at any moment. The short duration of ABCP means that an SPV has to roll over its debt every time an ABCP matures.

Many SPVs used the proceeds from the sale of ABCP to invest in MBS (i.e., the collateral backing ABCP were MBS). As we have seen, the perception of MBS as a safe debt instrument can suddenly change once the trend in house prices becomes clearly downward. Starting in the summer of 2007, many investors stopped refinancing maturing ABCP because of potential exposure to subprime mortgages via MBS. A full-scale panic ensued as the spread on overnight ABCP over the federal funds interest rate (the rate of interest on unsecured loans in the interbank market in the U.S.) increased from 10 basis points to 150 basis points. The outstanding amount of ABCP shrank steadily after the summer of 2007, despite several interventions by the Federal Reserve System in the form of liquidity facilities, offering short-term credit to banks to refinance maturing ABCP.

The ABCP market also provides another example of financial transactions carried out outside the oversight of regulators that are very similar to traditional banking. Thus, a closer look at the crisis in the ABCP market has also demonstrated that it was not very different from previous banking crises.

Perhaps the most balanced view is that while the financial crisis began in the shadow banking system, it had many epicenters. Furthermore, the structural similarities among many of the institutions in the shadow banking system — illiquid assets funded by short-term liabilities — and the trigger for the crisis — the decline in housing prices — tell much the same story.

^a A sponsor financial institution usually provides credit guarantees to the SPV. For a detailed description of the ABCP market, see the paper by Marcin Kacperczyk and Philipp Schnabl.

REFERENCES

Acharya, Viral. "Understanding Financial Crises: Theory and Evidence from the Crisis of 2007-2008," *NBER Reporter* (April 2013).

Adrian, Tobias, and Adam B. Ashcraft. "Shadow Banking: A Review of the Literature," Federal Reserve Bank of New York Staff Report 580 (October 2012).

Bernanke, Ben. "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *American Economic Review*, 73 (1983), pp. 257-276.

Bordo, Michael, Barry Eichengreen, Daniela Klingebiel, and Maria Soledad Martinez-Peria. "Is the Crisis Problem Growing More Severe?" *Economic Policy*, 16 (2001), pp. 51-82.

Elul, Ronel. "The Economics of Asset Securitization," Federal Reserve Bank of Philadelphia *Business Review* (Third Quarter 2005).

Federal Reserve Bank of San Francisco, "Who Are the Largest Holders of U.S. Public Debt?" <http://www.frbsf.org/education/publications/doctor-econ/2005/july/public-national-debt>.

Foote, Christopher, Kristopher Gerardi, and Paul Willen. "Why Did So Many People Make So Many Ex Post Bad Decisions? The Causes of the Foreclosure Crisis," Public Policy Discussion Papers 12:2, Federal Reserve Bank of Boston (2012).

Friedman, Milton, and Anna Schwartz. *A Monetary History of the United States, 1867-1960*. Princeton University Press, 1963.

Gorton, Gary B. *Slapped by the Invisible Hand: The Panic of 2007*. New York: Oxford University Press, 2010.

Gorton, Gary B., and Andrew Metrick. "Securitized Banking and the Run on Repo," *Journal of Financial Economics*, 104 (2012), pp. 425-451.

Gorton, Gary B., and Nicholas S. Souleles. "Special Purpose Vehicles and Securitization," in Rene Stulz and Mark Carey, eds., *The Risks of Financial Institutions*. University of Chicago Press, 2006.

Kacperczyk, Marcin, and Philipp Schnabl. "When Safe Proved Risky: Commercial Paper During the Financial Crisis of 2007-2009," *Journal of Economic Perspectives*, 24 (2010), pp. 29-50.

Krishnamurthy, Arvind, Stefan Nagel, and Dmitry Orlov. "Sizing Up Repo," NBER Working Paper 17768 (2012).

Leitner, Yaron. "Why Do Markets Freeze?" Federal Reserve Bank of Philadelphia *Business Review* (Second Quarter 2011).

Lester, Benjamin. "Breaking the Ice: Government Interventions in Frozen Markets," Federal Reserve Bank of Philadelphia *Business Review* (Fourth Quarter 2013).

Lucas, Robert E., Jr. "Inflation and Welfare," *Econometrica*, 68 (2000), pp. 247-274.

Monnet, Cyril. "Rehypotheccation," Federal Reserve Bank of Philadelphia *Business Review* (Fourth Quarter 2011).

Sanches, Daniel. "The Optimum Quantity of Money," Federal Reserve Bank of Philadelphia *Business Review* (Fourth Quarter 2012).

Schleifer, Andrei. "Comments on Gorton and Metrick: Regulating the Shadow Banking System," *Brookings Papers on Economic Activity*, 2 (2010), pp. 298-303.