The term “shadow banking” has been attributed to 2007 remarks by economist and money manager Paul McCulley to describe a large segment of financial intermediation that is routed outside the balance sheets of regulated commercial banks and other depository institutions. Shadow banks are defined as financial intermediaries that conduct functions of banking “without access to central bank liquidity or public sector credit guarantees.”¹ As shown in Figure 1, the size of the shadow banking sector was close to $20 trillion at its peak and shrunk to about $15 trillion last year, making it at least as big as, if not bigger than, the traditional banking system.² Given its size and role in the financial crisis, it would be useful to understand the mechanics of shadow banking. To do so, some basics of traditional banking need to be understood first.

Simply put, banks are intermediaries that obtain funds from lenders in the form of deposits and provide funds to borrowers in the form of loans.³ The principal function of a bank is that of maturity transformation—coming from the fact that lenders prefer deposits to be of a shorter maturity than borrowers, who typically require loans for longer periods. It is important to point out that, because of sudden liquidity needs of individual agents or businesses, this function cannot be performed by individual agents or businesses alone—therein lies the rationale for a bank. Banks are able to achieve this transformation by exploiting the fact that only a small fraction of depositors have liquidity needs at a given time. Therefore, the bank can store a small fraction of its deposits in the form of liquid assets (readily convertible to cash) and lend out the rest in the form of term (illiquid) loans. This function is also known as qualitative asset transformation because, by changing the maturity of its assets, the bank also changes their liquidity.⁴ However, by performing this function, a bank is essentially rendered fragile. The fragility comes from the fact that even a healthy bank can be the victim of a bank run. If all depositors demand their deposits back, the bank would have to liquidate all its assets (even those that are not liquid) to fulfill depositors’ demands. Since almost no bank can liquidate all its assets within a short period without suffering a loss in value, a problem of illiquidity can essentially turn into a problem of insolvency and the collapse of the bank. Accordingly, depositors are acting rationally when they withdraw their
Banks view raising such capital as costly and often engage in practices that would help prevent them from having to do so. One such practice is the creation of off-balance-sheet entities. ... This practice is often viewed as one of the major reasons behind the creation and growth of shadow banking.

The Deposit End of the Shadow Banking System

Most advanced economies have solved the problem of bank runs by the creation of deposit insurance. In 1980, deposit insurance in the U.S. was capped at $100,000; after the crisis, this limit was raised to $250,000. This meant that the demand for safe, short-term investments from large, cash-rich financial and nonfinancial companies remained unfulfilled. The shadow banking system fulfilled this demand in two ways—both of which made extensive use of widely available financial securities.

The first of these arrangements uses repo,
Figure 2
The Creation of Securities from Loans

The diagram shows a simplified, five-step process for converting loan originations into final securities. First, auto loans, student loans, mortgages and other loans are originated by regulated commercial banks and unregulated financial firms. Second, a warehouse bank (aggregator) buys loans from one or more originators and pools the loans. Third, the pooled loans are sold to an administrator, usually a subsidiary of a large commercial or investment bank; the administrator creates a special purpose vehicle (SPV) to hold the loans; the SPV issues securities against loans held in its portfolio. Fourth, the securities created by the SPV are sold by an underwriter, typically an investment bank. Finally, the securities are bought by investors.

The process begins with origination of loans. An originator (e.g., a bank) originates loans and sells them to an aggregator/seller/sponsor (e.g., a warehouse bank). The aggregator/seller/sponsor processes the loans, creates a conduit or special purpose vehicle (SPV), and sells certificates to investors. The SPV issues securities against the loans held in its portfolio.

Processes and funds are as follows:
- **Originator**: Processes and funds individual loans
- **Aggregator/Seller/Sponsor**: Processes loans from originator and forms pools
- **Conduit/SPV**: Creates conduit or special purpose vehicle (SPV)
- **Underwriter**: Sells certificates to investor and collects offering proceeds
- **Investor**: Purchases securities

The diagram depicts the relationships between the parties involved in the process.

The section refers to the processes by which the securities used in the deposit end of the system are created, either to be used as collateral in a repo transaction or as investments for MMMFs. The processes described below are a simple prototype of numerous schematics involved in the creation of such securities. In practice, the chains used in warehousing, securitization and servicing can be significantly more complicated than the illustrations given below.

Financial intermediation has moved from an originate-to-hold model of traditional banking to an originate-to-distribute model of modern securitized banking. Economist Gary Gorton argued in a book last year that deregulation and increased competition in banking rendered the traditional model of banking unprofitable. In modern banking, origination of loans is done mostly with a view to convert the loan into securities—a
The process transforms longer-term loans with significant credit risk into instruments of shorter maturity and of considerably lower risk that are redeemable on demand.
The Special Purpose Vehicle Plays a Key Role in Shadow Banking

The Special Purpose Vehicles (SPV) are typically organized as trusts to which the seller/sponsor transfers the loan documents (receivables)—sometimes on a rolling basis. The trust issues securities or trust certificates, which are then sold to investors. Notably, SPVs are legal entities with no employees and no locations, merely created by the administrator to hold the pool of loans and generate the securities. Technically, an SPV is bankruptcy-remote; this implies that if the administrator (creator of the SPV) were to enter a bankruptcy procedure, the administrator's creditors cannot seize the assets of the SPV. On the other hand, administrators will often provide an implicit guarantee beyond their contractual obligations to provide support to the SPV in the event of deterioration in asset performance.13

The conduit for securitization is formed by the SPV and various third parties that provide liquidity and credit enhancements to increase the marketability of the security certificates sold to investors (Figure 3). In some cases, the maturity of the certificates issued is shorter than the maturity on the originated loans, requiring the conduit to roll over maturing securities to pay off investors. Consequently, investors are exposed to roll-over risk and may require some form of liquidity provision as insurance against such risk. In addition, investors can require credit enhancement (against credit risk on loans that may default) in the form of a letter of credit from a bank or insurance company. The entities providing the liquidity and credit enhancements, as well as administrative services, are external to the SPV. It is possible that the administrator of the SPV is the same entity providing the liquidity and credit enhancements.

Interestingly, the credit enhancements on the securities can also be internally generated. Two popular ways in which credit enhancement is achieved are overcollateralization and loan subordination (tranching). Overcollateralization is achieved when either the SPV purchases loans at less than face value or issues certificates whose total program size is less than that of the value of the loans purchased or both. Tranching is the process by which payouts on the obligations are sliced, or tranched, into classes, whereby the highest (senior-most) class of securities has seniority of claim over subordinated securities. Accordingly, the more senior-rated tranches are less risky and generally have lower yields and higher bond credit ratings than the lower-rated tranches. An SPV may sell tranches of various classes linked by a waterfall structure—a term referring to loans that are paid sequentially from the most senior-rated tranches to most-subordinate tranches (Figure 4). It is important to note that the liquidity and credit enhancements on the securities can be provided by one or all of the methods stated above.

The sequence of payouts from the repayment on loans determines the rating and liquidity of each class of securities. The lowest tranche is known as the equity tranche—because it refers to the practice whereby the administrator or underwriter retains this tranche to mitigate problems of moral hazard and adverse selection. However, this norm has often been violated in practice.14 At the peak of the recent financial boom in the U.S., underwriters were able to sell equity tranches to investors with appetites for high risk.
the deposit end—the providers of wholesale funding to the shadow banks. The two markets in which such runs are most likely are the repo market and the commercial paper market. The evidence on runs in the markets for wholesale funding demonstrated the parallel between traditional bank runs by depositors in the banking panics prior to 1934 and the recent panic in credit markets that relied on wholesale funding. As wholesale funding dried up for troubled shadow banks, they were forced to sell off assets in order to meet liquidity demands of investors. Such a fire sale of assets lowered the prices of assets on similar collateral throughout the market, raising the cost of funding for healthy shadow banks precipitously.

This trend was first pointed out for the repo market in a series of papers that are summarized in work by Gorton. In the interdealer repo market, a run occurred primarily through increased haircuts on the securities posted as collateral. In the case of some securities, especially those backed by troubled mortgage loans, the haircuts were close to 100 percent—implying that these assets were no longer eligible for repo transactions. An increase in the haircuts on the repo implies an increased demand for collateral on the same loan or, conversely, a reduction in the supply of funds for a given amount of collateral. Since the supply of collateral in the entire shadow banking system is fixed over the short run, this meant that there was a significant liquidity crunch (shortfall in the supply of funds) and a steep rise in the cost of funding through repo transactions.

In the case of funding through MMMFs, the panic was witnessed in two major shocks to the commercial paper market in 2007-2008. The first shock came around July-August 2007 with the collapse of certain financial entities that had invested heavily in subprime mortgages. This led investors to question the quality of even highly rated ABCP. As a result, the spread of ABCP over the federal funds rate increased from 10 basis points before the shock to 150 basis points in the days after the shock. The second and more severe shock occurred with the collapse of Lehman Brothers in September 2008. This led to a direct default on commercial paper issued by Lehman Brothers, $785 million of which was held by the Reserve Primary Fund—one of the largest MMMFs, with more than $65 billion in assets. Needless to say, the news of exposure triggered a run on this fund and quickly spread to other MMMFs. To stem the run on MMMFs, the U.S. Treasury announced a temporary deposit insurance covering all money market instruments only three days after the collapse of Lehman.

Conclusion

The reader may question the rationale behind the development of the shadow banking system and all its components. While some analysts have asserted that the shadow banking system is redundant and inefficient, it is not difficult to see the benefits of securitized banking. Securitization allows for risk diversification across borrowers, products and geographic location. In addition, it exploits benefits of both scale and scope in segmenting the different activities of credit intermediation, thereby reducing costs. Moreover, by providing a variety of securities with varying risk and maturity, it provides financial institutions opportunities to better manage their portfolios than would be possible under traditional banking. Finally, and contrary to popular belief, this form of banking increases transparency and disclosure because banks now sell assets that would otherwise be hosted on their opaque balance sheets.

In summary, the shadow banking system can be viewed as a parallel system—one that is a complement to and not a substitute for traditional banking. The challenge going forward is to harness the benefits and mitigate the risks and redundancies of such a parallel banking system.

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ENDNOTES

1, 2, 11, 14 See Adrian, Ashcraft, Boesky and Pozsar.
3 Strictly speaking, this description fits commercial banks, which along with thrift institutions (savings and loans and credit unions) make up the set of depository institutions in the U.S.
4 In addition, credit intermediation involves “brokerage,” whereby the bank also reduces pre- and post-contractual informational asymmetries between the borrower and the lender. Note that this brokerage function is not necessarily exclusive to credit intermediation because many other intermediaries, such as used-car dealers, perform a similar function. For more, see work by Greenbaum and Thakor.
5 This key insight developed by Bryant and formalized in Diamond and Dybvig is arguably the most celebrated work in banking theory.
6 See Diamond and Dybvig.
7 See Wheelock and Wilson.
8 See Morrison and White.
9 See Admati, DeMarzo, Hellwig and Pfleiderer.
10 See Anderson and Gascon for details on MMMFs and ABCPs.
11 The evidence is somewhat different for the tri-party repo market. See Copeland, Martin and Walker for details.
12 See Gorton and Souleles.

REFERENCES

Adrian, Tobias; Ashcraft, Adam; Boesky, Hayley; and Pozsar, Zoltan. “Shadow Banking.” Staff Reports 458, Federal Reserve Bank of New York, July 2010.

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