

Money, Liquidity, and Monetary Policy

By Tobias Adrian and Hyun Song Shin (*American Economic Review*, 2009)

Traditionally, banks were the dominant suppliers of credit, but their role has increasingly been supplanted by market-based institutions—especially those involved in the securitization process.

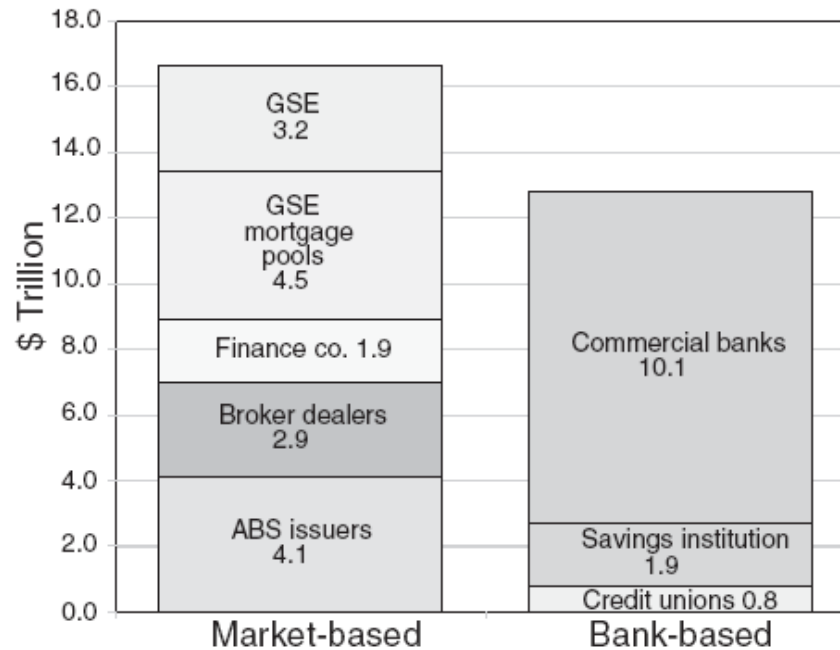


FIGURE 1. TOTAL ASSETS AT 2007:II

A similar picture holds for residential mortgage lending. As recently as the early 1980s, banks were the dominant holders of home mortgages, but bank-based holdings were overtaken by market-based holders.

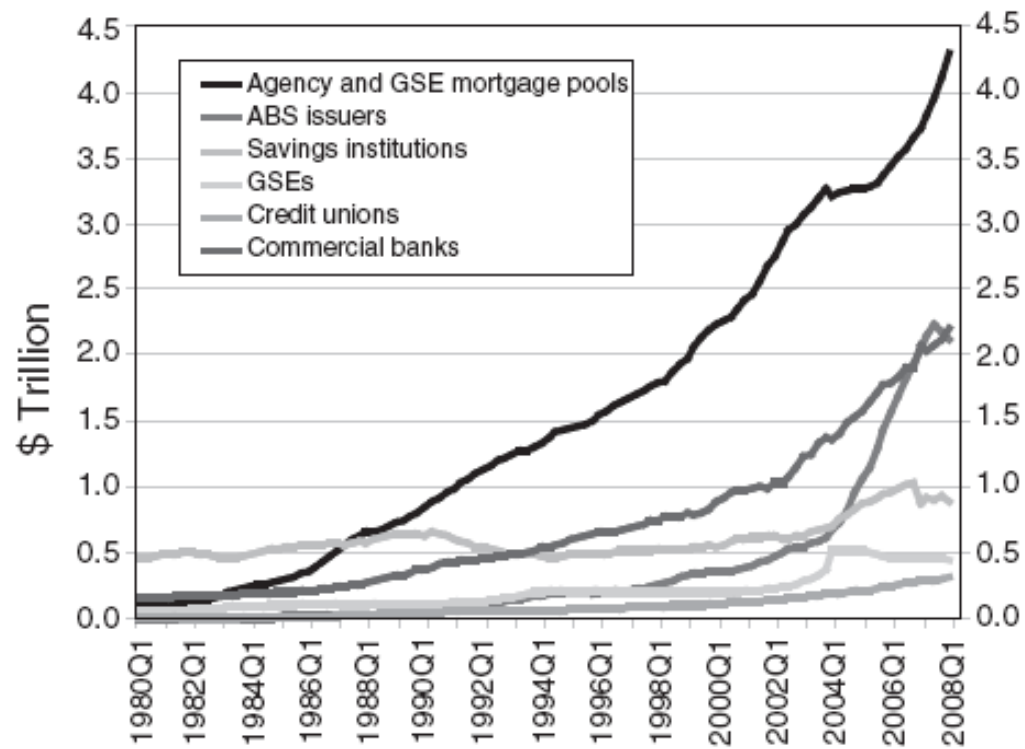


FIGURE 2. TOTAL HOLDINGS OF US HOME MORTGAGES BY TYPE OF FINANCIAL INSTITUTION

Bank-based intermediaries consist of commercial banks, savings institutions, and credit unions.

Market-based intermediaries include the government-sponsored enterprise (GSE) mortgage pools, private label mortgage pools, and the GSE holdings themselves, where a mortgage pool is a group of mortgages held in trust as collateral for the issuance of a mortgage-backed security.

Market-based holdings now constitute two-thirds of the \$11 trillion total of home mortgages.

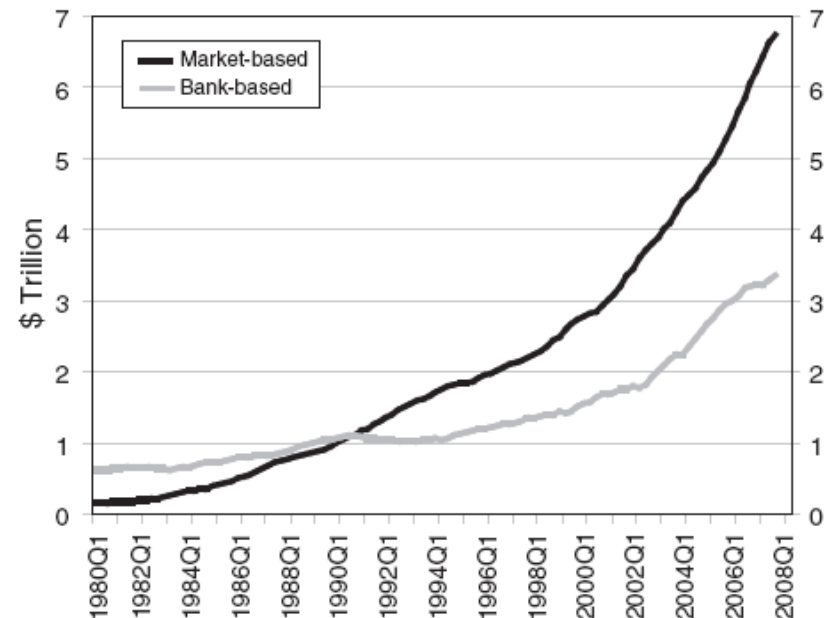


FIGURE 3. MARKET BASED AND BANK BASED HOLDING OF HOME MORTGAGES

Market-based credit has seen the most dramatic contraction in the current financial crisis. The most dramatic fall is in the subprime category, but credit supply of all categories has collapsed.

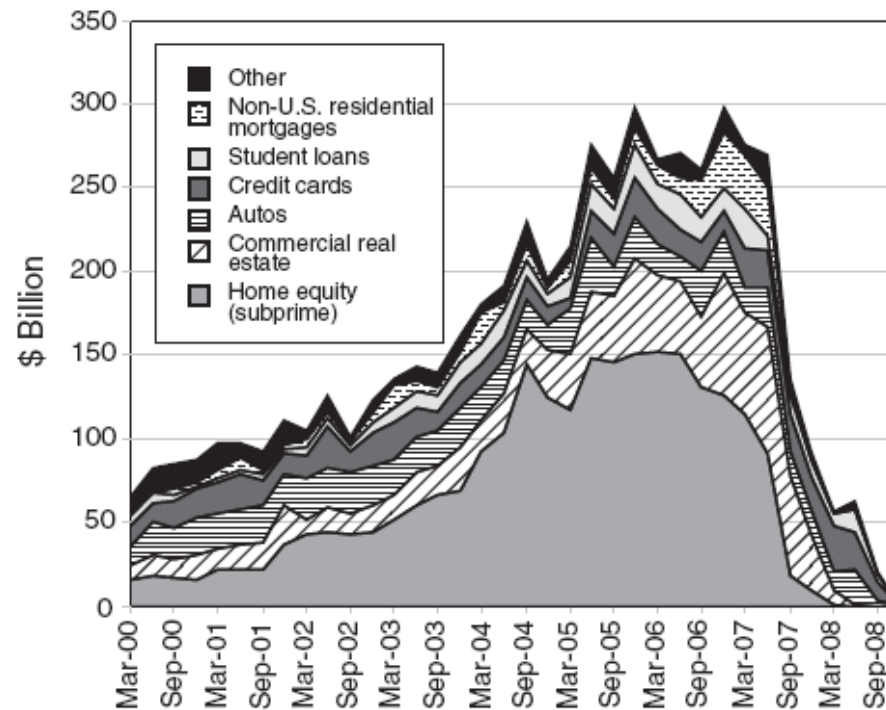


FIGURE 4. NEW ISSUANCE OF ASSET-BACKED SECURITIES IN PREVIOUS THREE MONTHS

Commercial bank lending has picked up pace after the start of the financial crisis, even as market-based providers of credit have contracted rapidly. Banks have traditionally played the role of a buffer for their borrowers in the face of deteriorating market conditions (as during the 1998 crisis) and are playing a similar role in the current crisis. The drying up of credit in the capital markets would have been missed, however, if one paid attention to bank-based lending only.

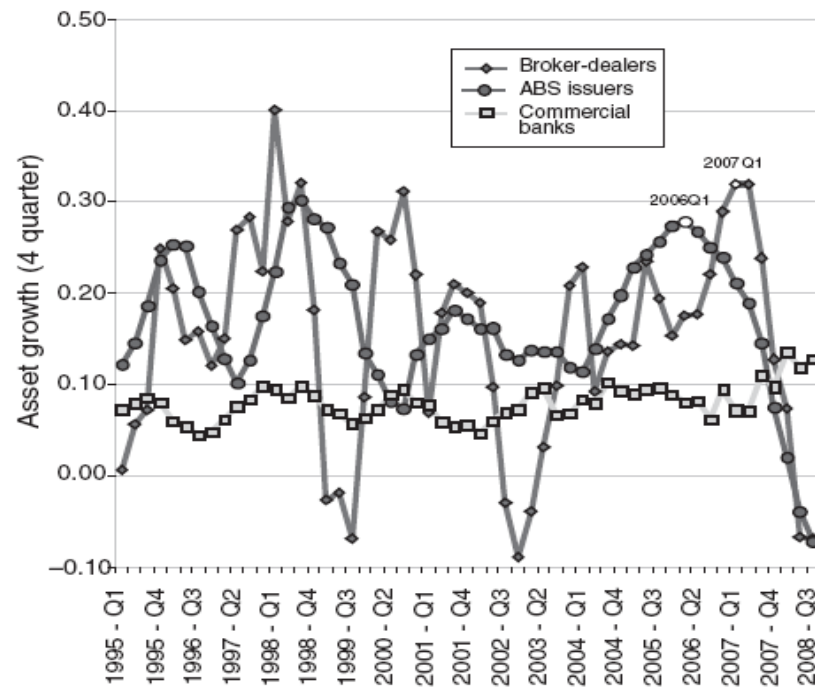


FIGURE 5. ANNUAL GROWTH RATES OF ASSETS

I. Market-Based Intermediaries

Broker-dealers (securities firms) have balance sheets consisting of marketable claims or short-term items that are **marked to market**. Broker-dealers have traditionally played market-making and underwriting roles in securities markets, but their importance in the supply of credit (purchasing and holding securities) has increased in step with securitization. Figure 6 shows the chart of quarterly change in assets against the quarterly change in leverage of five US investment banks (Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley).

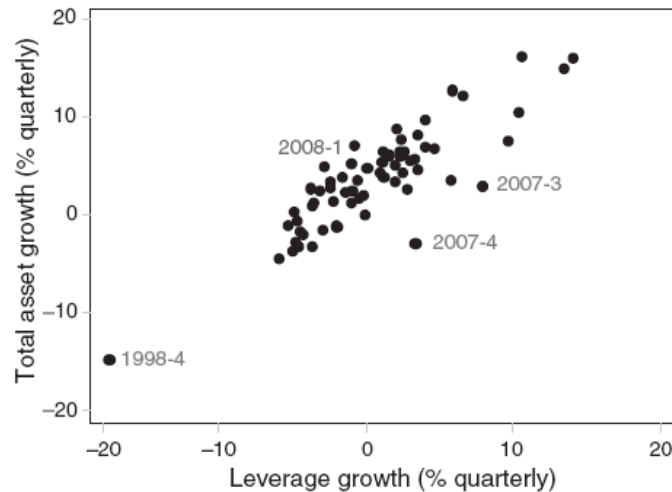


FIGURE 6. LEVERAGE GROWTH AND ASSET GROWTH OF US INVESTMENT BANKS

The striking feature is that **leverage is procyclical** in the sense that leverage is increasing when balance sheets are increasing, while leverage is decreasing when balance sheets are decreasing. This is exactly the opposite finding compared to households, whose leverage is high when balance sheets are small. For instance, if a household owns a house that is financed by a mortgage, leverage falls when the house price increases, since the equity of the household is increasing at a faster rate than assets.

We can understand the fluctuations in leverage in terms of the maximum leverage permitted by creditors in collateralized borrowing transactions, such as **repurchase agreements (repos)**. In a repo, the borrower sells a security today for a price below the current market price on the understanding that it will buy it back in the future at an agreed price. The difference between the security's market price and the price at which it is sold is called the "**haircut**." The fluctuations in the haircut determine the degree of funding available to a leveraged institution, since the haircut determines the maximum leverage permitted by creditors.

If the haircut is 2 percent, the borrower (e.g., an investment bank) can borrow \$98 for \$100 worth of securities pledged. Then, to hold \$100 worth of securities, the borrower must come up with \$2 of equity. Thus, if the repo haircut is 2 percent, the **maximum permissible leverage** (ratio of assets to equity) is 50. Suppose that the haircut rises to 4 percent. Then, permitted leverage halves from 50 to 25. Times of financial stress are associated with sharply higher haircuts, necessitating substantial reductions in leverage through asset disposals or raising of new equity.

TABLE 1—HAIRCUTS ON REPO AGREEMENTS (PERCENT)

| Securities | Apr-2007 | Aug-2008 |
|---------------------------|----------|----------|
| US Treasuries | 0.25 | 3 |
| Investment-grade bonds | 0-3 | 8-12 |
| High-yield bonds | 10-15 | 25-40 |
| Equities | 15 | 20 |
| Senior leveraged loans | 10-12 | 15 |
| Mezzanine leveraged loans | 18-25 | 35 + |
| Prime MBS | 2-4 | 10-20 |
| ABS | 3-5 | 50-60 |

Source: IMF Global Financial Stability Report, October 2008.

The fluctuations in leverage resulting from shifts in funding conditions are closely associated with epochs of financial booms and busts. Figure 7 plots the leverage of US **primary dealers**—the set of banks that has a daily trading relationship with the Federal Reserve. They consist of US investment banks, US bank holding companies with large broker subsidiaries (such as Citigroup and JPMorgan Chase), and foreign dealers with a large US presence.

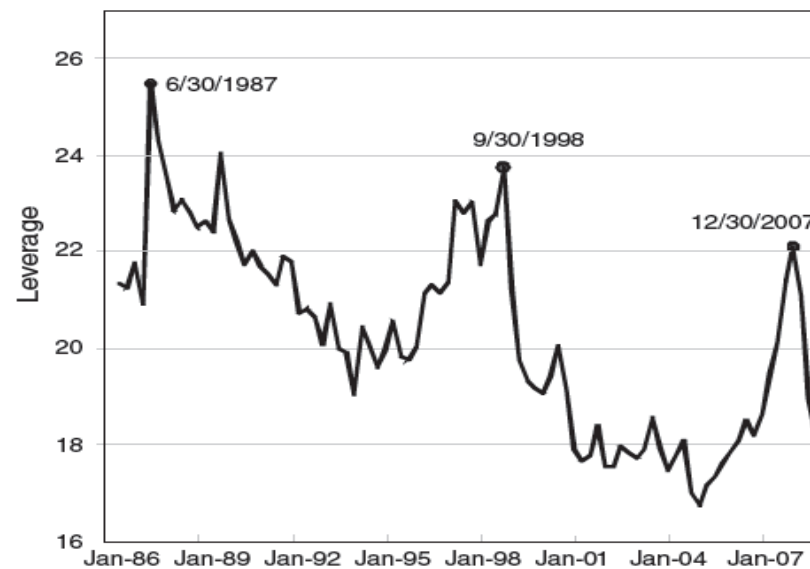


FIGURE 7. MEAN LEVERAGE OF US PRIMARY DEALERS
(June 1986 to September 2008)

(1) Leverage has tended to decrease since 1986. This decline in leverage is due to bank holding companies in the sample—a sample consisting only of investment banks shows no such declining trend in leverage.

(2) Each of the peaks in leverage is associated with the onset of a financial crisis (the peaks are 1987:II, 1998:III, and 2008:III). Financial crises tend to be preceded by marked increases in leverage.

The term “**liquidity**” suggests a stock of available funding in the financial system which is redistributed as needed. However, when liquidity dries up, it *disappears altogether* rather than being reallocated elsewhere (the fallacy of the “lump of liquidity”). When haircuts rise, all balance sheets shrink in unison, resulting in a generalized decline in the willingness to lend. In this sense, liquidity should be understood in terms of the growth of balance sheets (i.e., as a **flow**), **rather than as a stock**.

II. Lessons for Monetary Policy

In a hypothetical world where deposit-taking banks are the only financial intermediaries, their liabilities as measured by traditional **monetary aggregates**—such as M2—would be good indicators of the aggregate size of the balance sheets of leveraged institutions.

Instead, we have emphasized **market-based liabilities** such as **repos** and **commercial paper** as better indicators of **credit conditions** that influence the economy. Figure 8 shows that tracking primary dealer repos and financial commercial paper as a fraction of M2 shows the current credit crunch beyond just the traditional notion of broad money.

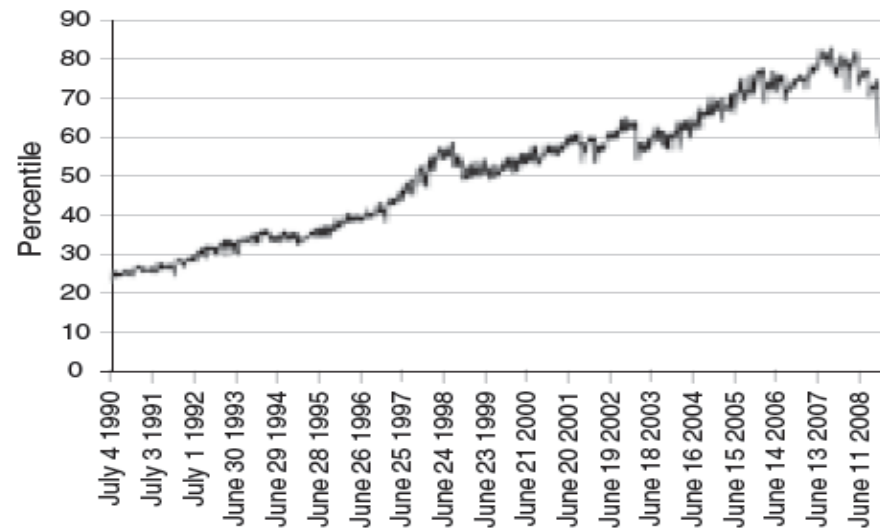


FIGURE 8. PRIMARY DEALER REPOS + FINANCIAL COMMERCIAL PAPER AS A FRACTION OF M2

The **money stock** is a measure of the liabilities of deposit-taking banks, and so may have been useful before the advent of the market-based financial system. However, the money stock will be of less use in a financial system such as that in the United States. More useful may be measures of **collateralized borrowing**, such as the weekly series of primary dealer repos.

Our results highlight the way that monetary policy and policies toward **financial stability** are linked. When the financial system as a whole holds long-term, illiquid assets financed by short-term liabilities, any tensions resulting from a sharp pullback in leverage will show up somewhere in the system.

Balance sheet dynamics imply a role for monetary policy in ensuring financial stability. Contrary to the common view that monetary policy and policies toward financial stability should be seen separately, there is a strong case for better coordination of monetary policy and policies toward financial stability.