Hello, I'm Ben Chabot – Financial Economist at the Federal Reserve Bank of Chicago.

Today I'm going to talk about the overnight money market. Understanding overnight money market dynamics and participants is crucial to the effective implementation of monetary policy. Even more so during the policy normalization process.

I will start by introducing various safe short-term investments available to investors with cash management needs. Then I will briefly describe the traditional banking system and elaborate on what we call the shadow banking system. We will talk about how the Fed interacts with the traditional banking system to target the overnight federal funds rate and how the Fed can use its new tools, that is, the interest on excess reserves and reverse repurchase agreements, to influence overnight interest rates in both the traditional and the shadow banking systems.

Many investors want to hold cash or cash-like overnight investments. To this end, we refer to them as cash pools. This demand is primarily from global corporations, large institutional investors, large asset managers, security lenders, government-sponsored enterprises, foreign central banks, and state and local governments—all of which need cash for payment and liquidity purposes.

When we say "cash-like" investments we mean investments that match the safety and utility of holding cash. Cash is risk-free. The nominal value of cash is invariant to changes in interest rates, so a cash investment is worth the same amount tomorrow as it is today. Not surprisingly, many investors wish to hold cash-like investments to satisfy their payment and liquidity needs or just to have a risk-free pile of assets to draw upon in times of financial stress.

So where do investors find cash-like investments? For starters, investors can hold one of the safest short-term cash-like instruments, which is a very short-maturity Treasury bill. This instrument is guaranteed by the U.S. government and at maturity it's going to pay a fixed amount. Because of its very short maturity the price of a Treasury bill is hardly exposed to interest rate fluctuations. Therefore, it can be liquidated early with little interest rate risk. So Treasury bills satisfy investors' need for safe overnight investments. However, the supply of Treasury bills is insufficient to meet the large demand for safe overnight investments. Therefore, cash pools must look for alternative cash-like investments.

For example, investors can hold bank deposits. Bank deposits have some appealing characteristics. Like cash, the value of a bank deposit doesn't fluctuate with interest rates and they can be used to meet payment obligations. However, bank deposits above a certain amount are uninsured, which exposes large investors to counterparty risk. If the bank fails, these investors are likely to lose money. Therefore, as opposed to safe Treasury bills, bank deposits are considered an unsecured overnight investment.

Banks—also known as depository institutions—exchange funds overnight in the market for reserve balances at the federal funds rate, that is, the overnight unsecured interest rate that banks borrowing reserves have to pay to banks lending those reserves.

Here it is worthwhile to further discuss the federal funds market and how it has changed since the 2008 financial crisis.

The Federal Reserve (hereafter the Fed) interacts with the traditional banking sector by setting a target for the federal funds rate. For decades prior to the 2008 crisis, the target was achieved through temporary or permanent purchases or sales of government-guaranteed securities from and to banks. These transactions,

known as open market operations, aimed to adjust the supply of reserve balances in the banking system to create conditions that encourage the fed funds rate to trade at the target level.

The Fed funds market consists of unsecured loans among banks and certain other eligible entities,[1] such as GSEs like the Federal Home Loan Banks, which have deposits at the Fed, but unlike private banks, GSEs do not get credited with any interest if they hold these balances overnight.

Before the 2008 financial crises there were few excess reserves in the system and the Fed could change the equilibrium fed funds rate by conducting small open market operations, as this rate was very sensitive to small changes in the total level of excess reserves.

During the financial crisis the Fed cut the federal funds target rate to a 0-basis-point through 25-basis-point range, and with its target rate at its effective zero lower bound, the Fed decided to expand the objective for open market operations to adjust the size and composition of its portfolio in order to stimulate the economy.

These open market purchases of long-term government-guaranteed securities—known as Large Scale Asset Purchases—dramatically increased the amount of reserves held at the Fed by banks and other entities eligible to trade in the fed funds market. As a result, small changes in the amount of reserves outstanding no longer resulted in noticeable changes in the equilibrium federal funds rate.

To better implement monetary policy in this new environment the Fed began paying interest on excess reserves (or IOER) to depository institutions in October 2008, but as previously mentioned, some institutions (such as the GSEs) are not eligible to earn IOER.

Paying IOER influences the equilibrium federal funds rate by setting a floor on the rate at which depository institutions are willing to lend in the federal funds market. Banks that can earn a risk-free rate by holding reserves at the Fed should have no incentive to lend excess reserves in the fed funds market at rates below the IOER.

But IOER has not served as a firm floor on the rate at which *all* institutions are willing to lend federal funds. One of the main reasons is that institutions such as GSEs do *not* earn IOER and therefore have an incentive to lend extra reserves at a rate below the IOER, because a small positive rate is better than nothing.

As we mentioned earlier, there aren't enough short-term Treasury bills to meet demand for cash-like risk-free investments. Therefore, cash pools are forced to look for alternative, private, cash-like safe investments—things that have the characteristics of cash but are not guaranteed by the full faith and credit of the United States government. Private agents produce these assets to meet the demand for cash-like investments.

One of the more prominent examples of private money-like claims is shares issued by government-only money market mutual funds. Money market funds offer shares that have cash-like characteristics. The funds promise to redeem the shares for cash on demand at a fixed price. How does the money market fund do this? One way is the fund invests its pool of money in slightly longer-term Treasury securities. These Treasury securities have no default risk but are nonetheless riskier because their promised payments are further in the future, so changes in interest rates can change the present value (or market price) of these

[1] See 204.2 (a)(1)(vii)(A)

bonds.

Another option for cash pools looking for safe overnight cash-like investments is the overnight Treasury repurchase agreement (or the repo market). A repo is a sale of securities coupled with an agreement to repurchase the same securities at a higher price the next day. From the perspective of the cash pools investing money, a repo closely resembles a collateralized loan.

For now, let's focus on repos where Treasury securities are used as collateral. Broker dealers hold many longer-maturity Treasuries and often wish to use these bonds to obtain cheap funding in the repo market. Cash pools are willing to lend broker-dealers money at low rates because overnight repo loans are secured by Treasury collateral, and therefore very safe.

However, repo lending does expose a cash pool to some counterparty risk. If the other side of the repo defaults, the cash pool will have to sell the securities to get its money back. However, the security is a safe government bond that can be sold easily. The lenders in a repo transaction further protect themselves by marking down the value of the collateral purchased relative to its true market value. This adjustment is known as a haircut. For example, the lender may agree to pay $100 today for securities that have $103 of market value. If the haircut is big enough, the lender will be able to resell the securities for more than the initial purchase price and suffer no loss.

Similarly, money market funds wishing to lend money safely overnight can enter into repo agreements with broker-dealers.

In practice, cash pools and money market funds lends money today by purchasing the government security and agreeing to sell it back to the original owner at a higher price tomorrow. The difference between the sale prices is the interest rate earned on the money lent overnight.

The Repo market is an example of private agents creating an investment vehicle which transforms longer-term bonds into overnight debt instruments with safe cash-like characteristics. This is effectively private issuance of money-like assets that substitutes for public issuance of safe assets such as Treasury Bills.

The repo market constitutes a very important part of what we call the "shadow banking market."

Before moving on, let's take a moment to discuss an important institutional feature of the repo market—the tri-party system. For convenience reasons, many repo transactions take place through third party custodial banks, in what is known as the tri-party system. Custodial banks offer a series of services, including trade settlement, collateral valuation, and collateral eligibility screening.

Many repo market participants prefer the tri-party system because the custodial banks create a platform that allows repo counterparties to come together and trade cheaply. The counterparties sign agreements ahead of time, specifying the terms of the repo transactions—such as what kind of collateral will be accepted and what haircuts will apply. The custodian then matches lenders to borrowers and holds the lent money and the securities pledged for the repo.

For some time the Fed has used the tri-party system to conduct repurchase agreements with broker-dealers when conducting open market operations.

Even after transforming government-guaranteed longer-term bonds into overnight instruments via repo,

there still may not be enough safe investments to meet the demand of cash pools. Some investors turn to other short-term securities that may not be as safe as overnight investments collateralized by public securities.

One prominent example of a riskier short-term instrument is commercial paper. Commercial paper is a money-market security issued by corporations to obtain funds to meet short-term obligations. Commercial paper offers a higher return because it is backed by only the corporation's promise to pay the face amount at maturity.

Prime money market funds, like government only money market funds, promise overnight liquidity by redeeming their shares on demand at a fixed price.

But, unlike government-only money market funds, prime funds invest in unsecured private assets that have some default risk. For example, they invest in commercial papers with high credit ratings and maturities of 90 days or less.

Cash pools can invest directly in commercial paper or invest indirectly via prime money market funds, which offer better liquidity and easy access to a diversified portfolio of commercial paper. The combination of diversification and liquidity makes the indirect investments through prime money market funds an option with cash-like characteristics.

Direct and indirect investment in commercial paper constitutes an important link between the shadow banking system and the real economy. Demand for commercial paper strongly affects the ability of corporations to raise funds to meet short-term debt obligations such as payrolls.

In addition to private short-term securities, there are large amounts of private longer-term bonds and equities held by risk portfolio managers, hedge funds, real estate investment trusts and exchange-traded funds. These asset owners often wish to use their longer-maturity risky assets as collateral to obtain funding at a cheap rate. To this end, they enter into repo transactions with broker-dealers.

To obtain short-term funding, these broker-dealers then re-pledge the acquired riskier collateral to prime money market funds that want money-like claims collateralized by private securities.

Despite the riskier collateral, these private repos are close substitutes to money-like claims because they are overnight investments and have larger haircuts than Treasury repos.

With a big enough haircut, securities such as government-agency mortgage-backed securities (MBS), private MBS, asset-backed securities, corporate bonds, or even equities can be transformed into assets that are viewed by market participants as safe overnight investments.

Collectively, private repos make up a large portion of private money-like claims and are a prominent example of how money flows throughout the shadow banking system.

As in the case of Treasury repos, many private repo transactions take place in the tri-party system where custodial banks offer the same services previously discussed.

It is important to point out that even though the Fed has been operating in the tri-party system for some time, its actions have only indirectly influenced interest rates in the shadow banking system.

More specifically, by altering the fed funds rate, or more recently, the interest on excess reserves, the Fed changed the marginal cost of lending in the formal banking sector. Because most banks interact in both the formal and shadow banking sectors, raising the marginal cost of funds in one sector could affect the rate at which banks are willing to lend in the other sector. The extent to which a change in the federal funds rate is transmitted to interest rates in the shadow banking markets mainly depends upon banks' perceived degree of substitution across different lending opportunities.

You may have noticed that in what we have described so far, the Fed implemented monetary policy solely through interactions with bank counterparties.

But, with the recent introduction of an overnight reverse repo facility, the Fed can now interact directly with a broader range of money market participants. These include both the Fed's traditional counterparties, such as banks and broker dealers, and non-bank counterparties that play a major role in money markets. Importantly, this allows the Fed to provide a safe overnight investment to participants that cannot earn interest on excess reserves, effectively expanding the set of investors unwilling to lend at rates below those offered by the Fed.

Let me explain in more detail. Due to Large Scale Asset Purchases, the Fed owns a large amount of safe government securities. In a reverse repo, the Fed sells government securities and borrows reserves from the eligible counterparties overnight at a fixed rate. This rate, known as the overnight reverse-repo rate is set by the Fed.

Included among the non-bank counterparties eligible to participate in reverse repos with the Fed are the GSEs.

Recall that the Fed funds rate often trades below IOER because institutions such as the GSEs are ineligible to earn IOER and are therefore willing to lend their excess reserves into the federal funds market at rates below IOER.

By making GSEs eligible counterparties for overnight reverse repo transactions, the Fed is better equipped to influence rates in both the repo and the fed funds market. GSEs can now lend to the Fed at the fixed rate offered at the overnight reverse repo facility. Because these loans have the Fed as a counterparty and are collateralized by government securities, they are much safer than unsecured loans in the Fed funds market. Therefore, a GSE should be unwilling to lend in the fed funds market at a rate below the overnight reverse repo rate.

Government-only and prime money market funds are also included among the non-bank counterparties eligible to participate in the overnight reverse repo facility. Here the same logic applies: These money market funds should be unwilling to lend to counterparties riskier than the Fed at a rate below that offered by the Fed at the overnight reverse repo facility.

Overall, this implies that the rate set by the Fed at the overnight reverse repo facility should provide a floor on the level of short-term interest rates for cash-like investments in both the traditional and the shadow banking systems. Because, as we already discussed in the case of the GSEs and money market funds, active participants in overnight money markets should be unwilling to lend at a rate below the overnight reverse repo rate.

To sum up, these new tools should allow the Fed to better control short-term rates in both the traditional banking sector, by adjusting the interest on excess reserves, and the shadow banking sector, by adjusting the rate on reverse repos.

As the FOMC indicated in the April 2015 Policy Normalization Principles and Plans, the Committee intends to target a 25-basis-point range for the federal funds rate. By altering the rates on IOER and overnight reverse repo, the Fed can adjust the upper and lower bounds of the targeted range. This should guide overnight money market rates to levels consistent with the Fed's goals of maximum employment and stable prices.

References

Baklanova, Viktoria, Copeland, Adam, and McCaughrin, Rebecca (2015). "Reference Guide to U.S. repo and Securities Lending Markets," Office of Financial Research Working Paper Series. Washington: Office of Financial Research, U.S. Department of the Treasury, http://financialresearch.gov/working-papers/files/OFRwp-2015-17_Reference-Guide-to-U.S.-Repo-and-Securities-Lending-Markets.pdf.

Bech, Morten, Elizabeth Klee, and Viktors Stebunovs (2014). "The Repo and Federal Funds Markets before, during, and Emerging from the Financial Crisis," in Chadha, Jagjit S., Alain C. J. Durre, Michael A. S. Joyce and Lucio Sarno eds., Developments in Macro-Finance Yield Curve Modelling. Cambridge, Mass: Cambridge University Press, pp. 293-325.

Carlson, Mark, Burcu Duygan-Bump, Natalucci, Fabio, Nelson, William R., Ochoa, Marcelo, Stein, Jeremy, and Van den Heuvel, Skander (2014). "The Demand for Short-Term, Safe Assets and Financial Stability: Some Evidence and Implications for Central Bank Policies," Finance and Economics Discussion Series 2014-102. Washington: Board of Governors of the Federal Reserve System, http://www.federalreserve.gov/econresdata/feds/2014/files/2014102pap.pdf.

Dudley, William C. (2014). "The Economic Outlook and Implications for Monetary Policy," Remarks before the New York Association for Business Economics, New York City. New York: Federal Reserve Bank of New https://www.newyorkfed.org/newsevents/speeches/2014/dud140520.

Dudley, William C. (2015). "The Economic Outlook and Implications for Monetary Policy," Remarks before the New York Association for Business Economics, New York City. New York: Federal Reserve Bank of New York, https://www.newyorkfed.org/newsevents/speeches/2014/dud140520.

Frost, Josh, Lorie Logan, Antoine Martin, Patrick McCabe, Fabio Natalucci, and Julie Remache (2015). "Overnight RRP Operations as a Monetary Policy Tool: Some Design Considerations," Finance and Economics Discussion Series 2015-010. Washington: Board of Governors of the Federal Reserve System, http://dx.doi.org/10.17016/FEDS.2015.010.

Ihrig, Jane E., Meade , Ellen E., and Weinbach, Gretchen C. (2015). "Monetary Policy 101: A Primer on the Fed's Changing Approach to Policy Implementation," Finance and Economics Discussion Series 2015-047. Washington: Board of Governors of the Federal Reserve System, http://dx.doi.org/10.17016/FEDS.2015.047.

Potter, Simon (2014). "Implementation of Open Market Operations in a Time of Transition," Remarks before the Japan Center for Economic Research, Tokyo, Japan. Tokyo: Federal Reserve Bank of New York, https://www.newyorkfed.org/newsevents/speeches/2014/pot140924.

Potter, Simon (2014). “Interest Rate Control during Normalization,” Remarks at the SIFMA Conference on Securities Financing Transactions, New York City. New York: Federal Reserve Bank of New York, https://www.newyorkfed.org/newsevents/speeches/2014/pot141007.

Potter, Simon (2015). “Money Markets and Monetary Policy Normalization,” Remarks at the Money Marketeers of New York University, New York City. New York: Federal Reserve Bank of New York, https://www.newyorkfed.org/newsevents/speeches/2015/pot150415.html.

Pozsar, Zoltan (2014). “Shadow Banking: The Money View,” Office of Financial Research Working Paper Series 14-04. Washington: Office of Financial Research, U.S. Department of the Treasury, http://financialresearch.gov/working-papers/files/OFRwp201404_Pozsar_ShadowBankingTheMoneyView.pdf.