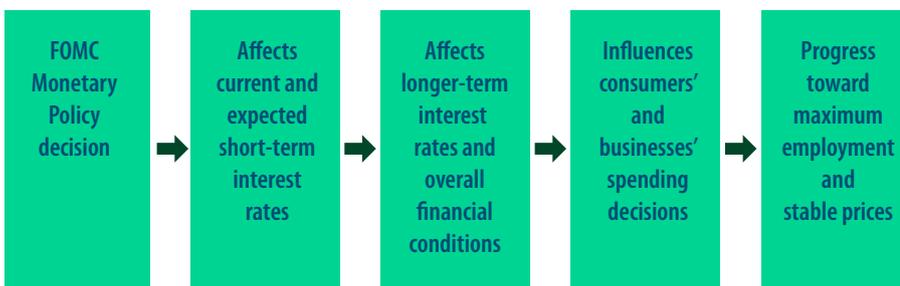


Fixing the “Curriculum Lag” in Economics: The New Tools the Fed is Using to Influence the Economy

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The Federal Reserve (the Fed) is the central bank of the United States. It has a congressional mandate to promote maximum sustainable employment and price stability. Maximum employment means that all Americans who want to work are gainfully employed, and price stability means that inflation remains low and stable over the longer run. In normal times, the Fed seeks to achieve this mandate by setting the position or “stance” of monetary policy, primarily by managing the level of short-term interest rates.¹ In particular, as shown in Figure 1, when the Federal Open Market Committee, or FOMC (the body within the Fed that sets national monetary policy), sets the stance of monetary policy, it directly affects short-term interest rates and indirectly affects longer-term interest rates and broader financial conditions. It is through these transmission channels that monetary policy influences consumers’ and businesses’ spending decisions, which move the economy toward the Fed’s dual mandate.

Figure 1. **The Transmission of Monetary Policy.**



The Federal Reserve conducts monetary policy in pursuit of the mandate set for it by Congress. It does so by setting the stance of monetary policy, which affects financial conditions and influences the spending decisions of economic agents. The transmission process from box 2 to box 5 has remained in place over time. This article describes how the Fed has changed its monetary policy implementation to ensure the linkage from box 1 to box 2.

While the mandated goals were articulated in 1977,² the approach and tools (i.e., “regime”) used to implement policy have changed over time. Before the

financial crisis, the Fed implemented policy with *limited* reserves and relied on open market operations as its key tool. Today, the Fed implements policy with

ample reserves and relies on interest on reserves, and in particular interest on excess reserves, as its principal tool.³ These changes might seem subtle, but the current framework is very different from the one described in many textbooks and curricula.

This article is intended as a summary of the Fed’s current monetary policy framework to address the “curriculum lag.” This information is essential for economics and government teachers, or anyone who teaches about economic policy and the Federal Reserve. It will also help educators and students to better follow monetary policy discussions in the financial news.

The Old Framework: Limited (Scarce) Reserves

Prior to 2008 the Fed ensured that its stance on monetary policy was transmitted to financial markets by using a framework with a limited or scarce amount of reserves in the banking system. In particular, the FOMC announced a target level for the federal funds rate, which is a market-determined interest rate at which banks lend funds to each other on an overnight basis. The Fed then used its preferred tools to ensure this overnight interest rate was at the target level.

What Are Bank Reserves?

Total reserves are the sum of cash that banks hold in their vaults and the deposits they maintain in accounts at the Federal Reserve. The funds that banks hold in accounts at the Fed are called reserve balances. Total reserves are composed of two types. First, *required reserves* are funds that banks are required to maintain. *Excess reserves* are the funds above these institutions' required reserve levels.

Money Market Instruments

Money markets are financial markets where cash is borrowed or lent short term. There are a variety of different money market instruments, including federal funds, Treasury bills, and commercial paper. Some institutions operate in multiple markets. As a result, when deciding where to invest cash or borrow cash, money market participants look across the markets to find the best rate. Because of this comparison, the money market rates tend to be close to one another.

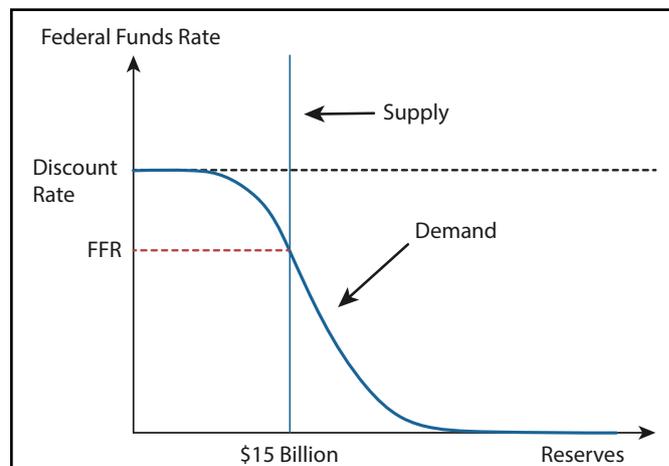
What Is the Federal Funds Market and Rate?

The Fed determines the total level of reserves in the banking system, but reserves are transferred between banks in the federal funds market. More specifically, the federal funds market is where banks that need reserves go to borrow cash from banks that have excess reserves. Banks who lend money act as suppliers of reserves in the federal funds market; and, banks who borrow funds act as demanders of reserves in the federal funds market. For each transaction, reserves are transferred from the lender's reserve account at the Fed to the borrower's reserve account. The borrower and lender agree on the interest rate associated with the transaction; this is the federal funds rate, FFR. On a given day, there are many transactions at slightly different FFRs. The weighted average median rate on a given day is called the "effective" federal funds rate.

Notice that the FFR is not "set" by the Fed, but rather determined by the borrowers and lenders in the federal funds market. The FOMC sets a target level or target range to indicate the rate at which it wants the majority of fed funds transactions to occur. In other words, the target is where the FOMC wants to see the effective rate be.

Figure 2 depicts how the Fed implemented monetary policy in a limited-reserves regime. The downward sloping demand curve represents banks' demand for reserves. Banks demanded reserves to help meet regulatory requirements and to ensure they had adequate funds to meet the banking demands of their customers. The demand curve intersects the y axis at the "discount rate," which is the interest rate that the Fed charges on overnight funding (or loans) at the discount window. So when thinking about borrowing cash in the market, banks should not pay more than what the Fed offers at the discount window. This is the reason why the discount window, in theory, should provide a ceiling for the FFR. Then the demand curve slopes down to capture the idea that as the cost of borrowing decreases, banks are willing to borrow more funds to increase their holdings of reserves. That is, when the federal funds rate is relatively low (high), the demand for reserves will be relatively large (small).

Figure 2. **Monetary Policy with Scarce Reserves.**



In the limited-reserves framework, the Federal Reserve sells or buys U.S. government securities in the open market to shift the supply of reserves left or right, respectively, which moves the Federal Funds Rate (FFR) higher or lower. Relatively small movements of the supply curve move the FFR.

The figure shows reserve balances as \$15 billion. In the limited-reserves regime, if the Federal Reserve increased reserve balances, the vertical supply curve would shift to the right, and the new intersection of the supply and demand curves would result in a lower FFR. Likewise, if the Federal Reserve decreased reserve balances, the vertical supply curve would shift to the left, and the new intersection of supply and demand curves would result in a higher FFR.

The discount rate is the interest rate charged by the Federal Reserve to banks for loans obtained through the Fed's discount window. As such it should work to put a ceiling on the federal funds rate.

Open Market Operations (OMO) Were the Key Tool in a Limited-Reserve Regime		
What is OMO?	How does OMO work?	Who uses OMO?
Purchases or sales—temporary or permanent—of U.S. government securities in the open market	Each purchase or sale of securities directly affects the volume of reserves in the banking system and thus the level of federal funds rate	Directed by the FOMC; conducted by the Federal Reserve Bank of New York (in competitive operations with primary dealers)
<p>The Fed has an Open Market Desk (the Desk) that has established relationships with securities dealers known as primary dealers that are active in the market for U.S. government securities (government securities are Treasury securities and a few other types of securities as defined by the Federal Reserve Act). So, when the Fed conducts an open market purchase, the New York Fed Trading Desk buys eligible securities from primary dealers (at prices determined in a competitive auction). The Federal Reserve pays for those securities by crediting the reserve accounts of the banks used by the primary dealers. (The banks, in turn, would credit the dealers' bank accounts.) In this way, the open market purchase leads to an increase in reserve balances. In graphical form (Figure 2), this increase in reserves would result in a rightward shift of the supply curve, and result in a lower federal funds rate. Notice that in this regime, the Fed used open market operations as a means to influence the FFR.</p>		

Monetary Policy Acronyms	
Federal funds rate	FFR
Federal open market committee	FOMC
Interest on reserves	IOR
Interest on required reserves	IORR
Interest of excess reserves	IOER
Overnight reverse repurchase agreement rate	ON RRP rate

The supply of reserves is a vertical line because only the Fed can supply reserves. In late 2017, the supply curve intersected the demand curve in the steep portion, with around \$15 billion of reserve balances in the banking system. In this downward sloping portion of the demand curve, relatively small contractions or expansions in the supply of reserves in the banking system would result in a higher or lower FFR, respectively. The level of reserves was adjusted (using open market operations) to move the FFR toward the target set by the FOMC. More specifically, the supply would be set so that it intersected the demand curve at a FFR equal to the FOMC's target.

Because banks compare their money market options, the FFR influences other interest rates in the economy. So, by ensuring that banks were borrowing and lending reserves around the target rate set by the FOMC, the Fed would influence broader financial conditions that ultimately affected spending, employment and prices in the national economy. For example, when the FOMC lowered the FFR target, this normally was accompanied by a decline in other interest rates (e.g., home mortgage interest rates) and financial conditions more broadly; those changes (lower interest rates) spurred spending decisions by

consumers and producers and ultimately affected employment and inflation.

In summary, prior to 2008, the Fed implemented policy with a limited supply of reserves in the banking system. In this regime the Fed actively conducted open market operations where it bought and sold U.S. government securities to shift the supply of reserves and influence the FFR and other market interest rates to move the economy toward maximum employment and stable prices.

How the Financial Crisis Changed Monetary Policy

In response to dire economic and financial conditions in 2008, the Federal Reserve lowered the FFR to a target range of 0 to 25 basis points (25bp), but the economy needed more stimulus.⁴ (A basis point (bp) refers to one hundredth of one percent. Basis points are also referred to as BPS. As such, 100 basis points is equal to 1 percentage point.) As a result, between 2008 and 2014 the Fed conducted a series of large-scale asset purchase programs to lower long-term interest rates, easing broader financial market conditions, and thus supporting economic activity and job creation. In particular, when conducting these programs the Fed purchased a sizable amount of longer-term U.S. government securities.⁵ Because when the Fed purchased these securities it paid for them by crediting reserve accounts of banks, the purchases increased the level of reserve balances from under \$20 billion in 2007 to a peak of \$2.7 trillion in late 2014. At this point, reserves were no longer limited but instead plentiful. As a result, the supply curve was intersecting the demand curve at its flat portion where small changes in reserves would no longer affect the level of the FFR (Figure 2). That is, with the abundant level of reserves in the

IOR Is the Key Tool in an Ample-Reserves Regime		
What is IOR?	How does IOR work?	Who uses IOR?
Interest paid on reserve balances held at the Fed	The Federal Reserve sets the levels of IORR and IOER. IOER serves as a reservation rate	Depository institutions with accounts at the Fed determine how many funds to deposit in their reserve accounts
<p>The rates for IORR (interest on required reserves) and IOER (interest on excess reserves) are set by the Federal Reserve. The Federal Reserve moves the federal funds rate into the target range set by the FOMC primarily by adjusting the IOER rate. This decision is done with the backdrop of an ample supply of reserves in the banking system.</p> <p>With ample reserves, banks use IOER as a reservation rate when they decide where to invest their excess reserves. They can leave their funds in their reserve account and earn IOER or they can invest in a money market instrument and earn the market-determined rate. This comparison ensures that the Fed has interest rate control of the federal funds rate and leads to arbitrage across markets so that money market interest rates are close to one another. In graphical form (Figure 3), an increase in the IOER rate, the ON RRP rate, and the discount window rate would result in an upward shift of the demand curve, and result in a higher equilibrium federal funds rate. Notice that in this regime, the Fed leans on its administered rates as the means to influence the FFR.</p>		

banking system, banks were so flush with reserves that adding more or taking away a few reserves with traditional open market operations would not affect their borrowing and lending decisions in the federal funds market and, hence, influence the rate being determined in these trades. This meant that the monetary policy implementation regime the Fed was operating in had to change. It also meant that the tools the Fed used to influence the federal funds rate (and other short-term interest rates) had to change as well.

From 2008 onward, the FOMC has set policy to achieve its congressional mandate (maximum employment and price stability) in an environment with many more reserves than before the crisis. The level of reserves declined from the peak in 2014, but they still remain ample today. In January 2019, the FOMC released a statement saying it would continue to implement policy with an ample supply of reserves in the long-run. At that time, reserve balances stood around \$1.6 trillion.

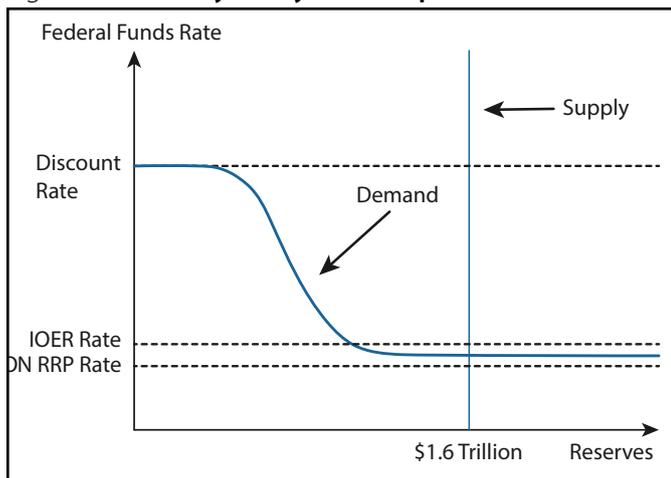
The Current, Ample Reserves Framework

With such a large quantity of reserves in the banking system, the Federal Reserve can no longer influence the FFR by making relatively small changes in the supply of reserves. So, how does the FOMC ensure that its stance of policy feeds through to market interest rates? The Fed introduced two new tools to implement monetary policy: interest on reserves (IOR) and the overnight reverse repurchase agreement (ON RRP) facility (and the corresponding ON RRP rate). These interest rate tools are termed “administered rates,” as they are set, or administered, by the Fed.

- IOR is paid to depository institutions who have reserve accounts at the Fed. IOR is applied to both required reserves (paying interest on required reserves, or IORR) and excess reserves (paying interest on excess reserves, or IOER).⁶ Banks had long held required reserves on deposit at Federal Reserve Banks, and received no interest compensation, which they perceived as a lost opportunity to earn interest elsewhere. For this reason, it was seen as a regulation that imposed an “implicit tax” on banks. IORR relieves the implicit tax on reserves requirements. Banks could always hold reserves in excess of the requirement (and receive no interest), but because these funds could be invested in money markets to earn a return, banks often minimized their holdings of excess reserves. The Fed’s decision to start paying interest on excess reserves (IOER) influences banks’ decision on the level of reserves to hold, and gives the Fed an additional tool for conducting monetary policy.⁷ (The rates paid on required and excess reserves need not be the same, though to date, the Fed has paid the same rates.)

- The Fed also introduced an overnight reverse repurchase agreement (ON RRP) facility with designated counterparties that are active in this market, such as large money market funds, large banks, and government-sponsored enterprises.⁸ This form of open market operation is primarily interacting with nonbank financial institutions. When one of these institutions uses the ON RRP facility it essentially deposits reserves at the Fed overnight, receiving a security. The next day the transaction is unwound, with the institution earning the ON RRP rate (which the Fed sets) on the cash it deposited at the Fed and the Fed reclaiming the security.⁹

Figure 3. **Monetary Policy with Ample Reserves**



In an ample-reserves framework, the Fed relies on setting its administered rates (IOER and ON RRP) to influence the level of the FFR. By increasing or decreasing the administered rates, the FFR should move higher or lower, respectively.

The figure shows reserve balances as \$1.6 Trillion. In the ample-reserves regime, if the Federal Reserve increased or decreased reserve balances, the vertical supply curve would shift to the right or left, with the new intersection of the supply and demand curves having roughly the same FFR. As a result, the Federal Reserve relies on its administered rates to move the FFR. When the Fed increases IOER and the ON RRP rates, as well as the discount rate, this shifts up the demand curve. The upward shift in the demand curve results in the new intersection with the supply curve at a higher FFR. Likewise, if the Fed decreases IOER and the ON RRP rates, as well as the discount rate, this shifts the demand curve down and it intersects the supply curve at a lower FFR.

With ample reserves in the banking system, the Fed cannot expect small adjustments to the supply of reserves (using open market operations) to have an impact on the FFR. Instead, the Fed began using these administered rates (IOER and ON RRP), which work as reservation rates, to guide the FFR within the target range set by the FOMC (see Figure 3). (In this case, a reservation rate is the lowest interest rate a lender is willing to accept when lending funds.) The IOER rate offers a safe, risk-free investment option to banks that can hold reserves at the Fed. As such, banks will not lend reserves in the federal funds market for less than the IOER rate. And, if the FFR were to fall very far below the IOER rate, banks would borrow in the federal funds market and deposit those reserves at the Fed, earning a profit on the difference. This is known as arbitrage, an important aspect of the way financial markets, and monetary policy, work. Arbitrage ensures that the FFR does not fall significantly below the IOER. For these two reasons, the Federal Reserve can steer the FFR into the target range set by the FOMC by adjusting the IOER rate.¹⁰ And, therefore, IOER, and in particular IOER, is the principal tool used by the Fed in an ample-reserves regime.

To elaborate, let's think of a bank that has excess reserves. What does it want to do with this cash? It has many options. The bank can leave the reserves at the Fed and earn IOER. The bank can lend the reserve balances to another bank in

the federal funds market. Or, it can invest the cash in another money market instrument. These latter choices must offer at least as high of rates as IOER or the bank will leave its excess reserves at the Fed. But, if the market rates were much higher than IOER, then banks would be very attracted to investing as much as possible in these money market products. Those offering the products would see all the cash coming their way and lower their rates (i.e., the rates they are paying to borrow the funds). It is these economic forces that pull the federal funds and other money market rates toward IOER.

The Fed also has the ON RRP facility, with its associated interest rate, as a supplemental tool. More types of financial institutions can participate in the ON RRP facility than can earn interest on reserves. These institutions use the facility's ON RRP rate to arbitrage many money market rates. Because institutions will never be willing to lend funds for lower than the ON RRP rate, the FFR should not fall below the ON RRP rate. As such, the rate paid on ON RRP transactions, which is set below IOER, acts somewhat like a floor for the FFR.

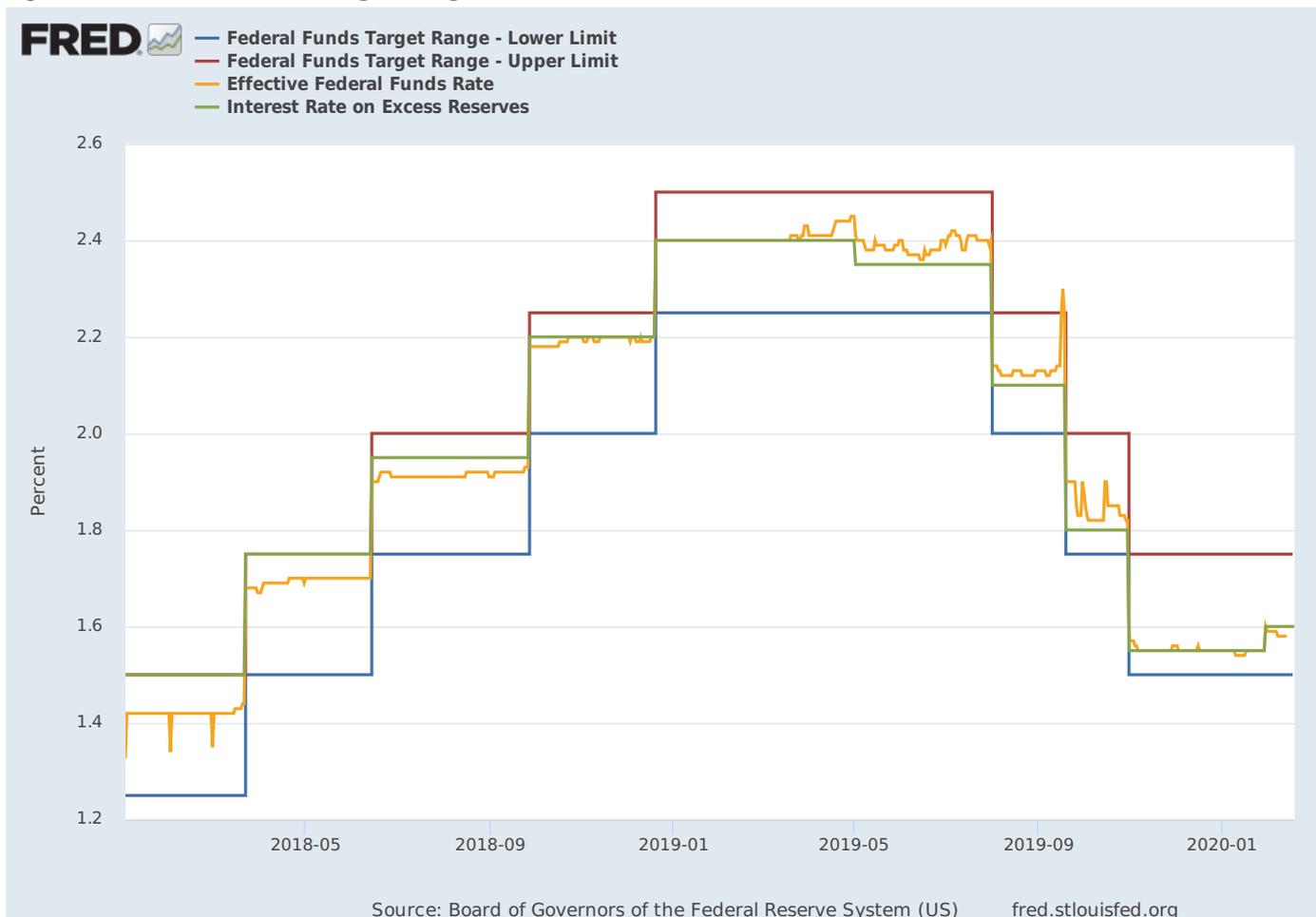
In setting the policy stance, the FOMC sets a target range for the FFR and then the Fed determines the appropriate settings of its administered rates (IOER and ON RRP) so that transactions in the FF market are in the target range

How Might the FOMC Respond to a Weakening in the Labor Market?

Suppose the economy weakens, with unemployment starting to rise. The FOMC might decide to make monetary policy more accommodating. That is, the FOMC could lower its target range for the FFR. When doing so, the Fed would lower its administered rates accordingly. These actions would transmit to money market and broader financial conditions.

- Lower interest rates decrease the cost of borrowing money, which encourages consumers to spend on goods and services and businesses to invest in new equipment.
- The increase in consumption spending by consumers and investment spending by businesses increases the overall demand for goods and services in the economy.
- With increased production, businesses are likely to hire additional employees and spend more on other resources.
- As these increases in spending ripple through the economy, unemployment decreases, moving the unemployment rate down toward its full employment level.

Figure 4. **The Federal Funds Target Range.**



The FOMC sets the stance of policy by setting a target range for the FFR. The Fed determines the settings of the administered rates to steer the market-determined, effective federal funds rate into this target range. Over time, as financial conditions have changed, the settings of these administered rates relative to the upper and lower ends of the target range have changed. IOER, for example, has been set at several basis points below the upper end of the target range over time. <https://fred.stlouisfed.org/graph/?g=nPHW>

(see Figure 4). For example, when the Fed first raised interest rates from near zero in late 2015, the FFR target range was set at 25bp to 50bp. The IOER rate was set at the top of the target range, at 50bp, and the ON RRP rate was set at the bottom of the target range, 25bp. Transactions in the federal funds market shifted up from rates near zero to within the new target range. All money market rates rose because the Fed raised the reservation interest rates (IOR and ON RRP rates) that banks and other financial institutions use in their determination of where to borrow and lend. This increase in short-term interest rates then transmitted to broader financial conditions, which affected consumers' and businesses' spending decisions and ultimately moved the economy toward the Fed's dual mandate. Over time, as economic and financial conditions change, the Fed adjusts the stance of policy and the settings of the IOR and ON RRP rates.

In summary, today and going forward, the Fed implements policy with an ample supply of reserves in the banking system. In this regime the Fed uses IOR, in particular IOER, as its primary tool to influence the FFR and other market interest rates, which move the economy toward maximum employment and stable prices.

People can learn about the Fed's stance of monetary policy and its setting of its administered rates through public communications. At the end of each FOMC meeting, the Committee releases a public statement, which indicates the target range for the FFR, and an implementation note, which indicates the setting of the administered rates.

The High School Curriculum Lag

The pre-financial crisis story of monetary policy is deeply entrenched in teaching materials. Nearly all high-school

textbooks and curriculum continue to tell the old story of how policy was implemented: the Fed relies on open market operations as the most important tool of monetary policy implementation; and open market purchases or sales of U.S. government securities shift the supply of reserves to hit the FOMC's target policy rate. This theme is consistent with the 2019 AP Macroeconomics Course and Exam Description that states "the tools of monetary policy include open market operations, the required reserve ratio, and the discount rate. The most frequently-used monetary policy tool is open market operations."¹¹ And, this story is part of the *Voluntary National Content Standards in Economics*, which have not been updated since 2010, that note that the Federal Reserve System's "major monetary policy tool is open market purchases and sales of government securities" and that the Federal Reserve's target for the federal funds rate is "largely reached by buying and selling existing government securities."¹² Because these exams and standards are used to guide curriculum writers, and drive the development of new materials, updating these products is important to move the teaching materials forward to reflect the way the Federal Reserve currently conducts monetary policy.

Teaching about Monetary Policy with Ample Reserves

The new framework has been in effect since the financial crisis and the Federal Reserve intends to continue to use this framework over the longer run. The new framework is relatively simple to explain and understand. When the FOMC wants to move the FFR higher or lower, the Federal Reserve raises or lowers two key interest rates, which it has the administrative power to set—IOER and the ON RRP rate. Arbitrage ensures that the IOER and ON RRP rates will guide the FFR into the target range. Though there are complexities to the operations, at the high school level, an understanding of how the Fed uses IOER and the ON RRP rate to move the FFR is sufficient for the understanding of monetary policy. Instruction can then turn to teaching the transmission of interest rates to economic outcomes.

Conclusion

Monetary policy has changed, but high-school textbooks, curriculum, and general understanding have lagged. It is important for social studies teachers to understand the current framework so that they are teaching their students correct information. This article provides background on the new ample-reserves regime; a primer that discusses these issues in more detail is available on the Federal Reserve Board's website.¹³ With this knowledge, teachers and students will be able to read newspaper articles about the Fed's policy actions and understand how the Fed is using monetary policy to steer the economy toward maximum employment and price stability. An additional benefit is that the new framework is likely easier to teach and more understandable for students. ●

Notes

1. In unusual economic circumstances, like the financial crisis and the coronavirus outbreak, the Federal Open Market Committee sets the stance of policy so that short-term interest rates are near zero. In these situations, the Fed also leans on unconventional tools to help support the economy. These tools are operationalized in the Fed's current, ample-reserve regime framework.
2. In 1977, Congress amended the Federal Reserve Act, directing the Board of Governors of the Federal Reserve System and the Federal Open Market Committee to "maintain long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices and moderate long-term interest rates."
3. Board of Governors of the Federal Reserve System, "Monetary Policy Report – July 2018." www.federalreserve.gov/monetarypolicy/2018-07-mp-report2.htm.
4. The Fed also implemented a number of credit and liquidity programs early on in the financial crisis to support financial institutions and foster improved conditions in financial markets. These special programs have expired or been closed for some time.
5. The Fed purchased a sizable amount of longer-term securities issued by the U.S. government and issued or guaranteed by government-sponsored agencies such as Fannie Mae or Freddie Mac. For more details, see the Board of Governors of the Federal Reserve System, "What were the Federal Reserve's large-scale asset purchases?" www.federalreserve.gov/faqs/what-were-the-federal-reserves-large-scale-asset-purchases.htm
6. Board of Governors of the Federal Reserve System. "Interest on Required Reserve Balances and Excess Balances." www.federalreserve.gov/monetarypolicy/reqresbalances.htm.
7. Board of Governors of the Federal Reserve System. "Interest on Required Reserve Balances and Excess Balances." www.federalreserve.gov/monetarypolicy/reqresbalances.htm. The rates paid on required (ICRR) and excess reserves (IOER) need not be the same, though to date, the Fed has paid the same rates.
8. Federal Reserve Bank of New York. "Reverse Repo Counterparties." www.newyorkfed.org/markets/rrp_counterparties
9. The interest rate a counterparty receives is the ON RRP facility's offering rate except in the highly unlikely event that the amount of propositions the Fed receives exceeds the amount of securities available for the operation. In that case, the interest rate would be determined by an auction process. For more details about the ON RRP facility, see the Board of Governors of the Federal Reserve System. "Overnight Reverse Repurchase Agreement Facility." www.federalreserve.gov/monetarypolicy/overnight-reverse-repurchase-agreements.htm
10. Board of Governors of the Federal Reserve System. "Interest on Required Reserve Balances and Excess Balances." www.federalreserve.gov/monetarypolicy/reqresbalances.htm.
11. College Board. "2019 AP Economics Course and Exam Description." <https://apcentral.collegeboard.org/pdf/ap-macroeconomics-course-and-exam-description.pdf?course=ap-macroeconomics>
12. Council for Economic Education. "Voluntary National Content Standards in Economics," second edition, 2010. www.councilforeconed.org/wp-content/uploads/2012/03/voluntary-national-content-standards-2010.pdf
13. See "The Fed's Ample-Reserves Approach to Implementing Monetary Policy," by Jane Ihrig, Zeynep Senyuz, and Gretchen C. Weinbach. www.federalreserve.gov/econres/feds/the-feds-ample-reserves-approach-to-implementing-monetary-policy.htm

The opinions expressed in this article are those of the authors and not those of the Federal Reserve Board of Governors, the Federal Reserve Bank of St. Louis, or the Federal Reserve System.

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