

## **“Recent Monetary Policy Changes and Their Effects on Monetary Aggregates”**

Abstract: The Federal Reserve has instituted sweeping changes in banking regulations and they have had profound effects on monetary aggregates, particularly banks’ reserves. Other policy changes such as discount rate establishment and open market operations have also change the way banks do business. This paper attempts to explain these changes in a way that is accessible to instructors of money, banking, and finance.

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# Recent Monetary Policy Changes and Their Effects on Monetary Aggregates

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## Introduction

The Federal Reserve has instituted some sweeping monetary policy changes in recent years that have had monumental effects on the money supply and monetary aggregates. Some of these changes have been implemented in response to the recent financial crisis, others to expand the Federal Reserve's control of the money supply and the overall health of the banking industry. The changes in the tools of monetary control—reserve requirement, discount rate, and open market operations—will necessarily change the traditional analysis of monetary policy by banking authorities and will change the lending and reserve policies of individual banks. Classroom instructors of economics and finance will also face new methods of analyzing the impact of monetary policies. A thorough analysis of these policy changes and their effects on monetary aggregates has not reached most textbooks in the field. The following is an attempt to present the monetary policy changes enacted by the Federal Reserve and their impacts on monetary aggregates in a way that may be employed by economics and finance instructors.

## Policy Changes:

### Reserve Requirement

In 2008 the U.S. Congress passed a law<sup>1</sup> at the request of Chairman Ben Bernanke, that allowed the Federal Reserve to lower the required reserve ratio to zero if it chooses, and also allowed the Federal Reserve to pay interest on banks' reserves. The Federal Reserve has not, as yet, effectively eliminated required reserves by lowering the requirement to zero, but it has begun to pay interest on reserves, both required reserves and excess reserves. Member banks have asked for interest payments on reserves for many decades. Since banks lose the opportunity to earn interest on reserves that lie idle with the Fed, they view this opportunity cost as a tax on membership in the Federal Reserve System.<sup>2</sup>

In the 1970s when interest rates were very high (and the opportunity cost of holding reserves was high) most new banks chose not to become members of the Federal Reserve System and existing state banks dropped out of the system. Fearing the loss of control over the money supply and the banking industry, Chairman Paul Volcker urged congress to pass the Depository Institutions Deregulation and Monetary Control Act of 1980. When enacted, this law allowed the Federal Reserve to set reserve requirements for all banks, not just member banks, and other financial institutions that offer checkable deposits (savings and loans, credit unions, etc.). It also allowed those institutions access to the Fed's discount window and deregulated interest banks paid on deposits. Requiring financial institutions to hold non-interest bearing reserves represents a cost for those institutions. By lowering the reserve requirement and paying interest on reserves the new policy of the Federal Reserve effectively lowers those costs.

As of today the Federal Reserve has not lowered the reserve requirement to zero, consequently there has been no impact on monetary aggregates. Even if the required reserve ratio is zero, banks will still choose to hold reserves—they cannot operate without some reserves. Lowering the requirement to zero simply allows banks to choose their own profit maximizing level of reserves to hold.

### Interest Paid on Reserves

In October 2008, the Federal Reserve began paying interest on required and excess reserves at two different rates. The interest rates were derived from a formula based on the federal funds target rate and the interest paid on required reserves was slightly higher than the rate on excess reserves. Since 2011 the Fed's have simplified it ... the interest on all reserves is 0.25%.<sup>3</sup> The impact of this seemingly small interest rate has been astounding. In May 2008 total reserves held by institutions offering checkable deposits was \$45.9 billion by May 2012 the total reserves jumped to \$1.56 trillion. Excess Reserves jumped almost one thousand fold from \$1.84 billion to \$1.46 trillion.<sup>4</sup> The massive increase in excess reserves is the result of banks' response to several events-- foremost is the interest paid on reserves by the Fed. Holding excess reserves result in higher interest income. Another is current market conditions. The combination of high risk and low interest rates discourage bank lending. Also, the Federal Reserve and the U.S. Treasury pumped money in the form of loans into many of the major banks who held them as reserves. Even though the interest the Fed pays on reserves is only 0.25% it represents a risk free source of bank revenue. Bank loans to customers have risks that are not currently offset by high interest rates. Consequently, banks find it most profitable to hold excess reserves. How much are they holding? See Table 1.

Table 1

May of Year	Total Reserves	Required Reserves	Monetary Base	Excess Reserves	Total Checkable Deposits	Required Reserve Ratio*	Actual Reserve Ratio*
Multiplier:	\$1000000	\$1000000	\$1000000	\$1000000	\$1000000	%	%
2000	40653	39683	573716	970	578000	6.87	7.03
2001	38625	37607	598692	1018	565500	6.65	6.83
2002	39511	38252	657786	1259	576800	6.63	6.85
2003	40916	39300	701170	1616	615000	6.39	6.65
2004	45435	43752	733591	1683	651400	6.71	6.97
2005	45447	43921	766838	1526	652700	6.73	6.96
2006	44818	43021	804821	1797	638000	6.74	7.02
2007	43342	41887	818316	1455	618200	6.78	7.01
2008	45917	44080	827228	1837	623400	7.07	7.36
2009	901104	58961	1768200	842143	760000	7.76	118.57
2010	1109769	64991	2005681	1044778	821600	7.91	135.07
2011	1587576	75072	2559321	1512504	970800	7.73	163.53
2012	1556346	98873	2609172	1457473	1195100	8.27	130.22

Sources: <http://www.federalreserve.gov/datadownload/Choose.aspx?rel=H3>

\* Calculated by author

### Discount Rate

Another recent change was the policy for determining the discount rate, the interest rate the Fed charges financial institutions for overnight loans. In the fall of 2007, the Federal Reserve instituted a policy to keep the discount rate 1% higher than federal funds target rate, the interest rate banks charge one another for overnight loans. This was adopted in an effort to encourage financial institutions to borrow from one another rather than from the discount window. From the beginning of the Federal Reserve until this change, the discount rate offered to member banks was the lowest rate available and represented an advantage of bank membership in the system. When the discount window was opened to all financial institutions that held required reserves, many of them took advantage of the opportunity to borrow at the lower rate. Under some circumstances this could interfere with the Fed's management of the money base. Interbank borrowing does not affect the monetary base...borrowing at the discount window increases the money base. By keeping the discount rate higher than the federal funds rate the

Federal Reserve can more easily and directly control the monetary base through the open market operations...the preferred method.

### Open Market Operations

Injections of new money from the Fed into the economy are most often undertaken through open market operations. The Federal Reserve Open Market Committee increases or decreases the monetary base by buying or selling bonds in the open market. This basic function has not changed; however, the Feds have adopted a new tool for directly increasing the money base, the Term Auction Facility. According to Frederic S. Mishkin, member of the board of governors:

“To address these pressures, the Federal Reserve introduced a new policy tool called the Term Auction Facility (TAF).<sup>7</sup> With this tool, the Federal Reserve auctions a pre-announced quantity of credit to eligible borrowers for a term substantially longer than overnight; thus far, each auction has involved a term of one month. As with primary credit, a depository institution is eligible to participate in a TAF auction if the bank is judged to be in generally sound financial condition, and a wide variety of collateral can be used to secure the loan. The minimum bid rate for each auction is established at the OIS rate corresponding to the maturity of the credit being auctioned.”<sup>5</sup>

Another recent change in open market operations is one that the Fed refers to as “switching.” The Open Market Committee is selling short-term bonds and buying long-term bonds. This policy is intended to lower long-term interest rates relative short-term interest. Its success has not been observed as of yet.

### Pedagogy

#### Required Reserves

The prospect of a zero reserve ratio affects the monetary policy analysis offered by theoreticians and instructors. For example most textbooks that cover the banking industry rely on a simple money multiplier to demonstrate the money expansion process and to calculate the potential money supply. Typically, the potential money supply is represented as the monetary base times the reciprocal of the required reserve ratio (Potential  $M = MB \times 1/RR$ ). If the required reserve ratio is zero then the potential money supply is infinitely large. The prospect of an ever expanding money supply is only a theoretical possibility, not one likely to occur.

In the past most textbooks that covered financial institutions suggested that banks preferred to stay “loaned up.” That is, they would maximize profits by keeping excess reserves to a minimum since excess reserves provided no interest income for the bank. This is no longer a safe assumption as it is clear from the recent data that the profit maximizing amount of reserves is much greater than simply required reserves. The reserve ratio the banks choose is no longer dictated by the Fed’s required reserve ratio and it will certainly be at the banks’ discretion if the Feds lower the reserve ratio to zero.

Recently, as indicated by the data, banks have held more than 100% of deposits in reserve. In effect the U.S. does not currently have a fractional reserve system. They are holding more than all of their checkable deposits in reserve. In fact, they are taking other deposits besides checkable deposits (savings, time deposits, etc.) and using them to earn the risk free interest offered by the Federal Reserve.

If the Feds lower the required ratio to zero and the potential money supply is meaningless, what do instructors teach? The actual money supply is a more useful, albeit, a more difficult calculation to offer. The actual money supply =  $MB \times (1 + c)/(c + r)$  where MB is the monetary base, c is the currency deposit ratio, and r is the actual reserve ratio, not the required reserve ratio.

The currency deposit ratio is the ratio of money held by the public in the form of cash relative to money held in the form of checkable deposits (see Table 2). Most textbook authors in the past have observed that the currency deposit ratio is less than one. That is, for most of modern history people have held more money in checkable deposits than in cash. But that number has changed in recent years. In 1960 c was 0.26, people held only about one fourth as much in cash as in deposits. In 1980 c rose to 0.39, in 2000 c was 0.9, and in 2010 it had

broken the old rule and become 1.07. Textbooks may no longer assume that a currency deposit ratio of less than one exists. Most textbooks do not thoroughly address the determinants of the currency deposit ratio. Most simply suggest that the currency deposit ratio rises when illegal activities rise due to the cash transactions in underground markets.

Under some financial market conditions, such as when the reserve ratio is greater than one, the actual money supply will be less than the monetary base. This eventuality has never occurred until recently. In 2012 for example, from Table 2 a monetary base of \$2,609,172 million yields a money supply, from Table 2 of \$2,238,100 million.

Table 2

May of Year	Currency in Circulation	Travelers Checks	Demand Deposits	Other Checkable Deposits	Total Checkable Deposits	Currency/Deposit*	Money Supply
Multiplier:	\$1000000	\$1000000	\$100000	\$1000000	\$1000000		\$1000000
2000	519200	8500	336100	241900	578000	0.898	1105700
2001	545700	8100	316700	248800	565500	0.965	1119300
2002	604700	8000	313600	263200	576800	1.048	1189500
2003	645700	7600	327300	287700	615000	1.050	1268300
2004	673200	7700	331500	319900	651400	1.033	1332300
2005	704700	7500	330900	321800	652700	1.080	1364900
2006	741000	7000	323500	314500	638000	1.161	1386000
2007	755200	6600	307200	311000	618200	1.222	1380000
2008	762400	6200	311300	312100	623400	1.223	1392000
2009	848500	5300	422300	337700	760000	1.116	1613800
2010	879400	4900	446900	374700	821600	1.070	1705900
2011	956200	4600	567500	403300	970800	0.985	1931600
2012	1039000	4000	767300	427800	1195100	0.869	2238100

Sources: <http://www.federalreserve.gov/datadownload/Choose.aspx?rel=H3>

\* Calculated by author

### Monetary Tools for Easy Money-Tight Money

The Federal Reserve can increase the money supply (“quantitative easing” is the new term) or decrease it with easy money policies or tight money policies. The following is a summary of the tools and methods of monetary control as is typically presented in the classroom with the new tools included:

#### Monetary Policy

##### Easy Money

- Decrease the Reserve Requirement
- Decrease the Interest Paid on Reserves
- Decrease the Discount Rate
- Buy Bonds in the Open Market
- Increase Term Auction Loans

##### Tight Money

- Increase the Reserve Requirement
- Increase the Interest Paid on Reserves
- Increase the Discount Rate
- Sell Bonds in the Open Market
- Decrease Term Auction Loans

**Summary of Recent Changes**

- The Federal Reserve has the option of lowering the reserve requirement to zero, but the current requirement is largely ineffective.
- The Federal Reserve pays interest on banks' reserves leading to massive excess reserves.
- The discount rate is held above the federal funds target rate leading to more interbank borrowing and less borrowing at the discount window.
- The Federal Reserve has begun offering longer term loans to financial institutions in the form of Term Auction Facilities.

#### End Notes

1. See (<http://www.federalreserve.gov/newsevents/press/monetary/20081006a.htm>)
2. See [www.federalreserve.gov/boarddocs/testimony/2003/20030305/default.htm](http://www.federalreserve.gov/boarddocs/testimony/2003/20030305/default.htm)
3. See <http://www.federalreserve.gov/monetarypolicy/regresbalances.htm>
4. See table
5. See Mishkin 2008

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