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Reducing the IOER Rate: An Analysis of Options¹

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This note examines the likely impact that reducing the interest on excess reserves (IOER) rate would have on short-term money market rates and money market functioning, including possible implications for money market funds.² Three cases are examined: cutting the IOER rate to a level of about 10 basis points, reducing the rate to zero, and setting a negative IOER rate.³ We assume that aggregate reserve levels will remain at exceptionally high levels and that discretionary open market operations are not otherwise employed to influence the level of short-term money market rates.

Overall, we would anticipate that cutting the IOER rate by 15 basis points, to a level of 10 basis points, would reduce overnight money market rates by a somewhat lesser amount, likely leaving them in a range centered between 5 and 10 basis points. The greatest potential impacts on financial market structure and functioning might be expected to arise through the effects of lower money market rates on money market funds (MMFs), although on balance we would not anticipate significant disruptions in this case. However, predicting these effects becomes progressively more challenging for levels of the IOER set closer to zero, and uncertainty is compounded by the possible impacts of recent regulatory changes for money market funds.

Setting the IOER rate to zero instead would probably leave short-term money market rates slightly above zero. Trading volumes in overnight markets, particularly bank wholesale funding markets, would likely be much reduced. The potential for investor reallocations out of MMFs would also be greater. Even with reduced trading volumes, the lower short-term rates would still likely be transmitted out the yield curve and hence could result in more accommodative financial conditions. However, the effect would be fairly modest, given the limited room for short-term interest rates to decline.

It is difficult to identify and quantify all of the potential effects of setting the IOER rate below zero. The ability of both depository institutions (DIs) and the public to hold currency would seem almost certain to prevent a sizable negative IOER rate from translating into significantly negative short-term rates. It is possible, but not certain, that setting the IOER rate at modestly negative levels, for example around -10 basis points,

¹ This note draws on a series of staff memos prepared for the December 2008 FOMC meeting. Those earlier notes did not posit explicit levels for the interest rate paid on excess reserves.

² Much of the economic benefit to lowering the IOER rate would depend on its impact on longer-term interest rates, which, in addition to its direct impact on short-term rates, might be affected by the degree to which lowering the IOER rate were also seen as a signal about the future path of policy. However, in this memo, we restrict our analysis to the direct effects on the level of short-term rates, and on whether there could be market disruptions that could interfere with the transmission of lower short-term rates to long-term rates

³ In all cases, the rate of interest paid on all required reserve balances is assumed to match the IOER rate.

might exert some further modest downward pressure on market rates without inducing institutions and individuals to shift into currency.

Option 1: Lowering IOER to about 10 Basis Points⁴

Effects on Rates and Trading Activity in Short-term Funding Markets

If the IOER rate were to be reduced to 10 basis points, average overnight unsecured domestic bank funding rates (U.S.-brokered Eurodollars and federal funds transactions) and secured rates for financing government securities (repo) would in general likely trade in a range slightly below the rate paid on excess reserves, and the same funding patterns that are observed today would likely persist. Experience over the past year suggests that lenders who are not eligible for IOER are often willing to accept yields as low as 5 basis points in the market instead of leaving their funds uninvested, as they still cover their transaction costs and (with the exception of the GSEs discussed below) face risks similar to those of leaving deposits uninvested at their clearing bank.⁵ In addition, there have been days when the effective rate was at or only slightly below the IOER rate and even DIs already holding large excess reserve positions have continued to borrow in the federal funds market, suggesting that these institutions are willing to participate in trades at very narrow rate spreads.⁶ As a result, a range of 5 to 10 basis points for the effective federal funds rate and other measures of money market rates seems likely.⁷

Thus, we would anticipate that a portion, but not all, of a 15-basis-point reduction in the IOER rate would be reflected in a reduction in overnight money market rates. Some degree of volatility associated with idiosyncratic late-day trading, sharp swings in dealers' collateral positions, statement dates, and other factors would be expected to continue to push rates outside their typical ranges on occasion.⁸ With trading patterns not expected to be disrupted in any significant way, we would expect the decline in overnight

⁴ While most of the discussion in this section focuses on the specific case of the IOER rate at 10 basis points, the analysis should generalize to IOER rates up to 15 basis points. However, it is not clear to what extent the analysis should generalize to rates below 10 basis points.

⁵ Conversations with market participants active in wholesale markets suggests that transactions costs typically account for 1 basis point or less on most wholesale transactions in bank funding and repo markets.

⁶ Figure 1 displays the effective federal funds rate and the high and low rates for brokered trades for 2010 to date. The presence in the market of non-IOER eligible participants that seek to invest large balances each day has created arbitrage opportunities for banks to borrow at rates below the IOER rate and maintain those funds as excess reserves, resulting in risk-free earnings.

⁷ From December 16, 2008, to July 21, 2010, the daily fed funds effective rate averaged 16 basis points. For much of that period, average daily rates of 14 to 15 basis points were common, but more recently these rates have been closer to 20 basis points. U.S.-brokered Eurodollar rates have tended to be slightly higher and Treasury repo rates more often somewhat lower than these fed funds levels.

⁸ While most borrowing in bank funding markets might continue to occur at market rates slightly below the IOER rate, credit tiering and ongoing needs of some banks to cover their structural deficiencies (even with high aggregate excess reserve levels) would be expected to lead to some trading above the IOER rate.

market rates associated with this cut in the IOER rate to be transmitted across the yield curve just as similar-sized declines occurring at higher rate levels would be.

GSE Participation and Federal Funds Transactions

Evidence suggests that the GSEs, which have the option to hold risk-free balances at the Fed but are not eligible to earn interest on those reserves, would also likely continue to lend to banks overnight in unsecured federal funds transactions if rates were at least 5 basis points or so, but such an outcome is not certain.⁹ Over the past year or so, some GSEs have occasionally preferred to leave cash at the Fed rather than lend when overnight market rates have fallen below 10 basis points or so, and staff conversations have confirmed that this placement of funds at the Fed has been a deliberate strategy for some individual GSEs. However, it is unclear to what degree this behavior reflects a strategic bargaining posture with borrowing institutions rather than solely a judgment about the risk-adjusted profitability of placing funds on an unsecured basis at rates below 10 basis points. Indeed, we have also observed lending by individual GSEs in unsecured markets at rates well below 10 basis points, and some recent discussions with GSEs indicate that the absolute lower bound of rates at which they would be willing to make fed funds sales could even be below 5 basis points. Nonetheless, the GSEs might reduce their lending in overnight markets if the rates they received were consistently below 10 basis points.

If the GSEs were to reduce or cease their lending into the market, volume in the brokered federal funds market would be significantly reduced. This change would likely make the calculated effective federal funds rate less representative of broader market conditions, and therefore of less use for the FOMC's policy deliberations. GSEs account for a substantial, though not precisely known, share of brokered federal funds transactions. If fed funds transactions volume were to decline substantially, the daily effective rate might become more influenced by idiosyncratic late-day trades.¹⁰ But apart from the possible effects on the calculation of the daily effective federal funds rate, the withdrawal of GSEs from fed funds lending is not necessarily problematic. GSE lending makes up a relatively small portion of total lending in overnight wholesale funding markets. As a result, the overall functioning of money markets, and in particular the ability of financial institutions to obtain funding in these markets to cover structural balance sheet deficiencies, would not likely be harmed.

⁹ Reactions by GSEs could vary, as their lending behavior in different markets is not homogeneous. Also, GSEs might have a slightly lower rate threshold for curtailing lending in secured markets than in unsecured markets, although even repo transactions against Treasury collateral are not generally viewed as being entirely free of risk.

¹⁰ In particular, late-day trading could impart some upward bias to the effective funds rate as a measure of the central tendency for overnight rates, as late-day trades, which sometimes occur at relatively high rates when banks struggle to cover unexpected deficiencies in illiquid market conditions, would account for a greater share of total transaction volume. For this reason, and for other considerations raised elsewhere in this note, if policymakers wished to continue to identify a range of effective federal funds rate outcomes with its policy stance, they may wish to set the upper end of that range slightly above the IOER rate. Alternatively, a different market rate reference or objective might be adopted.

Impact on Money Market Funds

The greatest potential impacts on financial market structure and functioning might be expected to arise through effects of lower money market rates on money market funds (MMFs). These funds currently have about \$2.8 trillion in assets under management, with about \$360 billion held in Treasury-only and Treasury-repo (“Treasury-focused”) funds and about \$1.6 trillion held in “prime” funds (Figure 2). The amounts invested in funds of this type have dropped considerably since early 2009, shortly after the IOER rate was reduced to 25 basis points, apparently reflecting investors’ attempts to obtain higher yields on alternative assets. In general, the pace of runoffs at money funds has moderated in recent months.

Very low short-term interest rates have already reduced revenues for nearly all MMFs. Yields on MMFs’ portfolio instruments have fallen short of the fees they normally charge, and many fund managers have waived fees to prevent negative net yields. Further declines in short-term rates would likely trigger additional outflows and further reduce industry revenues. Based on comparisons of current MMF expense ratios with those that prevailed in August 2008—when money market yields generally exceeded all MMF expense ratios—it appears that fees have been reduced for at least one third of all current MMF assets under management.¹¹ Pressures have been, and would continue to be, most pronounced in Treasury-focused MMFs, where such fee reductions affect about two-thirds of assets. To a lesser degree, other types of MMFs, such as government and agency as well as tax-exempt funds, would also come under significant additional strain such that further prolonged low interest rates could potentially generate some consolidation and liquidations. In contrast, prime MMFs are likely to be more resilient to the types of reductions in short-term rates that would be result from a lower IOER rate.

Even with further declines in revenues, it remains unclear whether fund sponsors would opt to close MMFs. In early 2009, several fund managers indicated that they believed that Treasury-focused MMFs could survive roughly a year in the current low interest rate environment, but fund closures have been minimal to date. Fund sponsors’ decisions to keep MMFs open likely reflect more than just a profit-loss determination at individual funds.¹² The value of maintaining MMFs as part of a menu of investment products may be important for asset managers, and sponsors may choose alternatives to fund liquidation to avoid losing customers and business lines.

On balance, we would expect declines in short-term market rates associated with a cut in the IOER rate to a level of 10 basis points to prompt additional outflows from MMFs as investors seek higher yields. At the same time, the prospect of some fund closures would have to be countenanced, with Treasury-focused funds likely the most affected.

¹¹ This figure is calculated by summing the assets under management in all of the funds for which the current gross yield falls short of the expense ratio reported in August 2008, and likely under-represents actual fee reductions.

¹² For example, some money fund managers have closed Treasury as well as government and agency funds to new investors but have kept them open for existing investors.

However, we would expect MMFs to remain a significant source of funding in short-term money markets, albeit at possibly reduced levels.

Effects of Changes in Money Market Funds on Money Markets

Although severe further attrition within the money fund industry as a whole is not seen as a likely outcome of lowering IOER to 10 basis points, this possibility cannot be excluded. To the degree that shareholders in MMFs instead invest directly in money market instruments, asset holdings and trading flows and relationships might shift, with some degree of temporary disruption possible. But after these adjustments, the remaining impact on money market rates should be limited. Treasury-focused funds, which are most likely to be significantly affected by lower rates, have a very limited effect on the market for Treasury securities because these funds hold a relatively small share of outstanding Treasury bills. Institutional investors hold over 75 percent of the money in Treasury-focused funds, and many of these investors probably could participate directly in the underlying markets.

The consequences could be somewhat different in the event of large-scale attrition or liquidation of MMFs if investors re-allocated their funds mostly into bank deposits or other bank liabilities rather than directly into wholesale money markets. This outcome seems more likely for retail investors, who represent about one-third of the assets under management at MMFs and who likely would be less able to participate directly in these wholesale money markets. Instead of lending in money markets, banks would have the option to earn 10 basis points risk free by holding these funds, and would therefore not have the same incentives to recycle funds previously invested in MMFs at rates lower (or even just slightly higher) than the IOER rate. In such a case, institutions with large structural deficiencies, such as securities dealers, might have to pay rates slightly above the IOER rate to obtain funding. Thus, at positive IOER rate levels, a large scale re-allocation of some short-term funds away from MMFs into banks would tend to partially countervail the downward pressure on overnight funding rates of a reduced IOER.

Option 2: Lowering the IOER Rate to Zero

Effects on Short-Term Money Market Rates and Trading Flows

Cutting the IOER rate to zero would remove incentives that banks currently have (and would still be expected to have even at an IOER rate of 10 basis points) to borrow in the market in order to arbitrage between funding rates and the IOER rate, eliminating one current source of demand in funding markets. However, financial institutions that rely on money markets to cover structural balance sheet deficiencies, including securities dealers and some banks, would still demand overnight and other short-term financing. Thus, we would anticipate that overnight money market rates could fall to the minimal levels needed to induce prospective lenders (which would now include banks holding sizable surplus reserves) to lend, which could be at rates as low as 5 basis points or even somewhat less.

Volumes in the overnight bank funding market (including both U.S.-brokered Eurodollar and federal funds transactions) could drop off significantly as banks ceased to arbitrage

funding markets to earn the rate paid on excess reserves. Associated with this decline in trading volume could be some atrophy of the supporting infrastructure, which could have longer-run implications for market functioning (including changes possibly associated with shifts in funding out of MMFs, which are discussed below).¹³ Borrowing volumes by dealers in secured funding markets would likely be much less affected.¹⁴ GSEs might remain participants in secured overnight money markets, and banks might even be induced to re-enter these markets as lenders more regularly. But while incentives for money market trading might be lessened or removed, we would not anticipate that this would cause rates in the overnight sector to become de-linked from longer-term rates.

Effects on MMFs

Previous research projected nearly complete revenue losses for Treasury-focused funds at effective market rates in the low single digits.¹⁵ Such losses could be enough to lead to widespread closures of these funds, although prime funds would likely continue to function despite some additional revenue losses with the IOER rate at zero. Even if MMF sponsors were willing to absorb the revenue losses associated with lower market rates, the lower returns to investors on these funds and even the reduced lending opportunities these funds could face might lead to a potentially substantial acceleration in money fund outflows into direct trading or bank liabilities. To an even more substantial degree than would be anticipated in the case where the IOER rate were cut to just a modestly positive level, MMF liquidations would be likely to prompt a significant reallocation into bank deposits. But unlike the case in which the IOER rate is left at a modestly positive level, banks would have an incentive to reinvest these funds at prevailing money market rates.

Additional Effects

A cut in the IOER rate to zero, associated declines in short-term market rates, and increasing inflows into bank deposits could have important implications for the banking sector.¹⁶ Deposit inflows would reduce bank leverage ratios, although for the most part these ratios are comfortably above regulatory standards. With money market yields declining, rates on deposit liabilities already at or near zero, and the spread between the

¹³ After the Bank of Japan's quantitative easing policy ended, money market activity generally recovered, although uncollateralized trading volumes never fully returned to earlier levels. However, there are some significant differences between Japanese and U.S. institutional arrangements. For more detail, refer to "Japanese Money Markets during Periods of Low or Zero Interest Rates," Fang Cai and Clara Vega, memo to the FOMC, December 5, 2008.

¹⁴ This discussion largely assumes that cutting IOER to zero would not directly affect the incentives that borrowers in these markets might have to change their reliance on these funding markets. It is not obvious, for example, whether dealers would have a clear incentive to either increase or decrease their securities inventories. However, narrowing and even reversing the spread between the IOER rate and overnight funding rates could alter banks' demand for and the distribution of excess reserves.

¹⁵ "Effects of Very Low Policy Rates on Money Market Funds," Patrick Dwyer, Patrick McCabe, Brian Mulligan, and Steve Oliner. Memo to the FOMC, December 5, 2008.

¹⁶ To a lesser degree, some of these effects would likely materialize even with smaller cuts in the IOER rate.

IOER rate and rates in wholesale funding markets likely to narrow, banks' net interest margins could decline somewhat.¹⁷ Banks are likely to respond to these pressures by cutting effective returns on bank deposits and by raising service charges where possible to offset their impact on bank balance sheets and spreads. Public demand for currency could expand, although Japan's experience with near-zero rates for many years does not suggest that currency demand would likely create severe distortions.

One previous concern, the possible impact on Treasury market liquidity of very low market rates, would likely be greatly eased because of the recent adoption of a penalty fee for delivery fails on trades in Treasury cash and repo markets. Absent this penalty, liquidity in Treasury cash markets had suffered in low interest rate environments in the past as the effective cost for fails was very low and the incidence of such fails increased substantially. The penalty fee appears to have been effective in reducing the incidence of delivery fails in the current low rate environment, and it would be expected to remain effective even if the IOER rate were set to zero. However, other financing markets, including those for MBS, would remain vulnerable to this risk. Indeed, the level of fails in the agency MBS market is already very elevated.

Option 3: Lowering the IOER Rate below Zero

Negative IOER in Other Countries

Assessing the possible impact of a negative IOER rate is challenging because there is virtually no domestic or international experience with negative policy rates on which to draw. In Sweden, the Riksbank has, since July 2009, maintained a negative interest rate on excess deposits held overnight by DIs. However, the Riksbank's daily and weekly market operations are aimed at maintaining overnight rates within a corridor whose lower bound is positive. The deposit facility, for which the rate is negative, is normally little used, and its rate thus has little direct impact on market rates. The Bank of England reportedly considered a negative rate target in its internal deliberations, but never implemented such a policy.

Legal and Practical Obstacles for Setting the IOER Rate Below Zero

There are several potentially substantial legal and practical constraints to implementing a negative IOER rate regime, some of which would be binding at any IOER rate below zero, even a rate just slightly below zero. Most notably, it is not at all clear that the Federal Reserve Act permits negative IOER rates, and more staff analysis would be needed to establish the Federal Reserve's authority in this area. In addition, the Federal Reserve computer systems used to calculate and manage interest on reserves do not currently allow for the possibility of a negative IOER rate, although these systems could be modified over time if needed.¹⁸ Moreover, if negative IOER rates were to pull Treasury bill yields into negative territory, the Treasury would encounter difficulties

¹⁷ With \$1 trillion of excess reserves, elimination of a 5-basis-point spread between the IOER rate and bank funding costs, which may approximate the effective current spread, would represent a net annual loss of \$500 million to the banking sector, or about 0.4 basis points on industry ROA.

¹⁸ A rough estimate is that a few months would be required to make the needed system changes.

because it cannot accept negative rates at its auctions, although presumably it could modify its systems as well. Finally, as discussed further below, at sufficiently negative IOER rates, DIs might opt to shift a significant quantity of their reserve balances into currency. Present Federal Reserve inventories of currency, at about \$200 billion, would not be adequate to cover large-scale conversion of the nearly \$1 trillion in reserve balances to banknotes.¹⁹ While the operational and legal impediments to a negative IOER rate are likely to be significant, for the remainder of this discussion we will assume that they can be overcome.

Currency and Substantially Negative IOER Rates

The ability of both DIs and the public to hold currency in place of any instrument yielding a negative return could prevent a sizable negative IOER rate translating into significantly negative short-term rates. With sufficiently negative IOER rates, DIs would substitute currency in the form of vault cash for reserve balances on a substantial scale to evade the costs associated with holding reserve balances, thereby significantly reducing reserve levels. In addition to reducing the total costs DIs face as a result of a negative IOER rate, sharply lower levels of reserve balances would likely prevent reductions in the IOER rate from being fully passed through to short-term market rates. At the same time, investors, including bank depositors, could counter attempts by banks to pass along a large negative IOER rate in the form of sharply higher service fees by increasing their own holdings of currency, subject to their own storage costs, which would further reduce reserve balances.

The exact point at which it would become cost effective to convert reserve balances to currency is uncertain, though it would presumably differ from bank to bank. For large denominations, the cost of shipping banknotes is on the order of one basis point; in addition, banks would have to cover the costs of storing additional vault cash holdings, which are in the range of 3 basis points per month (36 basis points per year).²⁰ Thus, a

¹⁹ Production capacity for \$100 bills, the largest denomination in production, is uncertain, but is no more than \$500 billion per year. In the extreme, presumably production of larger-denomination banknotes could be reinstated, but at least one year's lead time would be required before production of such notes could begin. There is precedent for the use of denominations up to \$10,000 in general and for denominations up to \$100,000 for transactions between the Federal Reserve and the Treasury. In addition, the information that currency production is being ramped up substantially, or that any other changes to banknote management are being made, could have large and unpredictable consequences if such changes were misinterpreted as pointing to higher inflation.

²⁰ These estimates are very rough and are based on rental of space for relatively small volumes of notes. It is not clear whether costs would increase linearly or at a higher or lower rate for larger volumes. We would not anticipate that DIs would be moving currency back and forth between their vaults and the Federal Reserve in response to short-term payment flows, which would entail higher transportation costs, but rather would adopt reserve management strategies that would primarily involve increasing currency holdings and working with the implied lower reserve balances over extended periods. Specifically, we would anticipate that profit-maximizing DIs would manage their currency inventories conditional on transportation and storage costs for banknotes, the IOER rate, borrowing rates, and daylight and overnight overdraft fees. In addition, it should be noted that the Federal Reserve's existing custodial inventory program allows DIs to convert some denominations of currency held in their vaults to balances without physically moving it.

negative IOER rate below about -35 basis points might have the potential to trigger a significant reduction in banks' reserve balance holdings, at least among those that actively manage their accounts. The aggregate effect of DI's actions to convert reserve balances to currency on a large scale would tend to counteract the effect a negative IOER rate would have on funding rates.²¹

Impact of a Modestly Negative IOER on Short-Term Interest Rates

At a modestly negative IOER rate, that is, between 0 and -30 basis points, DI's might not find it cost-effective to convert a significant portion of their excess reserves to currency, and such a rate could put some further downward pressures on short-term rates. In addition, whether or not most excess reserves were converted to vault cash, any negative IOER rate would still affect banks reaching the end of the day with excess balances from either supply shocks or intentional buffer stocks. These banks would face lower rates in a negative-IOER environment, and moderate further declines in short-term rates could potentially occur. Additionally, a negative IOER rate would likely result in attempts by DI's to pass along the costs associated with holding excess reserves to investors and depositors, and could induce some trading in short-term markets at negative rates, although competitive pressures and the expected duration of the negative rate would likely play a role in determining the actual impact on rates.²²

The degree to which a modest reduction in the IOER rate below zero would put further downward pressure on market rates is uncertain and would be importantly affected by the presence of IOER-ineligible firms (the GSEs and FHLBs in particular), which would tend to limit the size of a possible pass-through to market rates.²³ If a negative IOER rate did not apply to these institutions, they would be in a position to arbitrage the reserves market, accepting balances from market participants at rates just slightly below zero to earn a risk-free zero return. In the limit, these non-IOER participants could hold nearly all excess balances, severely limiting any pass-through from a negative IOER rate to negative market rates.²⁴ However, it is difficult to know the extent to which these participants would be willing to expand their balance sheets in order to conduct such arbitrage.

²¹ The impact of lower reserve levels on market rates is difficult to anticipate. Market rates will depend on the levels of the primary credit and IOER rates (assumed to be modestly positive and negative, respectively), the distribution of reserve shocks DI's face, and their level of reserve balances. A lower level of balances is expected to be associated with higher market rates. However, this effect might not be pronounced unless reserve levels fell well below current levels.

²² Banks and bank holding companies have a number of options for passing along costs to their customers and counterparties, including higher account fees and lower deposit rates. It is not obvious how banks would choose to operate in this case.

²³ In addition to the possible changes in GSE and FHLB behavior, foreign private institutions, if faced with actually earning negative rates, could lobby their home country central banks to offer dollar-denominated accounts at zero or just slightly negative rates, with those central banks holding balances on deposit at the Fed at a zero rate.

²⁴ Recall that the counterparty restrictions for the GSEs limit only lending counterparties; any institution is in a position to lend funds to the GSEs.

The preceding discussion has focused on the implications of the availability of currency and the possible activities of the GSEs for the impact of a negative IOER rate on market rates. It suggests that negative IOER rates are unlikely to reduce market rates dramatically more than an IOER of zero. However, that result hinges on the exact level of rates that would trigger large-scale shifts from reserves into currency, and on the behavior of non-IOER participants in funding markets. Beyond their possible effect on market interest rates, negative IOER rates would likely result in dramatically reduced trading volumes in funding markets, as in the case with the IOER rate set to zero, and in further reductions in the profitability of MMFs, with an increased likelihood that some MMFs, especially Treasury-focused funds, would leave the market.

Figure 1

Brokered Federal Funds Trading Rates with Interest on Excess Reserves at 25 Basis Points

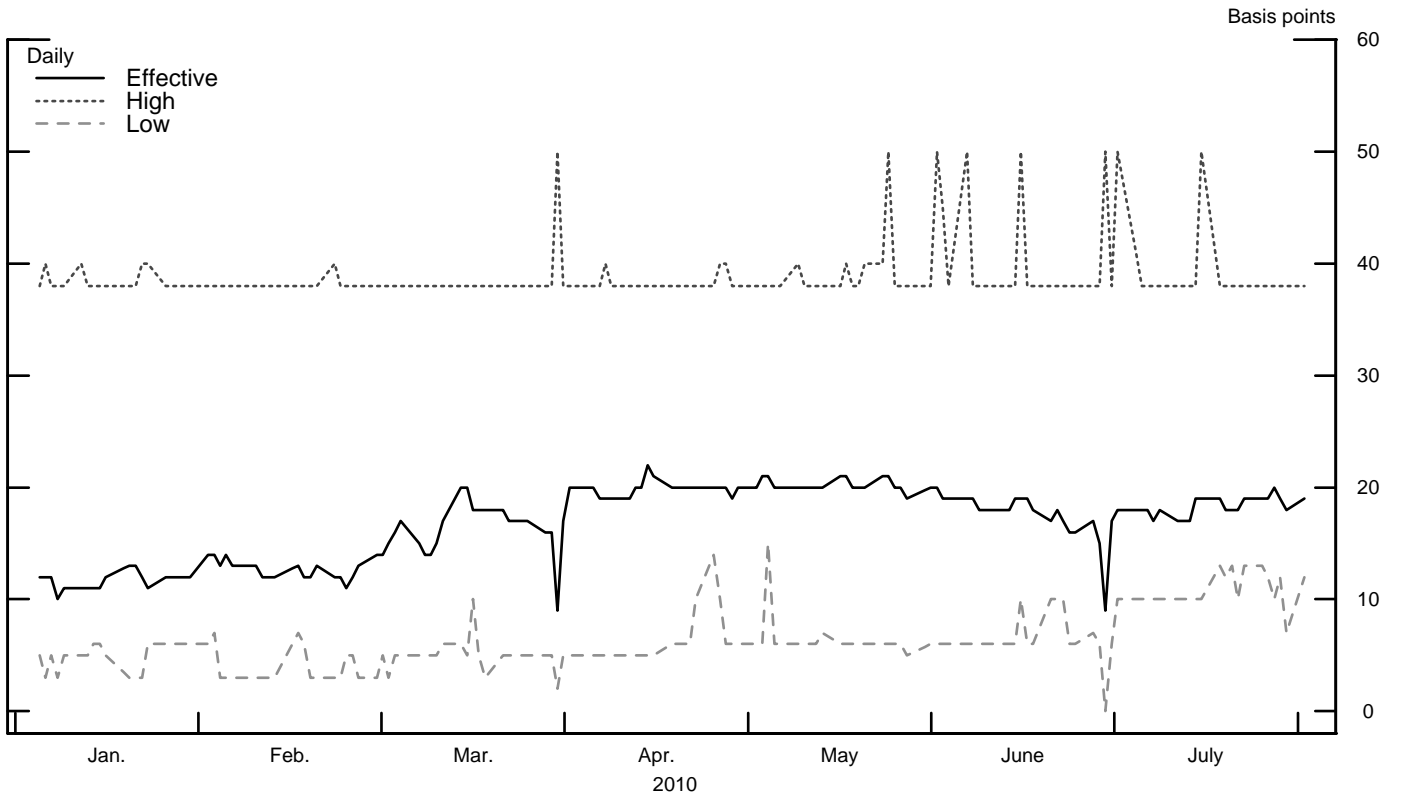
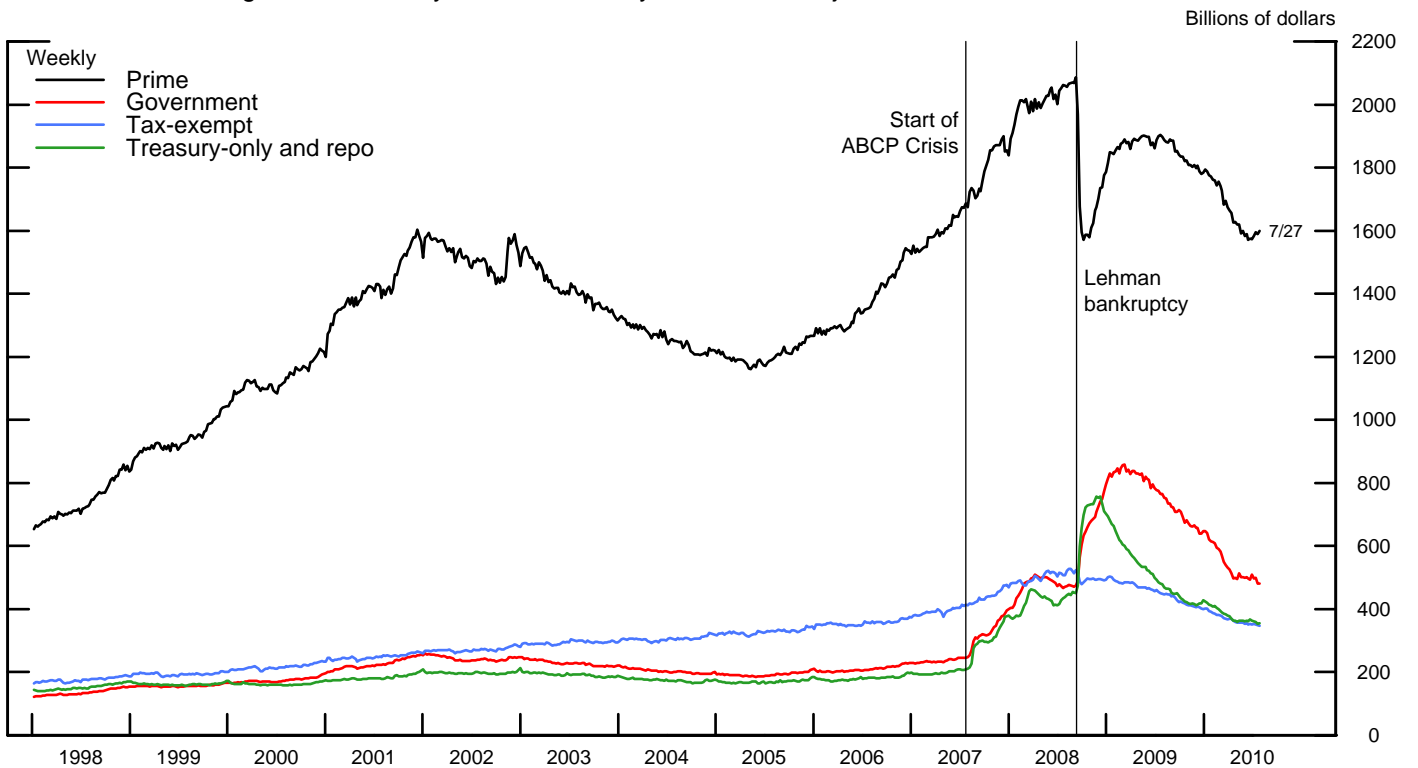


Figure 2

Assets Under Management in Money Market Funds by Investment Objective



Source: iMoneyNet.