Update on Foreign Central Bank Operating Procedures and the Foreign Experience with Using Interest on Reserves as a Monetary Policy Instrument

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April 19, 2013

This note provides a brief update on the operations of ten foreign central banks described in two earlier staff notes to the FOMC—a March 2008 note, "Foreign Central Bank Approaches to Monetary Policy Implementation," and a January 2010 note, "Interest on Excess Reserves as a Monetary Policy Instrument: The Experience of Foreign Central Banks." Since those notes were distributed, some central bank practices have changed and some central banks that pay interest on reserves or settlement balances have raised interest rates. This note reports on those changes and describes the experience of the central banks that raised rates, with a focus on the extent to which it was necessary to drain balances to achieve the tightening. These new observations on the foreign experience with paying interest on balances held at central banks are generally consistent with the findings described in the 2010 note, that the interest rate paid on the balances has seemed to provide an effective lower bound for market interest rates and that tightening by raising the interest rate paid on balances has been possible without draining those balances.

Central Bank Approaches to Policy Implementation

For the most part, foreign central banks continue to implement monetary policy in ways that were described in the earlier notes. The central banks of Norway and Denmark are exceptions, however, having altered their policy approaches somewhat since the 2010 note. This section reviews some of the key features of the current policy arrangements.

- The **Reserve Bank of Australia**, the **Bank of Canada**, and the **Riksbank** currently employ relatively narrow symmetric corridor systems, systems in which the policy target is in the middle of a "corridor" defined by a lending rate at the top of the corridor and the deposit rate at the bottom, to guide short-term interbank interest rates in their respective markets, similar to practices they followed prior to the crisis.
    - The Bank of Canada temporarily operated a floor system in 2009-10, a system in which a central bank's target for the overnight interbank interest rate is at or close to a deposit rate floor, but the Bank has since reverted to its pre-crisis arrangement, with the overnight rate trading close to the middle of the corridor and settlement balances once again small.

[1] We received useful comments and help from Seth Carpenter, Jim Clouse, Bill English, Steve Kamin, Steve Meyer, and Rob Martin.

- The **European Central Bank**, the **Bank of Japan**, and the **Bank of England** are currently conducting monetary policy largely as described in the 2010 note.[2] These central banks have left their respective markets with relatively large quantities of reserves, and short-term interbank interest rates are close to structural "floors" of the central banks' policy rate corridors.
    - The ECB has maintained its corridor system, but the introduction of fixed-rate longer-term refinancing operations added a considerable amount of liquidity, driving overnight market rates, currently roughly 8 basis points, close to the ECB's deposit rate, currently 0 basis points. Even though the ECB has reabsorbed some of that liquidity, as earlier 6-month and 1-year refinancing operations have matured and as some banks have begun prepaying refinancing drawn from the 3-year operations, the quantity of reserves remains large enough to keep the overnight rate close to the deposit rate.
    - As part of its new program to achieve 2 percent inflation, the Bank of Japan changed its main operating target for money market operations from the uncollateralized overnight call rate to the monetary base, promising to purchase Japanese government bonds and other assets so that the monetary base will double by 2015. However, it is not clear that this change signals any significant alteration to the framework for targeting the call rate. For example, the BoJ has maintained its temporary deposit facility, which it established in November 2008 to pay interest on excess reserves, and the call rate currently remains quite close to the deposit rate of 10 basis points. Future increases in the monetary base seem unlikely to push the call rate any lower.
    - In 2009, the Bank of England moved to a system in which banks are no longer required to set targets for their reserve balances and all reserves are remunerated at the Bank Rate. The large quantity of reserves has driven the sterling overnight interbank rate slightly below the Bank Rate, currently 50 basis points, in part because some financial institutions with sterling funds to lend have not taken the necessary steps to receive compensation from the BoE.
- The **Reserve Bank of New Zealand** and the **Norges Bank** currently employ tiered remuneration systems that operate like floor systems. In these systems, liquidity is sufficient to drive the overnight rate down toward a floor created by a rate of remuneration offered by the central bank on liquidity and settlement balances. In contrast to a more standard floor arrangement, the central bank imposes limits for each bank on the quantities of balances that can earn this remuneration. Balances above the limit earn a lower rate of interest, but the quotas are generous enough to make this a relatively

[2] Prior to the intensification of the crisis in late 2008, the ECB and the Bank of England operated symmetric corridor systems. The Bank of Japan operated an asymmetric corridor system, in which the upper bound of the corridor was defined by a lending rate that was set at a spread over the target for call rate and the lower bound was zero. Prior to November 2008, when the Bank of Japan instituted its deposit facility, the Bank did not pay interest on excess reserves. These prior arrangements are described more fully in the 2008 note.

infrequent event. This arrangement gives banks with excess balances a greater incentive to lend, an arrangement that encourages interbank trading.

- The RBNZ approach was put in place in August 2007 and has not been altered since then.
- The Norges Bank adopted its tiered system in October 2011: banks are remunerated at the sight deposit rate for liquidity balances up to a quota. The central bank had previously used a floor system in which all funds held at the overnight deposit facility were remunerated at the Bank's deposit rate.

- Two other central banks are currently implementing monetary policy to achieve exchange rate goals.
  - The **Swiss National Bank** conducts policy by targeting a range for the three-month Swiss franc LIBOR, largely as described in the 2008 note, although the width of the range has narrowed as the SNB lowered the upper end of the range after the lower end had hit zero. In September 2011, the SNB announced an exchange rate floor of 1.2 Swiss francs per euro and said that it stood ready to purchase unlimited quantities of foreign exchange in order to defend that floor. As a result of SNB intervention to counter upward pressure on the franc, as well as other operations in Swiss francs, market liquidity has been ample, and 3-month Swiss franc LIBOR has been near the low end of the SNB's current target range of 0 to 25 basis points.
  - The **National Bank of Denmark** (NBD) continues to adjust its monetary policy to maintain a fixed exchange rate against the euro, as described in the 2008 note. In June 2009, the NBD introduced a spread between the rates paid on its regular 7-day loan and deposit operations (the lending rate and the certificate of deposit rate respectively), citing a desire to encourage greater interbank trading. Initially, the spread was 10 basis points, but the NBD has varied it over time and it currently stands at 40 basis points. The NBD's certificate of deposit rate was lowered to negative 20 basis points in July 2012, following the ECB's decision to reduce its deposit rate to zero, to deter financial inflows from the euro area to Denmark.[3]

Interest Rate Paid on Central Bank Balances as a Floor for Market Rates and a Tightening Tool

The effectiveness of policy rates as floors for market rates depends in part on the access of market participants to the remuneration provided by the central bank at that policy rate. The

[3] The NBD raised the certificate of deposit rate to -10 basis points earlier this year. In addition to offering 7-day certificates of deposit on a weekly basis, the NBD also offers an overnight deposit facility, which allows banks to deposit funds with the central bank up to a fixed limit. Typically the rate on overnight deposits is below the 7-day certificate of deposit rate; however, the NBD sought to offset some of the harmful impacts of setting a negative certificate of deposit rate of on its banks by keeping the overnight deposit rate at 0 and increasing the limits on the amount of funds that banks could place there.

2010 note found that such policy rates generally provided a reasonably solid floor for market rates. Market rates generally equaled or exceeded these policy rates, even for central banks that were operating floor systems, and in the cases in which market rates fell below policy rates, these deviations were often small, for example the overnight call rate has at times traded a few basis points below the Bank of Japan's deposit rate, or did not last for more than a day or so. The main exception was the policy rate floor provided by the Bank of England. In that case, the sterling overnight rate routinely traded below the Bank Rate. This permeability in the floor remains today, where the overnight rate trades between 5 and 10 basis points below the Bank Rate. The BoE situation is similar to that of the Federal Reserve, in that not all lenders of funds in the interbank market have access to remuneration at the central bank's policy rate.

The 2010 note also looked at how aggregate balances of financial institutions at central banks have been adjusted during episodes of monetary tightening. The note found that, in most cases when central banks tightened, they increased the interest rate paid on balances held at the central bank and the increases were not accompanied by decreases in aggregate balances. These episodes provided some evidence that a central bank may successfully tighten monetary policy without draining reserve or settlement balances if it can increase the rate of interest paid on those balances. Since the 2010 note was written, there have been a handful of additional cases in which central banks have raised policy interest rates. For the most part, these tightenings were not associated with a decrease in reserves or settlement balances, although in some cases balances decreased in advance of tightening episodes.

- The ECB raised its policy rate corridor twice in 2011, lifting the rate it paid on deposits as well as its lending rate a cumulative 50 basis points. The overnight interest rate, which had been trading near the deposit rate floor, moved up along with the policy rates, and balances held at the central bank actually rose slightly over the tightening episode.
- The Reserve Bank of Australia raised its policy rates 175 basis points between late 2009 and late 2010, with no apparent net change in settlement balances.
- The Reserve Bank of New Zealand raised its official cash rate 50 basis points in 2010, with little net change in settlement balances.
- The Norges Bank raised both its lending and deposit rates 100 basis points over a period beginning in 2009 and ending in 2011. Total liquidity balances declined several months prior to the initial tightening, when the Bank allowed balances to decrease in response to a decline in bank's demand for central bank reserves as financial conditions normalized. Over the period of tightening, balances fluctuated widely but changed little on net.
- The Bank of Canada raised its target for the overnight rate three times in mid-2010. The first increase, which involved increasing the lending rate ceiling of the corridor 25 basis points but left the deposit rate floor unchanged, lifted the overnight rate off the deposit rate floor by 25 basis points. This increase was accompanied by a notable decline in settlement balances, as the reduction in balances was necessary to move from a floor system back to a symmetric corridor system with market rates at the midpoint of the corridor. The second and third increases, which raised the overnight rate another 50 basis

points in total, were accomplished by raising the deposit rate (and the lending rate) an equivalent amount, without any significant change in reserves.

- The Riksbank increased policy rates 150 basis points in several steps from mid-2010 to mid-2011. As with Canada, the initial rate increase involved an increase in the central bank's lending rate but no increase in the deposit rate; the remaining tightening steps included increases in the deposit rate. Balances held at the Riksbank declined substantially in advance of and during the initial period of tightening. However, the Riksbank did and does not view the decline in balances as a necessary precondition for the tightening of policy rates that ensued. The decline in balances was instead seen as a response to lower demand on the part of banks as financial stresses ebbed, in large part reflecting the maturation of several 1-year operations that the Bank had conducted when financial stresses were high in 2009. Balances increased slightly in the second half of the Riksbank's tightening episode.

Overall, these examples provide evidence that a central bank may successfully tighten monetary policy without draining reserve balances (or their equivalent) if the central bank can increase the rate of interest paid on those balances. However, the evidence is clearly not exhaustive, and it is possible that in some circumstances the effectiveness of tightening through increasing the policy rate of interest paid on balances held at the central bank may be more limited. Nonetheless, the evidence so far continues to indicate that the interest rate paid on central bank balances has played a key role in the implementation of monetary policy for many central banks.