

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

DIVISION OF MONETARY AFFAIRS

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To: Board of Governors and Reserve Bank Presidents

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Subject: Summary of Central Bank Workshop on Monetary Policy Implementation

Background

In late 2006, the Congress gave the Federal Reserve the authority to pay interest on balances held by depository institutions (DIs) at Reserve Banks and to reduce or eliminate reserve requirements beginning in October, 2011. These new authorities afford the Federal Reserve an opportunity to review the way it implements monetary policy. As part of this process, the Federal Reserve Board held a central bank workshop on monetary policy implementation on February 27 and 28. Representatives from the Federal Reserve System, the European Central Bank (ECB), the Bank of England (BOE), the Bank of Japan (BOJ), the Bank of Canada (BOC), and the Reserve Bank of New Zealand (RBNZ) attended and gave presentations on their systems for monetary policy implementation. Workshop participants also discussed general topics that cut across individual implementation systems, including payment systems and daylight credit; whether reserve balances should be required, contractual, or voluntary; standing facilities and market operations; and policy implementation in the recent period of financial stress.

Central Bank Presentations on Implementation Systems

During the first day of the conference, participants from each central bank discussed their basic framework for monetary policy implementation and some of the key associated policy issues. The discussion below summarizes these presentations; the basic structure of each system of monetary policy implementation is detailed in Table 1.

▪ **Federal Reserve**

Implementation Framework: The Federal Open Market Committee (FOMC) sets a target federal funds rate. Each day, the Federal Reserve Bank of New York's Open Market Desk conducts open market operations (OMOs) to make the supply of reserve balances equal the quantity of balances demanded at the target rate. Demand for balances arises from required reserve balances, contractual clearing balances (balances held at the Federal Reserve that earn implicit interest in the form of earnings credits), and excess reserve balances (balances held in addition to requirements). The supply of balances is affected both by OMOs and by other autonomous factors, including the amount of currency in circulation; float (payments in process that have been credited to one DI but

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not yet debited from another, or vice-versa); Treasury deposits at Federal Reserve banks; and reserves extended through standing lending facilities.

Reserve requirements are assessed on net transactions accounts (with an exemption) at marginal rates of 3 and 10 percent, and may be met over a seven-day or fourteen-day maintenance period (depending on the size of the depository institution). Requirements may be satisfied by reserve balances or by DI holdings of vault cash. Reserves may be carried over into the next maintenance period; reserve balances are not remunerated. Contractual clearing balances receive implicit interest in the form of earnings credits with the earnings credit rate set at 80 percent of the Treasury bill rate. There is a standing lending facility (the primary credit facility), which, at the time of the conference, extended credit to DIs at 50 basis points (bps) above the target rate. Some DIs have been observed borrowing in the interbank market at rates above the primary credit rate, evidently on concerns about the stigma associated with borrowing at the discount window. The lower bound on interbank rates is zero.

Policy Issues: In their discussion of the Federal Reserve presentation, participants noted a number of inefficiencies in the U.S. implementation system: DIs are not remunerated for reserve balances; DIs expend resources to avoid reserve requirements; both DIs and the Federal Reserve face costs of ensuring compliance; a large number of participants in the federal funds market have no reserve balance requirements (over three-quarters of requirements are satisfied by holdings of vault cash). Moreover, there was a sense that the process of implementing monetary policy is not fully understood by the general public or financial market participants, and this occasionally creates challenges for reserve management and Federal Reserve communications. For example, on August 10, 2007, the Open Market Desk provided a large volume of reserves to address intense market strains on that day. However, as the most severe market pressures receded over subsequent days, the Desk was not able to bring the maintenance period average level of reserves back into proper alignment with required reserves because the banking system requires a minimum level of operating balances each day to facilitate payment system activity. As a result, federal funds traded below the target rate for a period of time. Press outlets incorrectly speculated that the softness in overnight rates indicated that the Federal Reserve was effectively implementing a “stealth” policy easing. In contrast to some other central banks, the Federal Reserve does not publish information regarding its reserve forecasts.

▪ **The European Central Bank**

Implementation Framework: The ECB’s Governing Council sets a target interest rate. Weekly, ECB staff conduct Main Refinancing Operations (MROs), in the form of one-week term repurchase agreements (RPs), to equate supply and demand of reserve balances at the target rate. These operations are augmented by monthly Long-Term Refinancing Operations (LTROs), in the form of three-month RPs, and by fine-tuning operations, of any maturity, when necessary to keep the interbank rate near the target. Many of the same factors that influence the supply and demand for reserves in the United States are important in the euro area as well.

The ECB system of reserve requirements entails low required reserve ratios that are applied against a very broad base—all bank liabilities (except interbank liabilities) with an initial maturity of two years or less (with an exemption on the first €50 million). Vault cash does not count towards reserve requirements. The net result is a very large level of required reserve balances, on the order of €200 billion. Required reserve balances are remunerated at the target rate; excess balances are not remunerated. The reserve maintenance period is tied to the length of the intermeeting period, and can vary in length from three to six weeks. Reserves cannot be carried over into the subsequent maintenance period, and there is no clearing band. The ECB maintains a standing lending facility, with an interest rate 100 bps above the target rate, and also a standing redeposit facility, with an interest rate 100 bps below the target rate. These two rates effectively bound the interbank rate; hence the ECB's system is sometimes referred to as having a symmetric corridor or tunnel.

Policy Issues: In the discussion of the ECB's presentation, workshop participants noted that the elevated level of reserve balances in the current ECB framework plays a critical role in its process for monetary policy implementation. With such high balances, banks have ample scope for arbitrage across days of the maintenance period. As a result, the ECB does not need to conduct open market operations nearly as frequently as the Federal Reserve and some other central banks. Given the remuneration of reserves, there is little reserve avoidance, and low costs of monitoring compliance. The ECB preferred to establish a lower bound on interest rates through a redeposit facility rather than paying interest on excess reserves, but acknowledged that paying interest on excess reserves might be less burdensome from an operational perspective. The ECB publishes forecasts of the factors affecting reserve supply to reassure market participants that it does not have a bias towards providing surpluses or deficits. The ECB representative indicated some interest in considering reducing or eliminating reserve requirements.

▪ **The Bank of Japan**

Implementation Framework: At its Monetary Policy Meetings, the BOJ's Policy Board sets a target for the uncollateralized call rate.² The BOJ performs daily OMOs to equate supply and demand for balances at the target rate. OMOs include outright purchases of Japanese government bonds (JGBs) and RPs. The BOJ also occasionally issues its own securities, BOJ bills. The BOJ publishes its forecasts of the autonomous factors affecting the supply of reserves each morning. Reserve requirements are assessed on all deposits and on some short-term nondeposit liabilities. The reserve maintenance period is one month long. No carryover is allowed to subsequent maintenance periods, and there is no clearing band. Reserve balances are not remunerated. There is a standing lending facility, currently with an interest rate 25 basis points above the target rate, but no standing redeposit facility.

² This description of the implementation system applies to the time period after the BOJ's "Quantitative Easing" policy ended.

Policy Issues: Workshop participants noted that although the BOJ's system shares some similarities with the Federal Reserve system, the two systems differ in that the BOJ has been operating in a very low interest rate environment for the last several years, and has some additional monetary policy tools at its disposal, including the ability to sell bills. The ability to sell central bank bills provides a means of draining reserves to adjust aggregate reserve supplies and, if necessary, expand the balance sheet. Reporting burdens and administrative costs associated with the system of reserve requirements were viewed as modest. The BOJ publishes forecasts of factors affecting the supply of reserves to reduce uncertainty among market participants of available balances. The BOJ participants noted that they would follow closely the evolution of the U.S. system for monetary policy implementation in considering potential future changes to their system.

▪ **The Bank of England**

Implementation Framework: The BOE's Monetary Policy Committee (MPC) sets a target for the interbank rate. The BOE performs weekly OMOs, in the form of RPs of one-week term, to equate supply and demand for reserve balances at the target rate, and an overnight "fine tuning" operation on the last day of the maintenance period. The target level of reserve balances is voluntary, and chosen by the DI in the preceding maintenance period. The reserve maintenance period is the period between policy meetings. Average balances within a "clearing band" of plus or minus 30 percent around the voluntary target balance level are remunerated at the official policy rate.³ Balances outside of the clearing band are penalized, with the charge netting against remuneration. The BOE has a standing lending facility, with a rate 100 basis points above the target rate for all but the last day of the maintenance period, and 25 bp above the target on the last day. There is a standing redeposit facility, with rate 100 basis points below the target rate for all but the last day of the maintenance period, and 25 basis points below the target on the last day. As with the ECB, the rates on the lending and redeposit facilities effectively bound the interbank rate, and the BOE is also referred to as having a symmetric tunnel or corridor system.

Policy Issues: During discussion of the presentation, the BOE's representative noted that prior to the implementation of the BOE's current system in 2006, groups of banks were able to game the system by holding a large amount of balances and using this leverage to influence the market rate. The new system was intended to be more understandable and transparent. The current system is designed to have a regular sequence of open market operations (OMOs), to avoid discretionary choices by staff doing policy implementation. Although this greater degree of clarity was generally perceived as having been beneficial, there have been occasions when the added degree of transparency created some difficulties; in particular, not all features of a contingency framework that had been presented in public documents were in fact implemented during the recent period of financial turmoil.

▪ **The Bank of Canada**

³ Prior to August 2007 the clearing band was plus or minus 1 percent.

Implementation Framework: The BOC's Governing Council determines its key policy rate. The BOC conducts OMOs, in the form of RPs, as needed if the interbank rate is not close to the target rate. The BOC has neither required reserves nor voluntary reserve targets. It has a standing lending facility, with interest rate 25 basis points above the target rate, and a standing redeposit facility, with an interest rate 25 basis points below the target rate. Overdrafts at the BOC are charged at the lending facility rate. As with the ECB and BOE, these rates effectively bound the interbank rate, and the BOC is also referred to as having a symmetric tunnel or corridor system.

Policy Issues: Workshop participants noted that the BOC's implementation system is simple and transparent. That simplicity derives in part from the simplicity of the Canadian financial system. In particular, there are only fourteen banks that clear directly through the BOC, and BOC staff regularly consult these institutions in determining appropriate open market operations.

▪ **The Reserve Bank of New Zealand**

Implementation Framework: The Governor of the RBNZ sets a target for the Official Cash Rate (OCR). There are no required reserves or voluntary target levels of balances. However, all balances up to an upper bound are remunerated at the target rate (with balances above the bound remunerated at the target rate less 100 basis points). The RBNZ supplies a large amount of balances to the system to push the interbank rate down to the target rate; this approach is sometimes known as a "floor" system. OMOs are conducted on an irregular basis, as some deviation of the interbank rate from its target is tolerated. There is also a standing lending facility, with interest rate 50 basis points above the target rate.

Policy Issues: Following the presentation, the RBNZ representative noted that the policy of setting an upper bound for full remuneration on balances was introduced in response to a perceived tendency for one particular bank to hold an unusually large level of cash balances. The RBNZ could have injected more reserves to offset the reserve demands of this institution, but it felt uncomfortable about adding the amount of reserves that might potentially have been required and was uncertain about the efficacy of that approach. The average level of balances in the system is determined by whatever is perceived to be needed to maintain the overnight rate at the target. The overnight rate does trade below the target rate when banks are at risk of ending with balances above the upper bound with full remuneration. More generally, the RBNZ system does experience significant deviations from target on a fairly regular basis.

Table 1: Key Elements of Monetary Policy Implementation Frameworks

	Bounds on Interbank Rates		Mandatory or Voluntary Requirements	Length of Maintenance Period	Flexibility in Meeting Requirement	Remuneration of Balances
	Upper	Lower				
U.S.	Target +25 bp	0	Mandatory 3 or 10 percent on net transactions accounts (with exemption) and voluntary requirements	14 days or 7 days	Carryover allowance and clearing band	Zero on required and excess reserve balances. Implicit interest at 80% of Treasury bill rate on contractual clearing balances.
ECB	Target +100 bp	Target -100 bp	Mandatory low ratios on all liabilities with initial maturity of 2 years or less (with exemption)	Intermeeting period	None	Required reserves remunerated at minimum bid rate (target) on main refinancing operations. No remuneration on excess balances. Remuneration on deposit facility balances at 100 bp below target rate.
BOJ	Target +25 bp	0	Mandatory low ratios on all deposits and some short-term nondeposit liabilities	One month	None	None
BOE	Target +100 bp (Target +25 bp on last day of period)	Target -100 bp (Target -25 bp on last day of period)	Voluntary reserve targets. Very small unremunerated requirement to support BOE's operations.	Intermeeting period	Clearing band of +/- 1 percent	Official policy rate within band. Charge for excess reserves at the official policy rate netted against remuneration. Remuneration on deposit facility balances at 25 bp below target rate.
BOC	Target +25bp	Target -25bp	None	1 day	N/A	Target less 25 bp on positive balances
RBNZ	Target +50bp	Target	None	1 day	N/A	Amounts below a bank's upper bound earn the official cash rate; amounts above the bound earn that rate less 100 bp.

Note: Table is adapted from one developed by Sherry Edwards and Steve Meyer.

Topics Cutting Across Implementation Systems

The second day of the conference focused on issues that cut across alternative systems for monetary policy implementation including payment system issues, the role of reserve requirements, the role of standing facilities, and monetary policy implementation during periods of financial stress.

▪ Payment System Issues and Daylight Credit

The ECB and Federal Reserve have systems with many more banks in operation and institutions with accounts at the central bank than other systems. All six central banks have payment systems in which payments are final and irrevocable. Most central banks use a real-time gross settlement system, while the Bank of Canada uses a continuous, real-time multilateral netting system. All but the RBNZ provide daylight credit. Of those central banks that do provide credit, the Federal Reserve charges fees and imposes caps on the amount of credit. No other central banks charge fees for daylight credit but they do mandate the use of collateral. In the United States, the imposition of fees initially led to a decline in daylight credit. But over time, daylight credit has increased and banks have developed internal systems to queue payments so as to avoid daylight overdrafts, leading to a concentration of payment flows late in the day. A current policy proposal would allow the posting of voluntary collateral for daylight credit at no fee, or uncollateralized credit a price higher than the current rate. In theory, demands for intraday credit could have some bearing on the demand for end-of-day reserves at the central bank. However, several foreign central bank representatives noted, based on experiences in their institutions, that this potential interaction between the overnight interbank market and the demands for intraday balances did not seem important in practice.

▪ Reserve Requirements

Representatives from those central banks that impose reserve requirements stated that the purpose of such requirements was to create a stable demand for central bank money. Choice of the overall level of reserves in the system was somewhat arbitrary and could be modified. Central banks without reserve requirements noted that they have other ways of generating a demand for central bank balances, particularly the provision of payment system services. The BOE representative viewed a voluntary system of reserves as more efficient than one based on requirements because individual banks were better able to judge their own needs for balances than the central bank.

The BOE remunerates balances held against a voluntary target balance level at the policy rate because the BOE policy rate is a risk-free rate. The BOE representative noted that if the Federal Reserve moves to a system involving the remuneration of reserves, it would have to recognize that its policy rate (the target funds rate) is not a risk-free rate; as a result, the remuneration rate on reserves might need to be set somewhat below the policy rate. Most central bank representatives generally agreed that longer maintenance periods allowed for greater flexibility in managing reserves. Those with required or voluntary reserves also preferred to align reserve maintenance periods with the periods between policy meetings, presumably to avoid distortions caused in the market for funds when a change in the policy target is expected to occur within a maintenance period.

▪ **Standing Facilities and Open Market Operations**

Credit facilities were broadly similar across central banks at the conference, but redeposit facilities differed (and were nonexistent in some cases). In some systems, the facilities are used daily; in others, only in extraordinary circumstances. Workshop participants also noted that central banks face a choice about how much weight in the policy process should be attached to the collateralized rate at which they lend to DIs and the uncollateralized rate at which DIs lend to each other (the interbank rate). Currently, the BOJ and the Federal Reserve focus primarily on the interbank rate, while other central banks place somewhat more weight on collateralized rates.

Although representatives from several central banks had seen trading above the administered rates on their marginal lending facilities, such trading was infrequent. In general, it appears that there is less stigma associated with borrowing at the standing credit facility at most foreign central banks than is the case for the Federal Reserve's primary credit program. The BOE was an exception, however. For the BOE, the reluctance to borrow may be attributable to a perception that the facility was intended to be a lender of last resort, rather than as a vehicle to address temporary funding needs such as those associated with technical problems in the payment system. The BOE representative suggested that there ought to be at least as much stigma associated with paying a high rate in the interbank market as in utilizing a marginal lending facility; he wondered whether the press had contributed to the development of stigma associated with borrowing at the lending facility.

The number of counterparties in OMOs varies widely by central bank, with the Federal Reserve and BOE working with a relatively small number of counterparties, and the ECB with a larger number. There is also some divergence among central banks on the degree of tolerance for deviations of the effective rate from the target, with the RBNZ and BOE not tightly controlling the policy rate, and the BOC and ECB viewing tight control as important. The BOE representative noted in particular that there had historically been a wide range in the overnight rate, without any evidence that this had been detrimental for policy implementation.

The RBNZ and BOE accept a relatively narrow range of collateral, but are investigating accepting a wider range during times of financial stress, while the ECB already accepts a wide range. The BOC is considering accepting a broader range of securities in open market operations.

▪ **Policy Implementation during the Recent Period of Financial Stress**

The ECB representative indicated that over the recent months of severe market stress, they had aimed to provide the same amount of liquidity on average over the maintenance period as during normal times. However, the quantity of reserves had been heavily frontloaded in some maintenance periods, and a relatively large quantity of reserves were provided through long-term refinancing operations. This strategy of heavily front loading reserves was feasible for the ECB given the high level of required

reserve balances in the system relative to level of balances necessary for daily clearing needs..

The BOE did not make significant changes to its operations until relatively late in the current period of financial turmoil, leading to frequent occurrences of overnight rates above the policy target. More recently, the BOE has offered higher balances in its fine-tuning operations, widened its rate corridor, and offered three-month operations to more counterparties. The ability to issue central bank bills would have been helpful at time; in particular, lending to Northern Rock was large relative to the BOE balance sheet and central bank bills would have been a convenient way of draining the associated reserves. The BOE representative also noted that accepting a broader range of collateral in open market operations could have been helpful as well.

The BOC introduced term repurchase agreements to provide liquidity and broadened the range of collateral it accepts. Overnight rates were generally above the target. The BOJ injected more liquidity and used a broader maturity structure for its operations than usual. However, the quick provision of funds dropped rates close to zero. A standing redeposit facility would have been helpful. The market turmoil had little direct impact on the RBNZ, although it did accept a broader degree of collateral at its standing credit facility and moved forward the imposition of an upper bound for full remuneration on balances in order to encourage the redistribution of funds.