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A Poole-based perspective on monetary policy implementation

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This note discusses the approaches of the Federal Reserve, European Central Bank, Bank of England, Sveriges Riksbank and Swiss National Bank to implementing monetary policy. Interestingly, the current approaches chosen by these central banks cover all stylised options suggested by the well-established theoretical framework of Poole (1968). The different choices can be explained by specific implementation objectives and institutional settings.

As of the end of 2024, several central banks are reducing the size of their balance sheets—often referred to as quantitative tightening (QT). They do so by letting assets roll off, selling them actively, or by discontinuing lending programmes. This reduces the amount of reserves that central banks supply to banks as they implement monetary policy. Currently, many of these central banks do not intend to return to their pre-Global Financial Crisis (GFC) implementation framework. However, their choices of the ways in which they implement monetary policy—that is, broadly speaking, steering short-term interest rates close to a specific target by setting the supply of and influencing the demand for reserves—differ considerably.

The Federal Reserve (Fed), European Central Bank (ECB), Bank of England (BoE), Sveriges Riksbank (Riksbank) and Swiss National Bank (SNB) all maintain significantly larger supplies of reserves than was their standard practice before the GFC.¹ These central banks then supplied reserves in an amount that was close to the banks' structural needs that originated from settling transactions, fulfilling regulatory requirements or holding precautionary liquidity buffers.²

¹ In the context of the SNB, reserves are often referred to as 'sight deposits'. We use the general term 'reserves'.

² Banks' structural needs for reserves appear not only to have moved to a much higher level than before the GFC but also to have become more uncertain with regard to the level and the variability (cf. Maechler and Moser, 2022).



To discuss the implementation frameworks these central banks have adopted, we take a Poole-based perspective. More than 50 years after its conception, the theoretical work of Poole (1968) on the market for central bank reserves remains highly relevant, guiding both practitioners and academics in discussing monetary policy implementation frameworks.

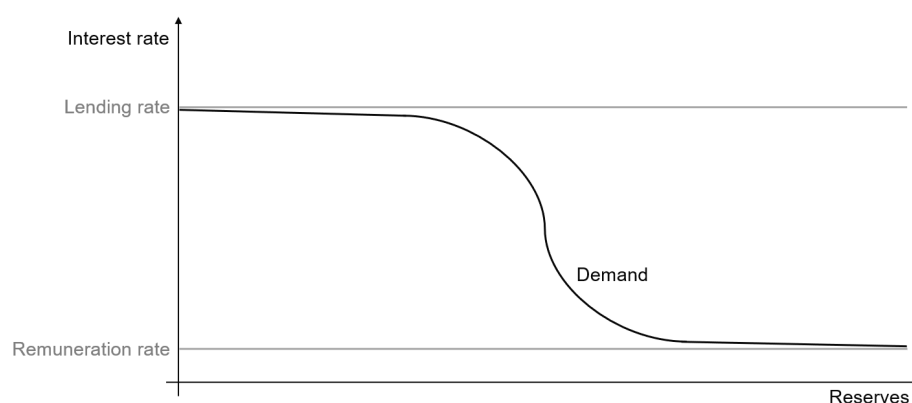
A Poole-based perspective on monetary policy implementation

In their implementation of monetary policy, central banks steer short-term interest rates. These rates represent the prices at which banks are willing to borrow or lend reserves in the money market. They are determined by the banks' demand for reserves as well as the central banks' supply of reserves. To influence demand and supply, central banks use so-called monetary policy instruments (such as the remuneration of reserves or open market operations).

For our discussion, we use a representation of the reserve demand curve, as is typical of a Poole-style model (cf. Chart 1). This graphical representation is an oversimplification, as it does not capture all facets of central banks' implementation frameworks and their effect on banks' demand for reserves. Among other things, it does not account for the possibility of different widths of the interest rate corridor, defined as the spread between the lending rate and the remuneration rate, and possibly different levels of structural needs of banks in the respective jurisdictions of the considered central banks.

As depicted in Chart 1, at sufficiently low levels of reserves, the demand curve becomes approximately flat around the interest rate of the lending facility through which the central bank provides reserves to banks (lending rate). Similarly, at sufficiently high levels of reserves, the demand curve becomes approximately flat around the interest rate at which the central bank remunerates reserves (remuneration rate). Along these flat parts of the curve, even large changes in the quantity of reserves supplied to banks have only a small effect on the price, namely, the interest rate in the relevant money market. Between these flat parts of the curve, close to banks' structural needs, the demand curve is steep. In this part of the curve, small changes in the quantity supplied can have a large effect on the money market rate.

CHART 1: STYLISED REPRESENTATION OF THE RESERVE DEMAND CURVE

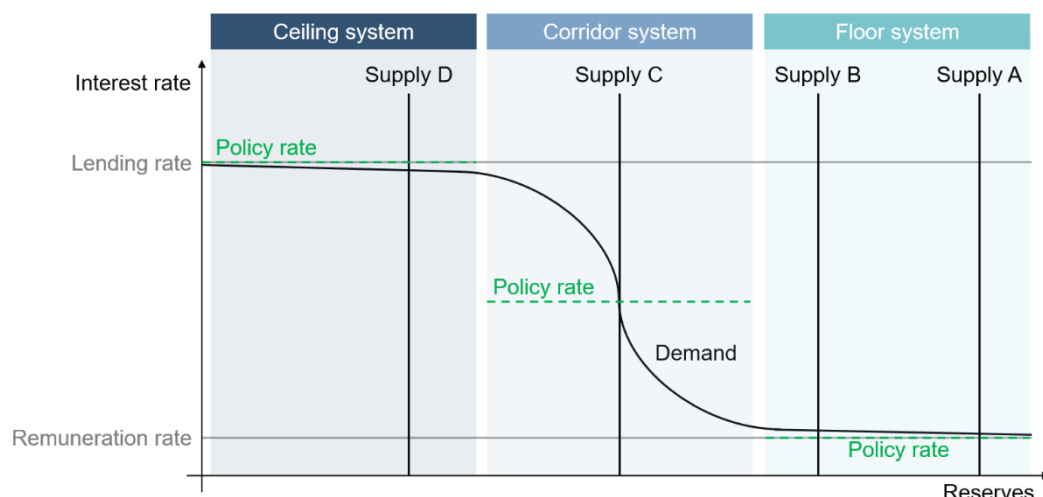


In this note, we focus on four stylised options that central banks can choose from to set the supply of reserves. These options can be categorised into a floor system, with two variants, a corridor system and a ceiling system, as illustrated in Chart 2.

In the floor system, the central bank supplies reserves in excess of banks' structural needs and thus operates in the lower, flat part of the reserve demand curve. Money market interest rates are close to the central bank's remuneration rate and are not affected by changes in the supply. We can think of two variants of the floor system, depending on whether the central bank lets the supply of reserves be anywhere on the flat part or whether it aims to be close to the steep part of the demand curve (cf. supply A or supply B in Chart 2, respectively). The reasons that central banks operate in one and not the other of these two variants can be quite diverse. For example, some central banks may decide to implement monetary policy with the lowest possible size of the balance sheet still compliant with a floor system.

Continuing with the corridor system, the central bank supplies reserves close to the structural needs and thus operates in the steep part of the demand curve (cf. supply C in Chart 2). Money market rates move in the corridor formed by the remuneration rate and the lending rate. They potentially react strongly to demand or supply changes, which may lead to greater volatility in money market rates than in the floor system. Finally, in the ceiling system, a central bank operates in the upper, flat part of the curve (cf. supply D in Chart 2). In this case, banks meet the structural needs by borrowing reserves via the central bank's lending facility. For that reason, money market rates are close to the lending rate and are generally not sensitive to changes in the supply.

CHART 2: THEORETICALLY POSSIBLE OPTIONS FOR CENTRAL BANKS' SUPPLY OF RESERVES



Central banks' choices when implementing monetary policy

Taking a Poole-based perspective, which options have central banks taken? The **SNB** is positioned in the lower flat part of the reserve demand curve, as it operates a system with large excess reserves (cf. supply A in Chart 2). The large supply of reserves results from the

SNB's foreign exchange (FX) interventions in the years after the GFC. The SNB has reduced its balance sheet by selling FX reserves in the amount of CHF 160 billion between Q2 2022 and Q4 2023. Even after these FX sales, which contributed to an appreciation of the Swiss franc and thereby helped in the fight against inflation, the SNB's balance sheet remains large. Theoretically, the SNB could absorb reserves via open market operations to operate a floor system with fewer excess reserves, a corridor system or a ceiling system. However, this would potentially require open market operations on a very large scale, which could pose risks to the effectiveness and efficiency of the SNB's implementation of monetary policy and ultimately impair the transmission of its monetary policy. The SNB has thus decided to take a different approach. It implements monetary policy in a system with large excess reserves and the special characteristics resulting from the applied reserve tiering and reserve absorption (cf. Maechler and Moser, 2022).³

The **Fed** is also positioned in the flat part of the demand curve for reserves. The Fed aims to keep reserves ample to control money market rates by adjusting its administered rates, such as the interest paid on reserves (cf. Federal Reserve, 2019). The Fed operates a variant of the floor system. It aims to bring the supply of reserves to a point that is close to, but not too close to, the steep part of the curve (cf. supply B in Chart 2). In this setting, the Fed supplies some reserves in excess of banks' structural needs and controls interest rates by setting its administered rates.

The Fed's approach is sometimes referred to as being supply-driven, as it plans to supply these reserves by keeping sufficiently large outright holdings of assets rather than lending to banks. Nevertheless, the Fed operates lending facilities, such as the Standing Repo Facility, in which banks can borrow reserves. These facilities help limit potential upward pressure on rates. The Fed's balance sheet is still declining as it continues QT, and thus far, it has not yet communicated precisely when it plans to end it. The Fed is looking at a variety of signals to decide when to end QT, including the sensitivity of rates with respect to changes in the reserves supplied (cf. Perli, 2024).

The **ECB** also continues to conduct QT and aims to implement its monetary policy through "a soft floor with a narrow spread" (cf. Schnabel, 2024a). While the ECB will supply some reserves by maintaining a structural bond portfolio, it intends to supply the marginal reserve through lending operations, including its Main Refinancing Operations (MRO).

In this demand-driven approach, estimating the volume of reserves necessary to steer money market rates effectively is not necessary (Schnabel, 2024b). The relatively narrow spread between the interest rate in its MRO and the interest paid on reserves is intended to limit upward pressure on money market rates. Based on information provided in the ECB's communication, it will supply reserves close to the steep part of the demand curve (cf. supply B or potentially, a supply closer to the steep part of the curve in Chart 2). According to the

³ The SNB remunerates banks' reserves using a tiering system. Reserves are remunerated at the policy rate up to a bank-specific threshold; above this threshold, they are remunerated at a lower rate. The SNB also absorbs reserves using open market operations (namely, reverse repos and SNB Bills). This framework allows the SNB to steer interest rates effectively, while supporting interbank money market activity.

ECB, one key benefit of supplying reserves close to the steep part appears to be the promotion of market activity. If the central bank tolerates money market rates increasing above the interest paid on reserves—thereby allowing a positive marginal opportunity cost of holding reserves—banks have an incentive to find market-based solutions to meet their structural needs (cf. Schnabel, 2024a).

The **BoE** is another example of a central bank that continues to conduct QT. As reserves decrease, the demand for borrowing reserves from the central bank is expected to rise. The BoE can address this increasing demand and prevent upward pressure on money market rates through its Short-Term Repo Facility (STR). In this facility, banks can borrow reserves on a weekly basis at the Bank Rate, which is the BoE’s policy rate and the interest rate paid on reserves (cf. Saporta, 2024). In addition to borrowing in the STR, banks can borrow reserves from the Indexed Long-Term Repo Operations (ILTR) on a weekly basis at or slightly above the policy rate, as well as overnight in the standing lending facility at an interest rate significantly above the policy rate.

Like the ECB, the BoE operates a demand-driven framework that is aimed at restoring incentives for banks to find market-based solutions (cf. Hauser, 2023). The BoE’s framework features a small spread between the interest rate in its weekly lending operations (STR and ILTR) and the interest paid on reserves, which ensures that money market rates will remain close to the policy rate. One can think of the BoE as operating one of two systems: a floor system with small excess reserves (cf. supply B in Chart 2) or a ceiling-like system (cf. supply D in Chart 2). From a Poole-based perspective, the classification as floor or ceiling-like system depends on whether the lending rate is represented by the rate in the overnight lending facility or in the weekly lending operations (STR and ILTR). In the former case, the lending rate is higher than the policy rate, implying a floor system. Conversely, in the latter case, the lending rate equals the policy rate, implying a ceiling-like system. Because the STR and ILTR are likely to be effective lending facilities in normal times, it can be argued that the BoE is indeed operating a ceiling-like system.

Our final example of a central bank that conducts QT is the **Riksbank**. It normalises its balance sheet by selling government bonds and thereby reduces excess reserves. The Riksbank implements its monetary policy in a corridor system (cf. supply C in Chart 2). While it operates deposit and lending facilities, it also absorbs reserves through the weekly issuance of certificates. As communicated by the Riksbank, the issue volume generally corresponds to the banking system’s excess reserves (cf. Sveriges Riksbank, 2023).

To conclude, several major central banks have adopted diverse approaches to implementing monetary policy. These approaches are tailored to their unique set of circumstances and arguably cover the full range of theoretically possible options: the floor system with large excess reserves, the floor system with small excess reserves, the corridor system and potentially the ceiling system. Our Poole-based perspective is an oversimplification. Nevertheless, it helps to identify the differences and similarities across central banks’ implementation frameworks.

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