Monetary and Capital Markets Department
TECHNICAL ASSISTANCE HANDBOOK

Monetary Operations and Domestic Market Development

Transitioning Operational Targets—From Reserve Money to Interest Rates

Prepared by the Central Bank Operations Division (CO)

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This handbook aims to distill, document, and make widely available the lessons learned from the Monetary and Capital Markets Department's (MCM) technical assistance (TA) over a long period while also incorporating lessons learned globally. It covers a wide range of central banking topics pertaining to governance and risk management, monetary policy, monetary and foreign exchange operations, and financial market development and infrastructures while highlighting, where relevant, specific issues for low-income, resource-rich countries. The handbook documents and promotes good practices and supports the consistency of advice over time. However, it stresses that one-size solutions cannot fit all, and all advice therefore needs to be tailored to country-specific circumstances. The handbook comprises self-contained, issue-specific chapters with cross-references on overlapping issues where needed. It is aimed at those who provide TA (both International Monetary Fund (IMF) and non-IMF personnel) and practitioners in central banks and other relevant institutions.

THIS CHAPTER: TRANSITIONING OPERATIONAL TARGETS—FROM RESERVE MONEY TO INTEREST RATES

The operating target is a variable that can be sufficiently controlled by the central bank to serve as a guide for its day-to-day liquidity management operations, and that can effectively support the achievement of the primary monetary policy objective. There are no preconditions that countries need to meet before adopting an interest rate-focused operating framework, except having the operational independence to be able to set interest rates at the level needed to achieve the policy objective. The transitioning can therefore be done relatively quickly. A central bank that is not ready to do so can still take steps to increase control over short-term interest rates. Transitioning involves: (i) choosing an operational framework that allows the central bank to control the short-term interest rates that banks transact at when placing excess reserves or when obtaining short-term funding, either from each other or the central bank; (ii) establishing rules and procedures for setting the level of the central bank's interest rate target, and for adjusting it; and (iii) shifting the focus of open market operations from monetary quantities to interest rates. This transition is typically, and preferably, done in the context of a modernization of the overall monetary framework based on the principles outlined in IMF (2015).

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Glossary

IT	Inflation Targeting
MT	Monetary Targeting
OMO	Open Market Operation
QPM	Quarterly Projection Model
RMP	Reserve Maintenance Period
RMT	Reserve Money Targeting
TA	Technical Assistance

Executive Summary

Countries that still formally use reserve money as the operating target should transition to an interest rate-focused framework as soon as possible. Reserve money targeting is in almost all circumstances suboptimal and associated with unclear and multiple policy objectives, volatile inflation, high interest-rate volatility and high liquidity risk, weak policy transmission, underdeveloped financial markets, and underdeveloped central bank analytical capacity. This transition is preferably done in the context of modernization of full monetary policy framework based on the principles of effective monetary policy frameworks in IMF (2015), perhaps the most important of which is ensuring the primary objective of monetary policy is price stability. Countries can make progress on these principles concurrently and from any starting point, though initial conditions—and policymakers' preferences—influence where, how, and how fast to proceed.

There are no preconditions for adopting an interest rate-focused operating framework, except that the central bank should have the operational independence to set interest rates. Therefore, most countries are able move quickly to a full-fledged interest rate-focused framework, which involves:

- Choosing an operational framework that allows the central bank to control the short-term interest rates that banks transact at when placing excess reserves or obtaining short-term funding, either from each other or the central bank.

- Establishing rules and procedures for: (i) setting the level of the central bank's interest rate target; and (ii) adjusting the target (when, in what direction, and by how much) to achieve the policy objective. The policy objective must first be clarified internally.

- Shifting the focus of the central bank's high-frequency liquidity management operations from money aggregates to market interest rates.

Three steps in a gradual transition are identified, and the pace of transition should be carefully considered. Moving to an announced policy rate before the central bank can adequately control market rates may set back progress and undermine institutional credibility. The three main steps in a gradual transition are:

- *Reduce undue interest rate volatility* by moving away from period-end reserve money targets and by calibrating open market operations (OMOs) so that excess reserves and total reserves are kept stable, and on the path implied by the reserve money target.

- *Set up a corridor without specifying a point target for interest rates* while retaining reserve money as the operating target. The level of nominal interest rates and observed volatility will guide the setting of the width of the corridor, together with a standing lending facility to cap interest rates and a standing deposit facility setting a floor.

- *Announce a point policy rate as the operating target.* The central bank can proceed with a point policy interest rate after it has improved its operational capacity, gained the capacity to set interest rates, and once short-term interest rate volatility has subsided.

Clear communication will help facilitate the transition. It helps strengthen market participants' understanding of the reforms as well as policy transmission. It is important not only to clearly say what you are doing but also to do what you are saying. Announcing reforms and then not following through can be very damaging to the central bank's reputation. In some instances, it may be better to first *de facto* implement the reforms before publicly communicating that they will be implemented.

I. Context and Issues

The operating target is a variable that can be sufficiently controlled by the central bank to serve as a guide for its day-to-day liquidity management operations. It should facilitate the communication of the policy stance, and its setting should be clearly linked to the attainment of the policy objective. Central bank operations should align market conditions with this announced policy stance. An effective operational framework supports the functioning of money markets and allows banks to predictably place surplus liquidity with, and obtain short-term funding from, each other or the central bank at rates that are reasonably stable.
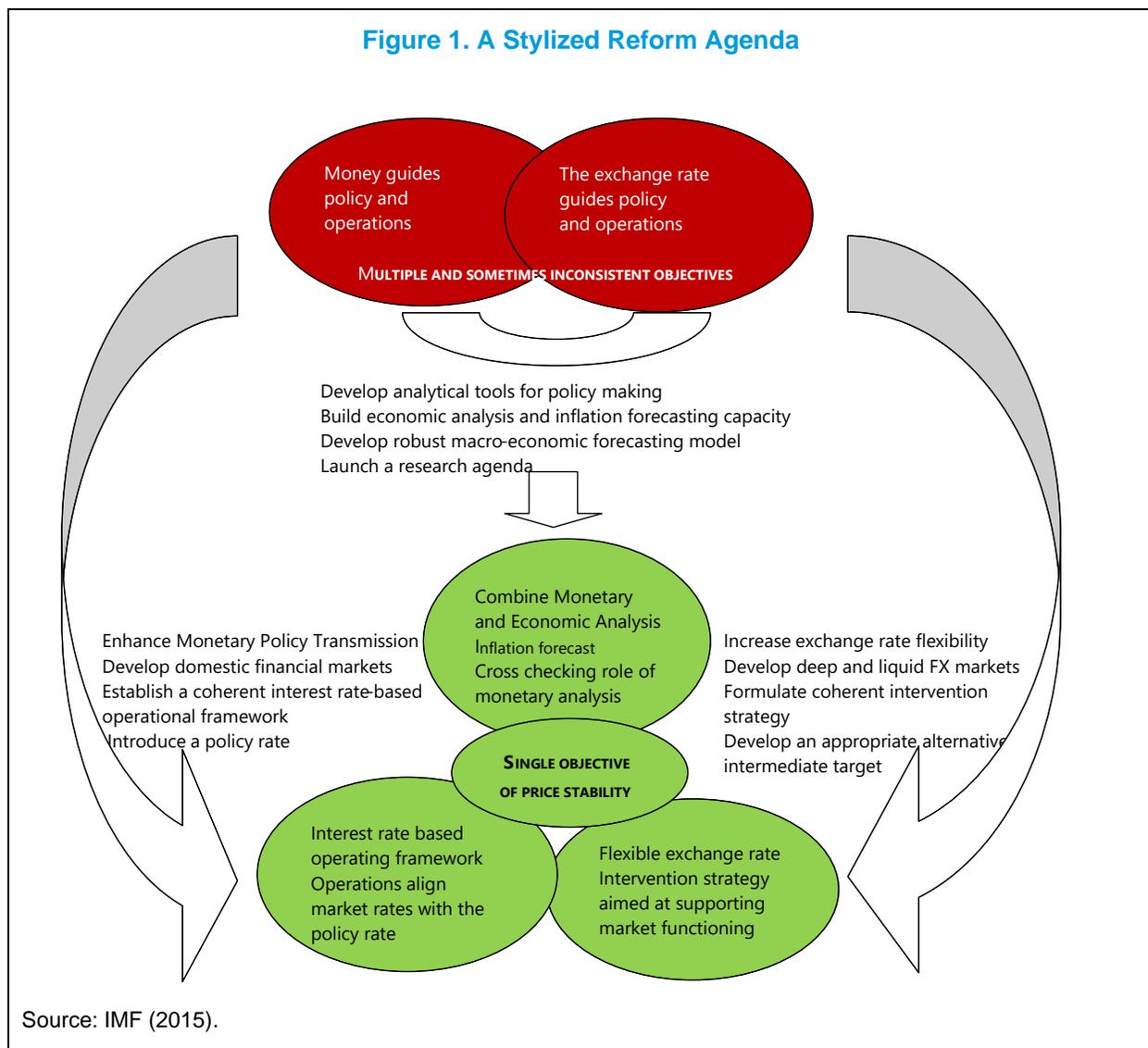
Money targeting (MT) with reserve money as the operating target (that is, reserve money targeting or RMT) is only appropriate under limited circumstances, and hence central banks should transition to targeting interest rates as soon as possible.[1] RMT may be warranted in the absence of central bank independence to set and adjust the level of short-term interest rates as needed for achieving the policy objective, if the risk of severe fiscal dominance is high, and monetary policy objectives are opaque, and during the immediate aftermath of very high inflation. The monetary relationships underpinning RMT are much weaker at lower levels of inflation, and hence rigid implementation of RMT results in volatile interest rates that undermine the transmission of monetary policy and hamper financial market development. Consequently, the operating framework should be shifted toward using interest rates as soon as possible and even when there no substantive changes likely to be made to the monetary policy framework for some time.

Migration to an interest rate operating target should preferably be part of a broader reform agenda (Figure 1). This agenda should be based on the principles of effective monetary policy frameworks set out in IMF (2015). Besides adopting a primary objective—price stability—and moving to an interest rate-focused operating framework, this broader reform agenda typically also involves: (i) moving to greater exchange rate flexibility; (ii) implementing reforms to ensure that the central bank has operational independence and is held accountable under a clear mandate; (iii) developing analytical tools for policymaking; (iv) enhancing monetary policy communication; (v) developing and deepening domestic financial markets; and (vi) enhancing policy transmission.

The challenge is to move smoothly from a monetary quantity-based operating target to one based on interest rates. There are no preconditions for such a move, except *de facto* having the operational independence to set interest rates at the appropriate level to meet the policy objective. Policymakers need not wait for the analytical tools or communication strategy to be fully developed, nor to wait for a deepening of domestic financial markets or for stronger transmission mechanisms, including the interest rate channel. In fact, a proper interest rate-focused operating framework is a pre-condition for developing the financial markets and strengthening policy transmission. Adopting short-term interest rates as the operating target can also be done while keeping broad money as an intermediate target, although it is generally better to relegate the role of monetary aggregates to that of (one of many) information variable(s).[2]

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[1] See Chapter, "Implementing Monetary Targeting."

[2] See Laurens and others (2015) for a detailed discussion of the changing role of monetary aggregates from targets to information variables.

Figure 1. A Stylized Reform Agenda

Money guides policy and operations

The exchange rate guides policy and operations

Mᴜʟᴛɪᴘʟᴇ ᴀɴᴅ sᴏᴍᴇᴛɪᴍᴇs ɪɴᴄᴏɴsɪsᴛᴇɴᴛ ᴏʙᴊᴇᴄᴛɪᴠᴇs

Develop analytical tools for policy making
Build economic analysis and inflation forecasting capacity
Develop robust macro-economic forecasting model
Launch a research agenda

Combine Monetary and Economic Analysis
Inflation forecast
Cross checking role of monetary analysis

Enhance Monetary Policy Transmission
Develop domestic financial markets
Establish a coherent interest rate-based operational framework
Introduce a policy rate

Increase exchange rate flexibility
Develop deep and liquid FX markets
Formulate coherent intervention strategy
Develop an appropriate alternative intermediate target

Sɪɴɢʟᴇ ᴏʙᴊᴇᴄᴛɪᴠᴇ ᴏF ᴘʀɪᴄᴇ sᴛᴀʙɪʟɪᴛʏ

Interest rate based operating framework
Operations align market rates with the policy rate

Flexible exchange rate
Intervention strategy aimed at supporting market functioning

Source: IMF (2015).

II. Conceptual Background

Monetary policy transmits through the same channels under MT as under all other policy frameworks, including inflation targeting (IT). Transmission is impacted by the perceived risk of banks ending the reserve maintenance period (RMP) either long or short of excess reserves, and by the interest rates on central bank standing lending and deposit facilities. Together, these determine: (i) the liquidity risk banks face; (ii) the overnight interest rate in the interbank money market; (iii) the bid rates for central bank OMOs and government securities; and (iv) other short-term market rates. It is through this process that the central bank can influence credit expansion and deposit creation—which determines both broad and reserve money growth—as well as output and inflation. The impact on money growth and the macro economy is further amplified through a multitude of channels (Figure 2).

Figure 2. Monetary Policy Transmission Channels
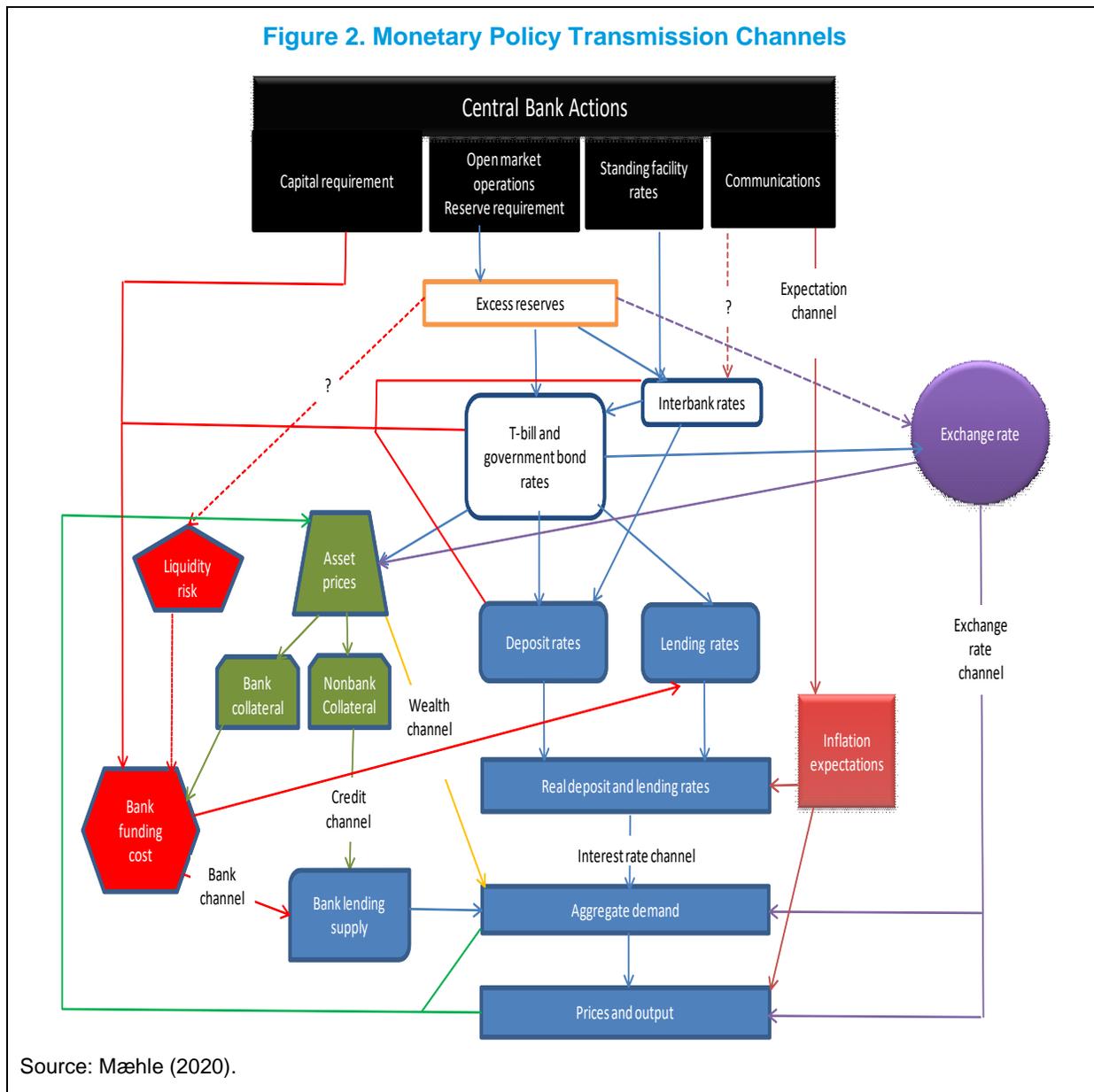
Source: Mæhle (2020).

**A reserve requirement creates an automatic feedback loop from deposit and broad money growth
to excess reserves and further to short-term interest rates.** Increased bank lending, and its impact on
deposit and broad money creation, does not change the total stock of reserve balances (L2+L3 in
Table 2),[3] only their composition. With required reserves set as a ratio to reservable liabilities, increased
bank lending will cause required reserves (L2) to increase and excess reserves (L3) to decrease. The
decline in excess reserves will increase liquidity risk and short-term interbank interest rates. If the higher
interbank interest rates are sufficiently stable, other interest rates should increase and thereby slowing
credit growth and broad money creation. In this circumstance the central bank can choose to:

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[3] That is, commercial bank demand/current account deposits at the central bank.

- Rely on this automatic feedback loop to indirectly steer short-term rates where they may need to be, as under the textbook RMT framework. Note, however, that changes in other autonomous factors (L1, L5; A1, A2, A4 in Table 2) will also cause changes in excess reserves and therefore in short-term interest rates.

- Use OMOs to offset these changes in excess reserves and keep them broadly constant at the targeted level and instead directly steer short-term interest rates by changing the rates on central bank standing facilities (see Table 1 below, and Figure 3). Interest rates would be more predictable if short-term rates were explicitly set as the operating target—with money used only as an intermediate target or as an information variable. Changes in short-term rates would have greater impact on other rates and the macro economy. In other words, transmission mechanisms would strengthen along with the control over money growth.

Table 1. Simplified Central Bank Balance Sheet	
<u>Assets</u>	<u>Liabilities</u>
A1. Net international reserves	L1. Currency in circulation
A2. Net lending to government	L2. Required reserves = f(retail deposits)
A3. Lending to banks (OMO)	L3. Excess reserves (includes overnight deposit facilities)
A4. Lending to banks (standing facilities)	L4. Central bank bills and substitutes (OMO)
	L5. Capital and reserves
Reserve money: (L1 + L2 + L3) = (A1 + A2 + (A3 + A4 - L4) - L5) Total reserves: (L2 + L3) Endogenous components (autonomous factors): L1, L2, L5; A1, A2, A4 Exogenous components (central bank instruments): A3, L4 Directly controlled by central bank through use of its instruments: L3	

When short-term rates are stable and well aligned with the policy rate, discrete changes in the policy rate will have a greater impact on banks' pricing behavior. Banks will have more confidence that changes in the structure of interest rates will be sustained. As a result, changes in the policy rate will likely be quickly reflected in their own deposit and lending rates, thereby aiding monetary policy transmission. More stable and predictable short-term interest rates, combined with effective policy communication, facilitate the development of the longer-term securities markets (notably the government securities market), strengthening policy transmission along the yield curve. Longer-term rates that incorporate actual and expected changes in the policy rate will further strengthen transmission to longer-term bank lending and deposit rates, and to private sector securities markets.

III. Steps in the Transition

A. BACKGROUND CONSIDERATIONS

The major steps in the transition are: (i) setting the initial level of the interest rate target; (ii) developing procedures for determining when, and by how much, the interest rate target should be adjusted; and (iii) choosing a particular configuration of the operating framework, including the structure and calibration of OMOs.

The speed of the transition should be considered, with a quick transition bringing benefits even in difficult circumstances. Shifting from a poorly functioning RMT framework to fully focusing operations on short-term interest rates should improve policy performance. Transitions will involve risks of market rates deviating from targets and may require restructuring or recalibration of OMOs. There is also a risk that the initial interest rate may be set too high or too low, causing inflation to deviate significantly from the target. However, such deviations are the norm (even among seasoned IT central banks), as are adjustments to policy stances due to the uncertainty of shocks and policy transmission that will change because of the reforms. Therefore, the main risk, including to the central bank's reputation, is overselling the initial benefits of the reforms, and not the risk of failing to get everything perfectly right, which isn't possible.

While a quick transition is preferable, there are circumstances where a more gradual approach is warranted. This includes situations where the central bank needs time to: (i) build capacity; and/or (ii) acquire the required degree of operational independence to set an interest rate target that is consistent with achieving its policy objective. Central banks that do not have adequate independence may find that formally operating under a RMT framework enables them to keep monetary policy sufficiently tight—that is, interest rates sufficiently high. Countries that prefer a more gradual transition can take several steps (discussed below) to increase control over short-term market interest rates without having to announce interest rate targets before they are operationally prepared.

The central bank should carefully consider when, and how, to publicly communicate the reforms. A central bank should not announce changes until it is ready to shift its operational focus from monetary quantities to market interest rates. If it opts to announce early but then hangs on to a money target as the operational target (instead of as an intermediate target, or information variable), then market rates (dictated by quantity interventions) may deviate from the announced "policy" rate. This introduces market distortions and serves no useful monetary policy purpose.[4] It makes communicating the policy stance and linking it to policy objective almost impossible. While there are clear benefits in being transparent about planned and ongoing reforms, publicly committing to something that it might not be ready to deliver can be risky. A less risky strategy could be for the central bank to *de facto* adopt an interest rate-focused operating framework but not publicly announce it until it has gained sufficient experience with steering short-term interest rates.

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[4] In such cases, actual market rates often better represent the true stance of monetary policy than the level of the "announced" policy rate.

B. MAIN STEPS TOWARD ADOPTING AN INTEREST RATE-BASED FRAMEWORK

Configuring the Interest Rate-Based Operating Framework

While the appropriate setting of the policy rate depends on the monetary policy objectives, there are several ways to implement an interest rate-based operational framework:

- *Announcing a target for a market rate* (the "policy rate"). This approach usually entails fixed-quantity variable-rate OMOs to align a market rate (generally the secured or unsecured overnight interbank rate) with the policy rate. The target rate is typically positioned in the middle of the corridor formed by standing lending and deposit facilities, and the facility rates are moved in tandem with the policy rate. To make well-informed decisions on the volume of reserves to inject or mop up through OMOs, the central bank must have a robust short-term liquidity forecasting framework and an accurate understanding of banks' demand for excess reserves. This framework also requires a well-functioning interbank market.

- *Attaching the "policy rate" to a central bank instrument.* There are two main approaches:

  (i) *A floor system, whereby the central bank's standing deposit facility rate serves as the policy rate.* This system is simple to operate and robust to market imperfections and liquidity forecasting weaknesses typically found in low- and lower-middle-income countries. It primarily requires maintaining a structural liquidity surplus and allows for interest rate-focused operations even when the interbank market is shallow or non-existent. While this system reduces banks' need for overnight interbank trading, it helps develop the markets for longer-term securities—and thereby transmission along the yield curve—by anchoring the short end of the yield curve.

  (ii) *A fixed-rate, full-allotment, mid-corridor system*, *whereby the central bank conducts OMOs at the policy rate set in the middle of the corridor.* The full amount demanded by banks is supplied by the central bank and therefore similar benefits accrue as with floor systems.

Under all configurations, changing the policy stance is achieved by changing the rates on the central bank's standing facilities (Figure 3).[5] Thus, the role of OMOs is different under an interest rate-focused framework than under RMT. Instead of being aimed at keeping reserve money on the targeted path, OMOs are aimed at offsetting changes in liquidity conditions caused by the autonomous factors (Table 1) so that excess reserves are kept constant at the targeted level. The OMO instruments can be the same as those under RMT but may be structured differently.

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[5] This assumes that the central bank has both a standing lending and a standing deposit facility in place.

Figure 3. The Demand for Bank Reserves

Increasing the Lending Facility Rate Only

Increasing the Lending and Deposit Facility Rates

Source: Authors.
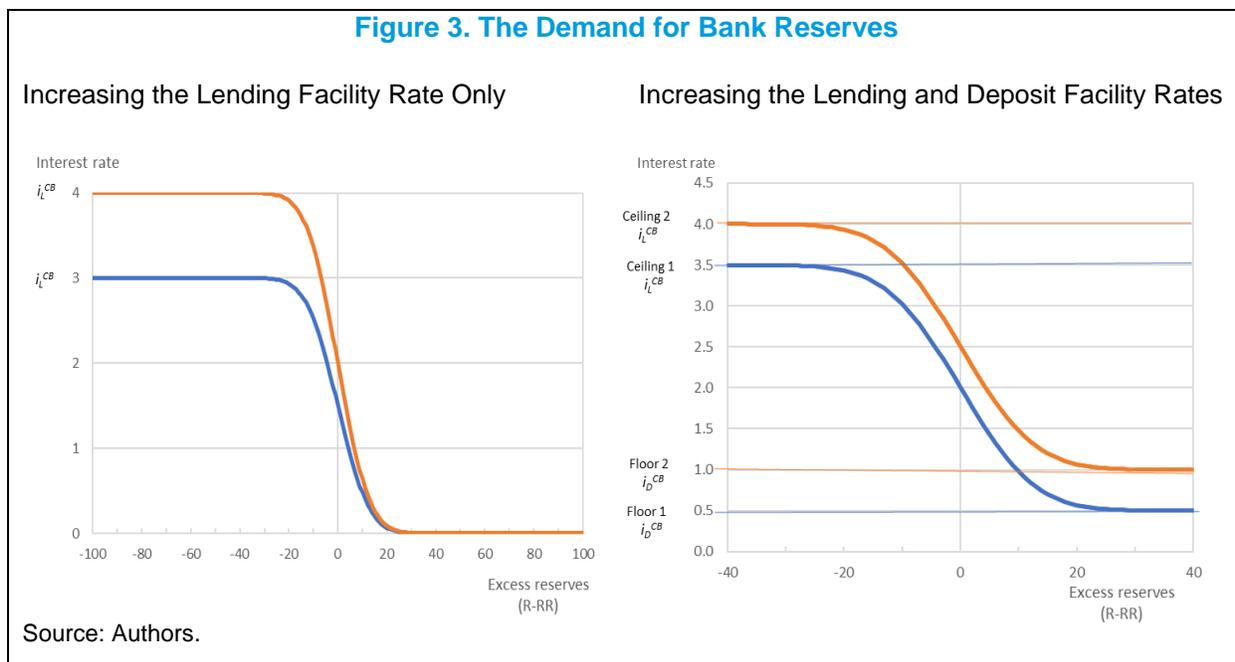
The maturity and frequency of the main OMOs depend on the choice of operating framework and the interaction with other monetary instruments, including the reserve requirement (Box 1). It is useful to distinguish between the main (i.e., fine-tuning) OMOs used to offset short-term changes in liquidity conditions, and longer-term OMOs used to ensure that the underlying (i.e., structural) liquidity position that best supports the main OMOs is maintained.

- *With a floor system, it is essential that a structurally long liquidity position is maintained so that interest rates stay anchored to the floor.* An "optimal" structural liquidity surplus is the minimum liquidity surplus necessary to keep rates at the floor. Such an approach can be termed a parsimonious floor system. Operating at this point on the demand curve ensures that the central bank balance sheet is no larger than required by this system. As in all systems, structural operations are required to offset longer-term changes in liquidity conditions caused by the autonomous factors. However, some fine-tuning operations may be required to manage short-term liquidity fluctuations around the optimal surplus.[6]

- *With mid-corridor systems—either variable-price fixed-quantity or the fixed-rate full-allotment configurations—more frequent fine-tuning OMOs are needed than in the case of a floor system.* Without reserve averaging (see the chapter on Reserve Requirements), these OMOs will have to be done daily. With averaging, OMOs can be done less frequently, but always on the last day of the RMP (Box 1).

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[6] Structural operations are operations that are not reversing (e.g., foreign exchange transitions, changes in reserve requirements) or have a long maturity (e.g., in long-duration government securities).

Box 1. Structuring the Main Open Market Operations within the Reserve Maintenance Period (Timing of the Operations and Maturity of the Instruments)

If banks are permitted to meet reserve requirements by averaging reserves over a long RMP, short-term interest rates will be more stable in the earlier part of the period. With averaging, during the earlier part of the RMP, a bank that expects to be short at the end of the day would not have to access the central bank's lending facility as it can make up for the shortfall by holding more reserves later in the RMP—as long as its reserve balance does not become negative. For this reason, reserve averaging can help stabilize market rates (and create a flat segment of the demand curve), but only if the expected interbank interest rate on the last day of the RMP stays fixed. If banks' expectation for the market interest rate on the last day of the RMP shifts, their behavior during the earlier part of the RMP will also change and cause the market interest rate for that part of the period also to deviate from the (implicit) target. The flat part of the demand curve will become shorter and shorter as the RMP progresses. As the end of the RMP approaches the ability of banks to offset past shocks without trading in the market decreases. As a result, market trading, interest rate volatility, and recourse to the standing facilities tend to increase toward the end of the RMP. If the interbank market is segmented, same day interest rate spreads tend to also increase toward the end of the RMP.

Thus, with reserve averaging, the central bank needs to ensure that average "liquidity conditions" (i.e., excess reserves) during the RMP are at the appropriate level. To achieve this, it could in principle be sufficient to conduct one OMO with an overnight instrument on the last day of the RMP. That is not sufficient in practice, though. Experience has shown that banks tend to underutilize the flexibility that averaging provides, and that their expectations for the liquidity conditions and short-term interbank market rates for the latter part of the RMP risk becoming unanchored if excess reserves are allowed to vary sharply during the RMP. Therefore, good practice is to at least conduct an OMO at the beginning, the middle, and on the last day of the RMP. The maturity of the OMO instrument should be sufficiently long so that the maturity of the operations cover the full RMP and without having the instruments overlapping each other. The following set up is one example for a four-week RMP (Wednesday–Tuesday):

- Wednesday 1. Auction of seven-day OMO instrument.
- Wednesday 2. Seven-day OMO1 repaid in the morning; auction of new seven-day OMO instrument.
- Wednesday 3. Seven-day OMO2 repaid in the morning; auction of new seven-day OMO instrument.
- Wednesday 4. Seven-day OMO3 repaid in the morning; auction of new seven-day OMO instrument.
- Tuesday (last RMP day). Auction of one-day OMO instrument. Repaid in morning of first day of next RMP.

The floor and the fixed-rate full-allotment systems are the easiest to operate.[7] These frameworks do not require highly accurate short-term forecasts of changes in the autonomous factors and are robust to changes in banks' demand for excess reserves. Because liquidity risk and interest rate volatility are elevated under RMT, banks tend to hoard reserves to self-insure against those risks. This elevated demand for excess reserves will decline as liquidity risk and interest rate volatility is reduced and confidence increases in the central bank's ability to keep liquidity conditions stable. Floor and full-allotment systems tend to impose lower short-term liquidity risks on banks, and consequently reduces the need for interbank activity. While this may hamper development of the short-term interbank money market, it better anchors the yield curve, thereby supporting the development of other financial markets and policy transmission along the yield curve.

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[7] See Chapter, "Operational Framework Choices," for an in-depth discussion on the different operating frameworks.

In transition, both the *floor* and the *fixed-quantity variable-rate mid-corridor* systems, can be adopted without having to publicly announce a change in the operating framework. RMT requires using fix-quantity variable-rate OMOs. The central bank can introduce a minimum bid rate for short-maturity OMOs that inject reserves and a maximum bid rate for short-maturity OMOs that mop up excess reserves. Those minimum and maximum rates should be the same for a central bank that alternates between injecting and mopping up reserve balances. The minimum and maximum rates will be the central bank's *de facto* policy rate and implied target for the interbank market rate, but the central bank does not have to explicitly communicate that initially. As explained in the chapter on Implementing Monetary Targeting, best practice is to have both standing lending and deposit facilities. A central bank that wants to transition to a floor system can, when it is appropriate to lower rates, adjust its OMOs so that excess reserves increase, thereby letting market rates drift toward the floor of the corridor without announcing that it is changing the operating framework. It may then subsequently start to move the floor when it wants to adjust market rates up or down.

Setting the Initial Level of the Interest Rate Operating Target

There are many considerations in setting the initial level of interest rates in the context of some form of flexible inflation targeting, including: economic theory, observed real short-term interest rates, inflation and exchange rate developments, and changes in inflation expectations. Real market rates above (below) the neutral or short-run equilibrium rate are contractionary (expansionary) and should help reduce (increase) inflation back toward the target.[8] While it is hard to determine the equilibrium real interest rate with precision, particularly when the economy is in transition from a high inflation to a moderate inflation environment, simple rules of thumb may be sufficient. To reduce inflation and stabilize the exchange rate, expected real interest rates should at least be positive in real terms, and the expected profit of holding local currency assets should be higher than the expected return on holding foreign exchange-denominated assets. Estimates of productivity growth, the expected return on investment in capital equipment, and households' internal discount rates provide further guidance. There are also statistical methods for estimating the neutral rate.[9] Erring by initially setting policy rates on the high side may reduce inflation quicker, boost the central bank's credibility and allow interest rates to be lowered sooner than otherwise.

Adjusting the Interest Rate Target

Inflation deviating from target, with inflationary pressures either building or subsiding, may indicate a need to adjust interest rates. Ultimately, developing a forecasting and policy analysis system with a core medium-term forecasting and monetary policy analysis model will help guide decisions on when and by how much interest rates should be adjusted. In the initial stage, however, it may be sufficient to rely on simpler inflation forecasts, insights embedded in now standard monetary policy analysis models, various statistical indicators, and a solid understanding of the current and cyclical position of the economy (see Appendix).

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[8] The "neutral rate" is the level of the real rate consistent with economic output at its potential and inflation on target.

[9] See Teodoru and Toktonalieva (2020), Hledik and Vlcek (2018), and Brubakk, Ellingsen, and Robstad (2018).

C. STEPS INVOLVED IN A GRADUAL TRANSITIONING

A central bank that is not ready to fully shift its operational focus from monetary quantity targets to market interest rates can still take steps to increase control over short-term interest rates, as outlined in IMF (2015).[10] The pace at which these steps are implemented, and indeed whether some are skipped, may vary. Taking these steps to reduce undue interest rate volatility are also consistent with best practice RMT, as explained in the chapter on Implementing Monetary Targeting.

Step 1. Reduce undue interest rate volatility

In countries that use reserve money operating targets, short-term interest rates often exhibit high volatility arising from four sources: (i) operations that are often focused on achieving period-end quantitative targets with little regard to managing intra-period liquidity; in this case, period-end interest rate volatility can be high; (ii) operations that are sometimes focused on keeping reserve money on a pre-determined path on a daily basis; in this case daily swings in currency demand generate corresponding fluctuations in excess reserves and short-term interest rates; (iii) weak central bank capacity to offset autonomous changes in liquidity conditions, in particular if banks are also required to meet their reserve requirement on a daily basis; and (iv) the timing, frequency, and maturity structure of OMOs are not properly aligned with the RMP and an reserve averaging provision. Addressing these constraints increases certainty about liquidity conditions, reduces intermediation costs and interest rate spreads, improves policy transmission, and paves the way for increased emphasis on interest rates. (More details can be found in the chapter on Implementing Monetary Targeting). Attention to the following points is important:

- *Operations should seek to stabilize excess reserves*—since money market interest rates are determined by the demand and supply of excess reserves—while keeping total reserves close to the path dictated by the reserve money target. Important here is for operational staff to continuously monitor the level of total and excess reserves—the latter of which is the only component of reserve money that can be controlled in the short-term.

- *Instrument design, liquidity management, and communication should aim at increasing certainty about liquidity conditions.* For example, allowing banks to meet their reserve requirement on average over a sufficiently long period reduces liquidity risks and therefore interest rate volatility. Improving central banks' capacity to better forecast liquidity conditions can also help, although difficulties here arise largely because of poor coordination with government, particularly when it is allowed to borrow directly from the central bank.

These measures should reduce high-frequency volatility caused by day-to-day liquidity management, but they may not address lower-frequency interest rate volatility associated with RMT. Without further reforms, it is difficult to fully resolve the tensions involved in attempting to smooth interest rates while simultaneously pursuing reserve money targets at monthly or quarterly frequencies.

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[10] See also Mæhle (2020).

Step 2. Set up a corridor without specifying a point target for interest rates, while retaining reserve money as the operating target

The central bank can introduce an interest rate corridor for interbank rates to further limit volatility. A corridor is implemented by the combination of an unlimited access overnight standing lending facility (which is needed to support the functioning of the payment system) that puts a ceiling on rates, and an overnight standing deposit facility that puts a floor under rates.[11] These facilities are of one day duration since the objective is to contain volatility in overnight rates. The corridor at the outset could be relatively wide—somewhere around 500 basis points when interest rates are in high single digits and even wider at higher interest rates. Over time, the corridor should be narrowed as volatility falls and the focus shifts from money aggregates to interest rates.

There is a conflict to resolve when interest rates are at one edge of the corridor for a prolonged period. The interest rate corridor should reduce interest rate volatility and uncertainty, thereby strengthening signaling and transmission and allowing the central bank to be flexible within the corridor. However, there is a potential conflict between interest rates and the reserve money target when rates are at either edge of the corridor for a period, which reflects that the level of interest rates is inconsistent with the stance of policy as expressed by the reserve money target. Such a conflict must be resolved through either a revision of the reserve money target and/or a repositioning of the interest rate corridor, the latter of which may be used to signal a change in the policy stance. The decision about whether to move the interest rate corridor or the reserve money target (or both) depends on the central bank's assessment of whether current economic developments are consistent with achieving its *de facto* policy objective. It is therefore a policy matter. With price stability as the primary policy objective:

- The corridor should be shifted upward (downward) if rates are at the ceiling (floor), RM growth is above (below) target, and indications are that inflation is trending above (below) target.

- The RM target should be raised (lowered) if rates are at the ceiling, RM growth is at or above target, but other information indicates that inflation is trending below (above) target.

Step 3. Announce a point policy rate as the operating target

Policy is signaled through changes in the "policy rate" and references to monetary quantities are dropped.[12] In conjunction with an ongoing narrowing of the interest rate corridor, the central bank communication on the monetary policy stance shifts to short-term interest rates, with liquidity management operations aimed at aligning market rates with the announced policy rate. The central bank at this point also needs to choose between the mid-corridor and floor operational frameworks, designing and calibrating its monetary instruments consistent with the chosen framework. Policy rate determination increasingly relies less on indicator variables, such as monetary aggregates, and is more forward-looking (see Appendix).

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[11] Bank access to the standing lending facility should be automatic, based on clear ex-ante procedures (including collateral requirements) and separated from banking supervision requirements.

[12] Countries may wish to retain indicative quantitative ceilings as "tripwires" in the early stages of Step 3.

IV. Frequently Asked Questions

- *Which interest rate should be the operating target?*

  The operating target should be a short-term interest rate that is frequently traded, observable, and relevant for transmission to other key interest rates. In many developing environments, often the most appropriate candidate is the overnight unsecured interbank market rate due in part to the lack of alternatives. Secured rates (i.e., repo rates) can also be used if there is sufficient market activity. Using secured rates largely removes the credit risk premium implicit in interbank rates—which sometimes leads to high volatility in reported rates. This is because while liquidity conditions in aggregate may be similar over different days, transactions between banks of differing credit quality may lead to substantial differences in the reported average of interbank rate on those days.

- *Can an interest rate and a monetary quantity be targeted at the same time—which takes precedence and when??*

  Interest rates and monetary quantities cannot be the operational target at the same time. There is however, a level of interest rate that is consistent with a targeted level of reserve money. Thus, a margin around this interest rate can be targeted, as noted earlier under Step 2. Broad money can be the intermediate target that guides the setting of an interest rate operational target, an approach formally used by some advanced countries when operating an MT regime.[13]

  Under strict RMT, monetary quantities must take precedence. However, *de facto*, a central bank can target short-term interest rates without announcing a target while formally operating a MT framework. Such an approach may provide cover for setting interest rates at the level needed to contain inflation when it may be politically difficult to do so if the official operating target is an interest rate requiring explicit communication.

  Policy rate announcements must be backed by operations that align market conditions with the announced rate. A central bank that is not ready to fully shift its *de facto* operational focus from monetary quantity targets to interest rates should not try to use a central bank policy rate to signal the policy stance. For the policy rate to credibly signal the policy stance, a central bank must demonstrate its commitment to use its monetary instruments so that short-term interest rates stay close to the target.

- *How is the initial width of the corridor determined and when should it be narrowed? What is the optimal width post transition?*

  With a gradual transition (see Step 2) the initial width of the corridor can be relatively wide. There is a trade-off; a narrow corridor limits volatility but increases the chances of interest rates being persistently at the floor or ceiling. A narrow corridor requires more frequent repositioning of the corridor, which may complicate communication of the policy stance. Therefore, it is better to set it relatively wide initially to provide the flexibility needed to meet the reserve money target and to reduce the likelihood for frequent repositioning. However, the corridor should subsequently be narrowed as the central bank

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[13] A floor system allows for interest rates and quantities to be targeted at the same time since the demand curve is flat when short-term interest rates are at the floor.

gains operational experience (e.g., improves its liquidity forecasting and liquidity management capacity) and as interest rate volatility declines.

There is no firm rule for determining the optimal width of the corridor post transition. Views have evolved with corridors becoming narrower, including in response to the persistent decline in nominal interest rates. A 200-basis point (bps) wide corridor is in fact quite narrow when interest rates are at 20 percent but relatively wide when interest rates are just 1 percent.

- *What should be done if the interest rate trades persistently on one side of the corridor?*

This situation indicates an inconsistency between interest rates and the reserve money target. This conflict must be resolved through either a revision of the reserve money target and/or repositioning of the interest rate corridor, the latter of which may be used to signal a change in the policy stance. The decision about whether to move the interest rate corridor or the reserve money target (or both) is a policy decision that will depend on the central bank's assessment of the state of the economy and inflation pressures. With price stability as the primary policy objective:

  - The corridor should be shifted upward (downward) if rates are at the ceiling (floor), RM growth is above (below) target, and indications are that inflation is likely to be above (below) target.

  - The RM target should be raised (lowered) if rates are at the ceiling, RM growth is at or above target, but other information indicates that inflation is likely to be below (above) target.

- *How should shifts in the corridor—which may or may not be a change in the policy stance—be communicated?*

A repositioning of the corridor could serve as a signal to the market that policy is being adjusted, thereby helping improve transparency and communication. This is the case even when pursuing a reserve money target without a (point) policy rate to signal the stance. Whether to explicitly communicate a policy shift will depend on whether the central bank is transitioning toward a fully interest rate-focused framework and whether it is prepared to publicly acknowledge that it is *de facto* steering short-term market interest rates.

- *Should the volume of transactions through the standing facilities be constrained?*

Banks should be able to borrow freely from the central bank's lending facility if they meet all procedural requirements, including collateral requirements. Frequent borrowing by an individual institution from the central bank is not necessarily a sign that it is facing liquidity constraints since this may result from a system-wide shortage of liquidity, or inefficiencies in the payment and settlements systems. Lacking the required collateral, however, and/or non-compliance with liquidity regulations (e.g., the liquidity coverage ratio) would be such a sign. Where markets are segmented, some banks may need to repeatedly turn to the central bank for marginal funding. These banks may typically be newer banks with less well-established borrowing relationships, and they may be viewed as particularly important for enhancing banking competition, reducing lending rate spreads, and improving access to banking services in circumstances where the financial sector is undeveloped. In such cases, some banks may have an extended reliance on central bank funding. However, this should be discouraged in the medium-term through appropriate calibration of liquidity regulation, supervisory actions, as well as financial market development measures to deal with the causes of the segmentation.

There should be no limit on the amount banks can deposit in the overnight deposit facility. However, in some operational frameworks, the central bank sets a two-tiered deposit facility where excess reserve balances up to a limit (i.e., a quota) earn the policy rate and any balances over that earn say 100 bps less (see the chapter on Operational Framework Choices). In this circumstance, there should be no limit on volumes remunerated at the lower of the two deposit facilities.

V. Technical Assistance Approach

Technical assistance (TA) on transitioning operational targets would typically take place as part of a broader TA program to modernize the monetary policy framework (IMF 2015 principles). TA should ensure that a well-sequenced strategy is in place and stress the need to start as soon as possible on transitioning to an interest rate-focused operating framework. It should also emphasize the need for clear communication and provide guidance on what to say and how to say it. The transition may also be accompanied by TA on market development (both foreign exchange and domestic money markets) to improve transmission.

TA should assess whether the central bank has sufficient operational independence to explicitly set a short-term interest rate target. If that is not the case, the TA should help the central bank:

- Get a clear mandate in terms of its goals, and operational independence to pursue these goals, within the context of public accountability. This may require both legal changes and public education.

- Start to gradually transition toward an interest-rate focused framework as outlined earlier (three steps).

Irrespective of the chosen transition pace, TA should provide guidance on:

- Design of the standing facilities and corridor width in transition.

- Setting the initial level of the interest rate, and on how to adjust the target.

- The choice of operational framework: (i) flexible-price fixed-quantity mid-corridor; (ii) fixed-price full-allotment mid-corridor; and (iii) a conventional floor or a two-tier floor system.

- The structuring of the OMOs within the RMP, including with respect to the maturity of the instrument(s) and timing and frequency of the operations.

Appendix I. Setting and Adjusting Interest Rates

Setting the Initial Level of the Interest Rate Operating Target

Setting the initial level of interest rates may be less challenging than assumed. The basic insight of Knut Wicksell 120 years ago that underpins today's monetary policy models provides some clear guidance. Real money market rates that are below the expected real return on real investments (or on foreign exchange-denominated assets) or below the households' internal discount factor (what Wicksell referred to as the "natural rate" and today is referred to as the real equilibrium interest rate) make it profitable to borrow to finance consumption, invest in physical (or "real") capital, or buy foreign exchange-denominated assets, and thus would result in increased output and inflation and a weaker exchange rate. While it is hard to determine with precision what the equilibrium interest rate is, and particularly so in crisis times or when the economy is in transition from a high inflation to a moderate inflation environment, simple rules of thumb may be sufficient. To reduce inflation and stabilize the exchange rate, expected real interest rates should at least be positive in real terms (say 2-5 percent) and the expected profit of holding local currency assets should be higher than the expected return on holding foreign exchange-denominated assets—the latter may be approximately equal to expected depreciation. Additional guidance may come from actual observed real short-term market interest rates, recent inflation, exchange rate developments, and changes in inflation expectation. Erring on initially setting policy rates on the high side may reduce inflation more quickly, boosting the central bank's credibility and allowing market interest rates to decline sooner than otherwise.

Adjusting the Interest Rate Target

Inflation diverging from target with inflationary pressures building or subsiding may indicate a need to adjust interest rates. It is useful to have a forecasting and policy analysis system with a core medium-term forecasting and monetary policy analysis model. But this is not strictly required at the outset. Such models have been adopted by advanced inflation targeting central banks, and include the simpler New-Keynesian Gap model (referred to as the quarterly projection model, or QPM).[14] Neither the pioneering inflation targeting (IT) countries nor the advanced MT countries that ex-post looked like they were practicing inflation targeting in disguise had such models at the early stage of their adoption of IT.[15] The experience of these countries—and the core insight imbedded in today's monetary policy models— shows that inflation, besides shorter-lived shocks, is primarily driven by domestic demand pressure. In the QPM, such pressure is proxied by the deviation of output from its longer-term equilibrium/non-inflationary/ potential level (i.e., the "output gap") and import prices (proxied by the deviation of the real exchange rate from its longer-run trend, or equilibrium level, i.e., the "real exchange rate gap").

The Taylor Rule and the Taylor Principle provide additional insight. The monetary policy rule in the typical QPM, and most other monetary policy models, is based on a generalized and forward-looking version of the Taylor rule (1993). The original version had nominal interest rates set equal to the natural

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[14] The IMF capacity development has help many developing and emerging market economies establish such models.

[15] See Bernanke and Mihov (1997) for discussion about Germany's experience with flexible monetary targeting, and Batini, Kuttner, and Laxton (2005) and Batini and Laxton (2007) on the early experience with adopting inflation targeting.

or equilibrium real interest rate (r_t^n) plus the contemporaneous observed annual, or four-quarter, inflation rate (π_t^4)[16] and an even-weighted average of the inflation gap ($\pi_t^4 - \pi^T$) and output gap ($\hat{y}_t$).

Original backward-looking Taylor rule: $i_t = r_t^n + \pi_t^4 + 0.5(\pi_t^4 - \pi^T) + 0.5\hat{y}_t$

Forward-looking Taylor rule: $i_t = c_1 i_{t-1} + (1 - c_1)(i_t^n + c_2(E_t\pi_{t+4}^4 - \pi^T) + c_3\hat{y}_t),\ \ i_t^n = r_t^n + E_t\pi_{t+4}^4$

Importantly, the rule ensures that nominal interest rates are raised by more than inflation in response to an increase in inflation—that is, that real interest rates are increased. This is referred to as the Taylor Principle. In contrast to the original version, the version adopted in most policy models includes a degree of interest-rate smoothing ($c_1 i_{t-1}$) and adjustments to the interest rate target in response to a weighted average of the expected inflation gap ($E_t\pi_{t+4}^4 - \pi_t^T$)[17] and the current output gap. The original Taylor rule was backward looking, and a mechanical use of it can be procyclical as monetary policy mainly impact future inflation.

A good understanding of the current and cyclical position of the economy are pre-conditions for effective forward-looking policymaking. A fundamental insight embedded in the New-Keynesian gap models is that the cyclical position of the economy and the estimates of the deviations of output, interest rates, and the exchange rate from their longer-term equilibriums (the "gaps") may go a considerable way toward determining whether there is a need to adjust policy. Output growth above potential implies that the output gap is closing or becoming increasingly positive and thus that marginal production costs should be increasing and inflation pressure building. This suggests a need to raise interest rates. Similarly, a depreciating real exchange rate relative to longer-run trend (i.e., a closing or increasingly positive real exchange rate gap) may indicate increasing demand pressure as well as increasing marginal costs for importers, and thus increasing inflation pressure. Combining a measure of the output and real exchange rate gaps into a real marginal cost index would provide a forward-looking inflation indicator that can be used to determine whether interest rates should be adjusted in the absence of a fully operational monetary policy model.

Deviation of broad money growth from the equilibrium or longer-run trend may provide a similar supplementary forward-looking inflation indicator, as indicated by the experience of Germany and other advanced countries when they formally practiced flexible MT. Germany, in line with the original Friedman rule (Friedman 1976), set its money target based on an inflation target (referred to as "unavoidable inflation," and set at 2 percent) and an estimate of potential output growth. A deviation of observed broad money growth from this "target" could indicate that inflation pressure might be building or decreasing and thus if confirmed by other information indicate that interest rates would have to be adjusted. This "broad money gap" measure would coincide with, and be an indicator of, the output gap if credit growth, and thus broad money creation, are mainly driven by actual and/or expected real output growth, which may partly explain why Germany's monetary policy conduct ex-post, during this period may look like inflation targeting in disguise.[18]

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[16] $\pi_t^4 = E_t(\pi_{t-3} + \pi_{t-2} + \pi_{t-1} + \pi_t)/4$. Where π_t is the on-quarter inflation rate.

[17] Four-quarter ahead in this case.

[18] See Bernanke and Mihov (1997).

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