INTERNATIONAL MONETARY FUND

Moldova's Inflation Targeting Regime

Philipp Engler and Roland Meeks

SIP/2026/025

IMF Selected Issues Papers are prepared by IMF staff as background documentation for periodic consultations with member countries. It is based on the information available at the time it was completed on February 10, 2026. This paper is also published separately as IMF Country Report No 26/025.

2026
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SELECTED ISSUES PAPER

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IMF Selected Issues Paper
European Department

Moldova's Inflation Targeting Regime, Republic of Moldova

Prepared by Philipp Engler and Roland Meeks*

Authorized for distribution by Alina Iancu
April 2026

ABSTRACT:
This chapter reviews the evolution of Moldova's inflation targeting (IT) regime since its introduction in 2013, focusing on the National Bank of Moldova's (NBM) operational framework in a challenging macro-financial environment. Inflation has been volatile and largely driven by exogenous factors, including food, fuel, regulated energy prices, and high exchange rate pass-through, complicating the conduct of IT in a small, open, and partially dollarized economy. Empirical evidence shows that monetary policy initially reacted mainly to exchange rate movements, targeting inflation only indirectly. Since 2020, policy has shifted toward a more conventional IT framework, with systematic responses to the inflation gap, reduced foreign exchange intervention, and strengthening monetary transmission. The chapter also assesses the costs of high reserve requirements and discusses options for their gradual normalization.

RECOMMENDED CITATION: Engler, Philipp and Roland Meeks, 2026. Moldova's Inflation Targeting Regime. IMF Selected Issues Paper (SIP/2026/025). Washington, D.C. International Monetary Fund

JEL Classification Numbers:	E52, E58, E31, F31, E44
Keywords:	Inflation targeting; monetary policy transmission; exchange rate pass-through; foreign exchange intervention; reserve requirements; liquidity management; central banking in small open economies; Moldova; financial market development.
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SELECTED ISSUES PAPERS

Moldova's Inflation Targeting Regime

Republic of Moldova

Prepared by Philipp Engler and Roland Meeks[1]

[1] "The authors would like to thank Sergio Sola for contributing valuable aspects to the discussion of reserve requirements, Rossen Rozenov, Alina Iancu and Andreja Lenarcic for their helpful comments and suggestions.

INTERNATIONAL MONETARY FUND

REPUBLIC OF MOLDOVA

SELECTED ISSUES

February 10, 2026

Approved By
European Department

Prepared By Philipp Engler (All EUR) and Roland Meeks (MCM) with contributions from Sergio Sola (MCM)

CONTENTS

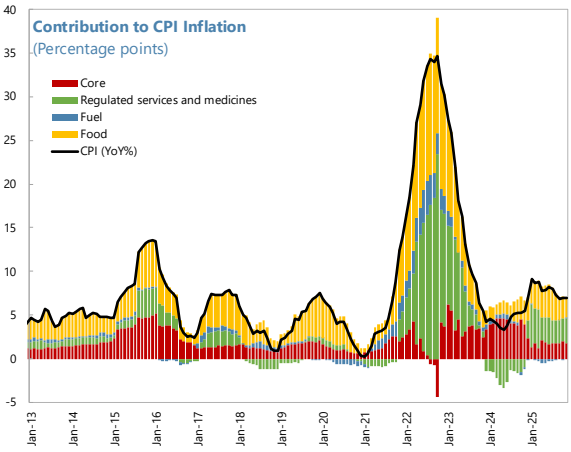
MOLDOVA'S INFLATION TARGETING REGIME[1]

This paper examines the challenges of the National Bank of Moldova (NBM) in building its inflation targeting (IT) regime since 2013. It describes its evolving use of instruments and some of those instruments' effects. It also describes the welcome shift away from de facto targeting the exchange rate towards a more standard IT regime. The paper further describes the benefits of reducing reserve requirements and discusses policy options going forward.

A. Context

1. Moldova's inflation targeting (IT) regime started in 2013. The National Bank (NBM) adopted a formal IT regime in late 2012, following preparatory steps in 2010 that introduced quantitative targets. Operationalization in 2013 marked a significant institutional shift: the amended NBM Law enshrined price stability as the primary objective with an inflation target range of 5+/- 1.5 percent, strengthened governance provisions, and clarified the Bank's autonomy in setting monetary policy instruments. To enhance transparency, the NBM began publishing quarterly Inflation Reports which included detailed macroeconomic forecasts, risk assessments, and policy rationale. To operationalize more forward-looking policies, forecast-based decision-making was introduced, supported by a newly developed macroeconomic model and scenario analysis. This was supported by improved communication via regular press releases and policy statements explaining how decisions align with projected inflation paths, helping to anchor inflation expectations.

2. Inflation has been volatile and exogenously driven with high pass-through from exchange rates to the CPI, posing a challenge for IT. While for the first two years of the IT regime inflation remained close to the 5 percent target, has been very volatile since end-2014. The main reason[2] for the volatility is the high share of goods in the CPI whose prices are largely exogenously determined and highly volatile, notably food and fuels. Regulated prices like gas and electricity have been prone to occasional large adjustments related to Russian gas supply and pricing up to 2025. Furthermore, the large share of imported goods in the CPI has contributed to a sizable pass-through from the exchange rate to consumer prices. Estimates from a vector autoregression model that distinguishes between monetary and exchange rate shocks reveal that for the MDL-US dollar exchange rate, changes driven by shocks to the exchange rate



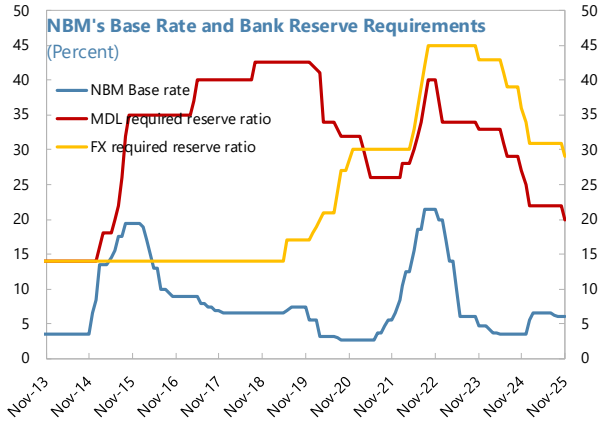
Source: NBS.

[1] Prepared by Philipp Engler (EUR) and Roland Meeks (MCM) with contributions from Sergio Sola (MCM).

[2] One episode of accelerated inflation followed the bank fraud in 2014 that caused a banking crisis, capital flight, and a strong depreciation in 2015 (see German Economic Team Moldova, 2015).

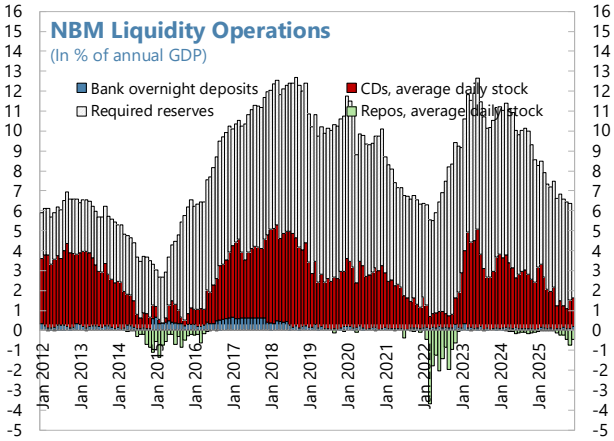
have a median pass-through to the CPI of 45 percent; while for the MDL-euro exchange rate the pass-through elasticity is 53 percent. For exchange rate changes driven by domestic monetary policy shocks the pass-through from an exchange rate change to the CPI is 62 percent for both the MDL-US dollar rate and the MDL-euro rate. That means around half of an exchange rate movement transmits to the CPI for those shocks (see technical annex A for details).

3. The challenging environment has led the NBM to intensely use its complementary monetary policy tools. The NBM, like all inflation targeting central banks, uses a short term interest rate, the base rate, as its main operating target. The focus on a single operating target simplifies communication about the policy stance, bolstering transparency and credibility. But the NBM has various complementary instruments to control market liquidity and ensure control over the base rate. These include reserve requirements (RRs), open market operations, and standing facilities. As is typical in low-income countries (LICs), the NBM has faced an environment that has made IT challenging to implement:



Source: NBM.

a. *Fear of floating* caused by liability dollarization or very high pass-through can lead an IT central bank to treat the exchange rate as a de-facto additional target. In reaction to conflicting signals from inflation and exchange rate movements the central bank may then guide its interest rate setting by exchange rate movements and heavy use of foreign exchange interventions (FXI), diluting the inflation targeting focus.



Source: NBM.

b. *Shallow financial markets*, rendering transmission from the operating target to other interest rates and the overall economy weak. In Moldova, a contributing factor was excess liquidity in the banking system after the bank fraud in 2014 and emergency lending operations (see IMF (2022) for details). The NBM increased RRs to exceptionally high levels and also issued short-term certificates of deposit (CDs) to mop up excess liquidity and support monetary transmission.

The remainder of the paper will discuss in detail the NBM's practice of base rate setting, its intensive use of FXI in the early years of the IT regime, and its liquidity operations.

B. The NBM's Evolving Monetary Policy Operations and Implications

4. The NBM's use of the base rate as its main operating target has evolved away from steering the exchange rate and towards conventional inflation targeting. To get a sense of the evolving nature of the NBM's policies since the start of the IT regime a Taylor rule is estimated on a sample of quarterly data split into the pre- and post-2020 periods. The timing of the split is motivated by the adoption of explicit rules guiding FXI by the NBM in late-2019. Those rules limited use of FXI to easing of FX market disruptions while not permitting interventions to stem trend exchange rate movements. The split reveals a striking contrast: while one would expect a significant reaction of the base rate to the inflation gap (the difference between the year-on-year inflation rate and the NBM's 5-percent-target) in an inflation targeting regime, the data reveal no such reaction from 2013 to 2019. Instead, the base rate increased by 7 basis points to a quarterly depreciation in the leu-dollar exchange rate of 1 percent. The estimated coefficient is significant at the 1 percent level. The NBM thus targeted inflation indirectly by aiming to mitigate exchange rate fluctuations and the ensuing pass-through to the CPI. In contrast, since 2020, the NBM has acted much more like a conventional inflation targeter: the base rate has displayed a significant reaction to the inflation gap while the exchange rate coefficient is smaller and significant only at the 10 percent level. The exchange rate has thus continued to play a role in base rate setting, but the reactions were less systematic and quantitatively smaller (see technical annex B for details of the estimation approach).

Taylor Rule Coefficients: Subsamples

	2013Q1-2025Q2	2013Q1-2019Q4	2020Q1-2025Q2
Inflation gap	0.1	-0.03	0.54***
Output gap	0	-0.15	-0.03
Change in exchange rate	0.07***	0.07***	0.04*

Sources: NBS and IMF staff calculation.
Notes: *0.05<p≤0.1, ** 0.01<p≤0.05, *** p≤0.01.

5. Transmission from the base rate to deposit and lending rates has strengthened over the past decade while T-bill rates have reacted quickly and strongly.[3] While several distinct transmission mechanisms determine the effects of monetary policy (see IMF, 2022 for an overview), with the largely bank-based financial sector, a key mechanism in Moldova operates from changes in the base rate to changes in bank lending and deposit rates which then affect lending and aggregate demand. Between 2010 and 2014 monetary policy was ineffective in steering bank rates, with no effect on deposit rates and only a small and very transitory effect on the lending rate. This has changed in the past decade as both the deposit and lending rate display a significant effect within a few months. Since 2021, the deposit rate rises 0.19 percentage points on impact after a one-percentage point increase in the base rate. Pass-through is complete after about 4 months with a total increase of 0.55 percentage points. The lending rate does not react on impact and also rises less over time. After 3 months it settles at 0.3 percentage points higher than before the base rate

[3] See also Engler and Giucci (2015) and IMF (2022) for earlier analyses of interest rate pass-through in Moldova.

hike.[4] A recent example is the pass-through following the energy price hike in January 2025 which was somewhat higher at 0.38 as the base rate increase of 290 bps was followed by an increase of bank loan rates of 110 bps until July 2025. The lower pass-through to lending than deposit rates in the estimation likely reflects strong borrower-lender relationships that render banks reluctant to quickly change lending rates when the policy stance changes; deposits, in contrast, may not be very elastic with respect to deposit rate changes so banks can pass on base rate changes more forcefully. Lastly, T-bill rates have always reacted quickly to base rate changes and more strongly than bank rates. Since 2021, 71 percent of base rate hikes were transmitted to T-bills within a few months (see technical annex C for details of the estimation approach).

Effect of 1 Percent Policy Rate Change in Market Rates

		2010-2014	2015-2020	2021-2025M4	2010-2025M4
Lending rate	ST	0.34***	0.02	-0.01	0.05
	LT	0.13	0.27***	0.30***	0.27***
Deposit rate	ST	0.06	0.06	0.19***	0.14***
	LT	0.04	0.61***	0.55***	0.53***
Tbill rate	ST	0.69***	0.11	0.26**	0.27***
	LT	0.91***	1.23***	0.71***	0.95***

Source: IMF staff calculations.

Notes: *0.05<p≤0.1, ** 0.01<p≤0.05, *** p≤0.01.

6. Use of FXI has declined substantially in recent years. A reaction function of monthly FXI shows a systematic reaction to changes in the leu-dollar exchange rate in the pre-2020 sample but not in the post-2020 sample (see technical annex D for details). A one percent month-over-month depreciation of the leu against the dollar was associated with FX sales of 0.09 percent of annual GDP in the first subsample. In the second sub-sample the reaction coefficient is not significant. In line with that observation, the data also shows that interventions have become smaller relative to GDP and less biased toward dollar sales, hinting at a reduced focus on preventing depreciations. Over the past two years interventions have also become smaller relative to FX interbank transactions, rendering a much smaller footprint in the FX market. Overall, the degree of exchange rate management, measured as the ratio of FXI volatility over the sum of FXI and exchange rate volatility[5] has decreased. This analysis suggests that the NBM has changed its approach to exchange rate management (for the previous analysis see IMF 2022).[6]

[4] Engler and Giucci (2015) interpreted the result of a significant short-term effect on lending rates in their 2009-2015 sample as an improvement over the previous period due to the establishment of the base rate as the NBM's main policy tool since 2009/2010 when the inflation targeting framework was being set up. At the time the long-term effect was not significant suggesting still little traction of monetary policy action. This has changed with the still small but highly significant long-term effect as shown in this paper.

[5] See Adler et al. (2020) and Poghosyan (2020) for a discussion of this indicator.

[6] Despite the now dominant role of the euro for Moldova's economy and the NBM's FX operations the leu-euro exchange rate the NBM has not targeted the euro rate with FXI. The FXI reaction function with the dollar replaced by

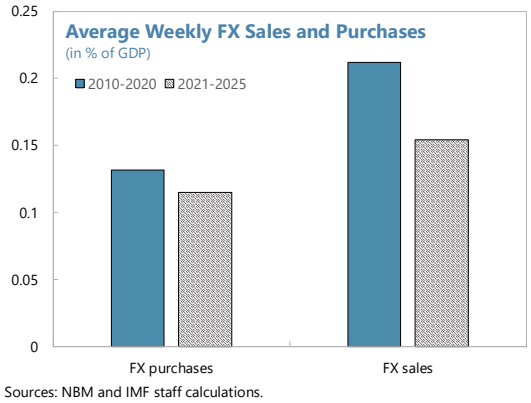
(continued)

Figure 1. The NBM's FXI Practice

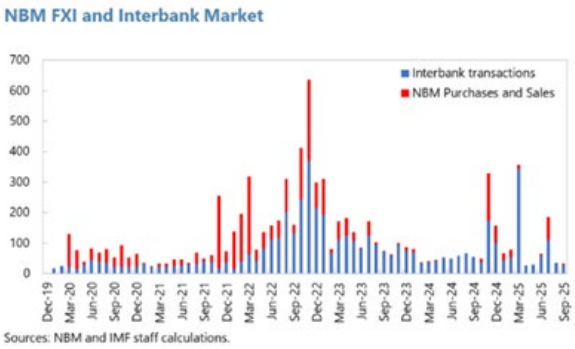
FXI Reaction Function

	2013-2019	2020-2025M7
FXI (-1)	0.37***	0.17***
ΔUS-$	-0.09***	-0.13
π_gap	0.01	0.01

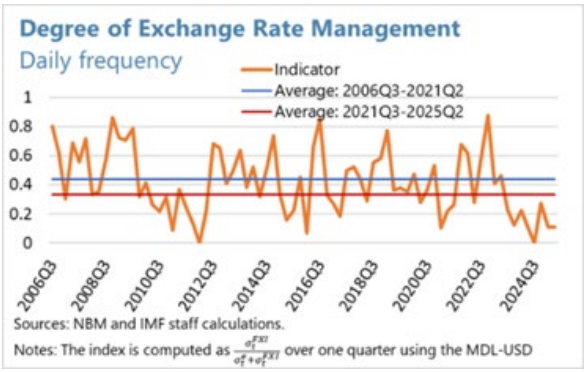
Sources: NBS and IMF staff calculation.
Notes: *** 0.01<p≤0.05, *** p≤0.01.



Sources: NBM and IMF staff calculations.



Sources: NBM and IMF staff calculations.



Sources: NBM and IMF staff calculations.
Notes: The index is computed as $\frac{\sigma_t^{FXI}}{\sigma_t^{\epsilon}+\sigma_t^{FXI}}$ over one quarter using the MDL-USD

7. The intense use of high RRs, while appropriate during times of excess liquidity, is becoming distortive for the banking system as conditions normalize. In response to the banking crisis following the fraud, the NBM raised the reserve requirement ratio on deposits in lei from 14 to 35 percent between February and November 2015 and then to 42.5 percent in October 2018 to reduce excess liquidity and support monetary transmission. But high RRs come at a cost. By the requirement to hold a fraction of deposits as central bank reserves which are only partially remunerated[7], banks face a friction in intermediating deposits to loans that creates an inefficient wedge between lending and deposit rates, raising the spread between the two. While the spread is determined by a host of factors, the large increases in the RR ratio over short periods of time in

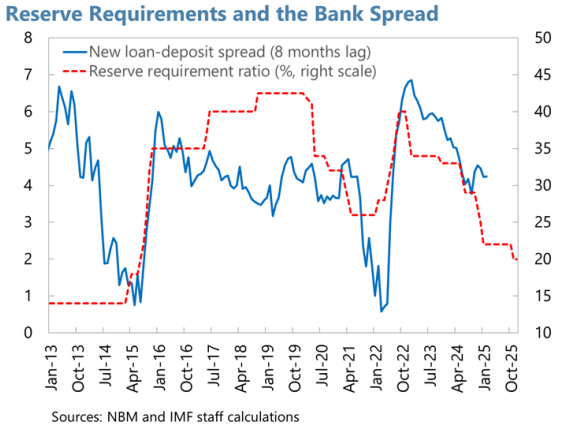
the euro does not show any significant reaction to the euro rate. Hence, despite the growing role of Moldova's trade in euros over time and the switch from the US-dollar to the euro as reference currency in January 2025 the NBM has not influenced the euro rate in any systematic way. This is a welcome development and shows a change in the NBM's commitment to targeting inflation while taking an easier approach to exchange rate volatility.

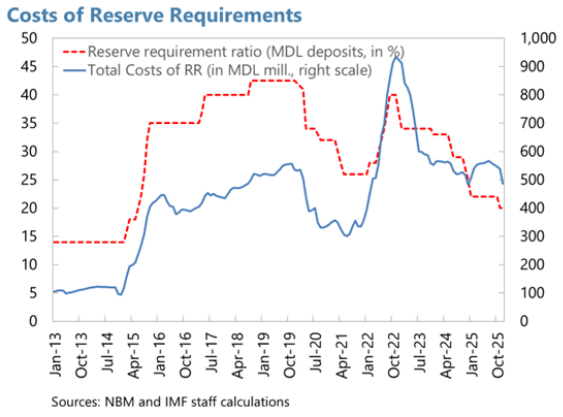
[7] The first five percent of a bank's required reserves are not remunerated while the remaining 95 percent are remunerated at the overnight deposit rate, which is currently two percentage points below the base rate.

2015 and 2022 had visible effects with a delay of a few months. The distortion can be measured as an opportunity cost of total required reserves (see technical annex E). In December 2025, as the NBM reduced the RR ratio to 20 percent, the cost still stood at about MDL 487 mln, which was still sizable at roughly 1.6 percent of banks' equity.

8. Model simulations indicate that a reduction of RRs may ease credit conditions. We calibrate an extended version of the quantitative IPF model (Adrian et al, 2021) to key features of the Moldovan economy. We consider the effect of a 10 percent reduction in the RR from 22 to 12 percent as an indicative experiment, starting from a rate that is close to that currently imposed on local currency deposits. The reduction is assumed to be perfectly credible and perfectly anticipated by all agents in the economy. Adjustment is gradual, such that the RR adjusts fully within four years, with the half-way point reached after 18 months. The near-term response of the banking variables is consistent with a dominant effect from reduced leverage as reserves are shed from balance sheets easing financial frictions. Nominal loan rates and spreads fall on announcement, while the stocks of loans and deposits rise. The trend towards higher loan volumes drives profitability; banks' market-to-book ratios undergo a sustained rise. In the model, the overall macroeconomic effects are small; but an important caveat is that new credit is directed to households and so it boosts asset prices and consumption (at least in the short term); the likely benefits from boosting business lending, e.g., more capital deepening and improvements in labor productivity, are not captured.

Figure 2. Reserve Requirements





9. CDs and repos are the NBM's bank specific tools to regulate liquidity but may have acted as a substitute for the interbank market. While RRs are applied to all bank deposits to regulate aggregate liquidity, CDs and repos are money market instruments to regulate bank specific liquidity needs. The NBM applies the base rate for CDs while the repo rate is set at +0.25 pp above the base rate; maturities are generally 14 days. CDs have been used intensely during the past

decade as banks shed excess liquidity from their balance sheets beyond what was withdrawn through RRs. As a share of GDP, CDs peaked at just below 5 percent in March 2018 and again in July 2023. By December 2025 CDs had declined to 1.4 percent of GDP, reflecting the drainage of excess liquidity related to the rapid credit growth over the past two years. Repos, in contrast, have generally been used less, but saw a pickup in activity in late 2025. Their use during this time coincided with sales of CDs, implying that the NBM provided liquidity to some banks at a time when it absorbed liquidity from other banks. Both banks short and long in liquidity thus conducted transactions with the NBM rather than with each other on the interbank market.

C. Policy Discussion

10. The greater focus on the inflation gap in setting the base rate is a welcome step towards normal IT practices. The significant coefficient on the inflation gap in the estimated Taylor rule signals a determination by the NBM to keep inflation within its target band and bolsters the NBM's credibility and accountability. Credibility will further grow over time with an increasing track record of following IT principles.

11. FXI practices have improved markedly. The more limited response of the base rate and FXI to exchange rate movements in recent years has allowed the exchange rate to reflect market forces to a larger extent. The rules set up in 2019 clarified that FXI should address FX market disruptions but not fundamental exchange rate changes. While those rules clarify the limits to FXI use, they leave enough discretion to react to turbulence. The IPF describes three "use cases" for FXI (see IMF (2023)) and references therein): i) to address destabilizing premia from arbitrage frictions in shallow FX markets, ii) to counter financial stability risks from FX mismatches and iii) to support price stability when exchange rate changes risk de-anchoring inflation expectations. The first case is relevant for Moldova as FX markets remain shallow, at times resulting in occasional non-fundamental exchange rate volatility. The second case is also relevant as liability dollarization is still sizable with a 20-percent share of FX loans in total loans despite a steady decline in recent years; however, macroprudential instruments are an effective first line of defense that effectively limit currency mismatches. Lastly, while inflation expectations have remained well-anchored in Moldova, unanchoring risks cannot be disregarded. The best strategy to avoid unanchoring is to further strengthen the NBM's credibility, by continuing to build a track record of effectively fighting inflation, by following the recommendations in the Central Bank Transparency Code Review so that a clear communication ensures the public understands its deliberations and decisions, and by strengthening the NBM's political, institutional, and financial independence.

12. The NBM should reduce the level of RRs further once inflationary pressures have subsided. While the high levels of RRs were initially justified by the large excess liquidity in the banking system and the lack of trust among banks after the bank fraud, the strong lending growth since early-2024, which has increased the credit to GDP ratio from 21 to 29 percent, has reduced excess liquidity substantially. Credit growth slowed towards the end of 2025, likely due to the monetary tightening at the beginning of the year, but is projected to continue in the coming year and, over time, to further reduce excess liquidity. The NBM should therefore pursue a carefully calibrated reduction of RRs while monitoring closely inflation developments.

13. Lower RRs would also support government debt and interbank market development. With excess liquidity fading, the NBM will turn from a liquidity absorber to a liquidity provider. Repos could increasingly be used for open market operations to manage aggregate rather than bank specific liquidity with government debt as collateral. Valuations of government debt would rise with higher demand, providing a needed boost to the development of the government bond market. Scarcity of liquidity and a better functioning sovereign bond market should also help revive the interbank market, supported by ending the fixed-rate-full-allotment and improving liquidity management and forecasting practices both by banks and the NBM.

14. Further work is needed to calibrate the path towards lower RRs and endpoint. A plan for a reduction path would need to consider how the released reserves are used by banks. A slow release over time would be one option that would avoid a possibly undesirable credit boom with any remaining excess liquidity to be absorbed by issuance of CDs. But as an induced credit expansion could be stronger during economic booms and strong credit demand than during recessions and low credit demand, some variation in the speed of reducing RRs might be desirable, depending on an optimal credit expansion path. The endpoint for the RR ratio level also requires careful calibration. Among regional peers local currency RRs are currently in the range of 5.5 and 10 percent. To determine the optimal level for Moldova banks' specific liquidity needs given certain shocks and the degree of interbank market development would need to be taken into consideration.

Minimum Reserve Requirements on Local Currency Deposits

Albania	Bosnia and Hercegovina	Kosovo	Montenegro	North Macedonia	Serbia	Moldova
7.5% (<1 yr), 5.0% (1-2 years)	10%	10%	5.5% (<1 yr), 4.5% (>1 yr)	9% (< 2 years), 0% (> 2 years)	7% (<2 years), 2% (>2 years)	20%

Note: Respective maturities in brackets.
Sources: Respective central banks

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Appendix I. Methodology

A. Pass-Through Estimation

1. To estimate exchange rate pass-through (ERPT) from changes in the nominal exchange rate (NER), denoted as ΔS, to the CPI, a flat prior BVAR is estimated on monthly data for 2006-2025. Identification is achieved through standard sign restrictions (Forbes et al., 2018) for monetary policy and exchange rate shocks. ERPT is calculated based on VAR impulse-response functions (Δx_h):

$$ERPT_k^{(d)} = \left. \frac{\Delta CPI_h^{(d)}}{\Delta S_1^{(d)}} \right|_{\varepsilon_k}$$

for posterior draws $d = 1, \dots, D$, a horizon $h = 12$ months, and a structural shock ε_k.

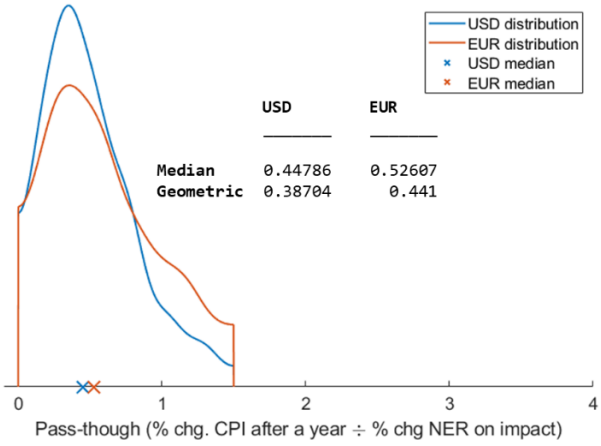
2. The sign restrictions are shown in the table below.

	Base rate	**CPI^**	**Euro NER ***	**Dollar NER***	**Free reserves**	**FXI****
Monetary policy shock	> 0	< 0	< 0	< 0	< 0	n/a
Exchange rate shock	> 0	> 0	> 0	> 0	n/a	< 0

Note: * A decrease denotes an *appreciation* of the Moldovan leu vs. the named currency; ** A decrease denotes sales of reserves (purchases of Lei); ^ CPI restriction holds at the 12-month horizon for y/y inflation; shaded fields: Forbes et al. (2018) restrictions (originally for quarterly data, so imposed for 3 months)

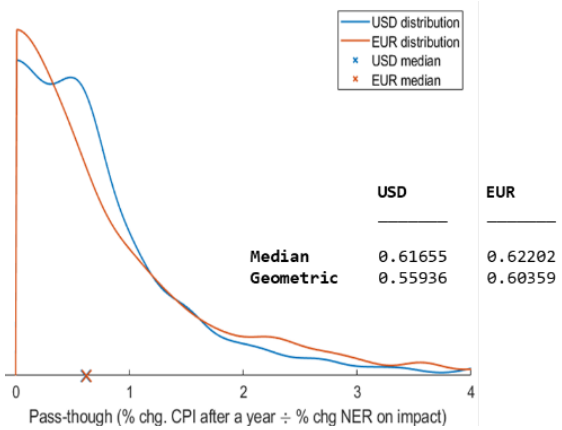
ERPT is calculated as a distribution, conditional on a particular source of disturbance. The problem to address is that ERPT estimates can be very high (even after discarding ΔS very close to 0). Here a *reasonableness* prior is proposed as another restriction that limits ERPT up to 150 percent which allows for a more credible identification as outcomes are more theory consistent. The distributions for domestic monetary policy and exchange rate shocks after one year are shown below:

Distribution of Pass-through Estimates: Exchange Rate Shocks



Source: IMF staff calculations

Distribution of Pass-through Estimates: Monetary Policy Shocks



B. Taylor Rule Estimation

3. A Taylor type rule with the base rate as the NBM's policy instrument is estimated at a quarterly frequency for two subsamples of the IT regime, 2013Q1-2019Q4 and 2020Q1-2025Q2. The regression included a constant and two lags of the base rate. The inflation gap is computed as the year-over-year CPI inflation rate minus the target rate of 5 percent. The output gap was proxied by a series of industrial production, using a Hodrick-Prescott filter to remove the trend. For the change in the exchange rate the quarter-over-quarter change in the MDL-dollar exchange rate was used.

C. The Transmission of the Base Rate to Bank Rates

4. To estimate the pass-through effect of base rate changes on lending, deposit, and T-bill rates the approach of Mishra et al. (2010) was applied. The following autoregressive distributed lag model was estimated with monthly data:

$$\Delta x_t = \alpha \Delta x_{t-1} + \beta \Delta x_{t-2} + \gamma \Delta y_t + \delta \Delta y_{t-1} + \varepsilon \Delta y_{t-2} + \mu_t$$

where x_t is the respective endogenous variables of interest (lending rate, deposit rate, T-bill rate) and y_t is the base rate. The short term (ST) effect is the estimate of coefficient γ and the long-run (LT) effect is the ratio $(\gamma + \delta + \varepsilon)/(1 - \alpha - \beta)$ of all five estimated parameters.

D. The FXI Reaction Function

5. For the FXI reaction, FXI, expressed as a percentage of GDP, was regressed on one lag of FXI, the m/m percentage change in the MDL-dollar exchange rate and the inflation gap measured as the y/y CPI inflation rate minus the target rate of 5 percent. The data was monthly and the sample was

split between the 2013-2019 and 2020-2025M7 subsamples. The FXI series is from Adler et al. (2020).

E. Costs of Reserve Requirements

6. The costs of reserve requirements for banks can be measured in terms of a unit opportunity cost and total costs. The unit cost is the difference between the policy rate and the remuneration of reserves and determines the wedge between lending and deposit rates. The NBM pays interest to banks at the overnight deposit rate (ONDR) on the share of required reserves that exceeds 5 percent of the reserve base (RB) which is currently 2 percentage points below the base rate. The first five percent of the reserve base are not remunerated. The unit cost of required reserves can thus be expressed as

[5%*RB*Base rate+(RR ratio-5%)*RB*(Base rate - ONDR)]/(RR ratio*RB)

which simplifies to

(5%/RR ratio)*base rate+[(RR ratio-5%)/RR ratio]*(base rate - ONDR)

As the gap between the base rate and the ONDR is changing rarely, the unit cost varies mostly with the base rate and the RR ratio. In this paper these costs are calculated for the banking system as a whole. At the required reserve ratio of 20 percent of the reserve base and a base rate of 5 percent in December 2025, the unit cost was 2.8 percent. The total cost is the unit cost times the required reserves holdings.

F. Effects of Changes of the Required Reserve Ratio

7. The framework we use is adapted from a quantitative model of the integrated policy framework (QIPF, Adrian et al. 2021). The QIPF is a two-country open economy New Keynesian model, featuring trade linkages and frictions in the foreign exchange market that lead to a home country premium, as in Gabaix and Maggiore (2015). A rich array of nominal and real rigidities geared towards ensuring congruence with macroeconomic data are included, with the prices of domestic, imported, and exported goods sticky in local currency. The model features monetary, fiscal, and foreign exchange policy tools. In the extended model employed here, we additionally allow financial intermediaries to operate, making loans and taking deposits in local currency.

8. The model structure is as follows. Firms produce goods for domestic and foreign consumption using capital and labor inputs, with the former being fixed. Households consume a bundle of domestic and foreign goods and housing services, and supply labor. Households are divided into equal-sized blocks of 'saver' and 'borrower' types, with the latter having a higher rate of time preference than the former, as in Iacoviello (2005). Loans to borrowers fund consumption and the purchase of housing services. The housing market plays a key role in the model as borrowers face a limit on the overall credit that they can obtain from intermediaries, which is based on the

value of the housing collateral that they own (a 'loan-to-value' or LTV limit). Fluctuations in asset prices directly affect this borrowing limit, and therefore credit demand and consumption.

9. Credit supply is constrained by the ability of banks to raise funding from depositors. As in Gertler and Kiyotaki (2010) and Gertler and Karadi (2011), depositors are aware that bankers can extract a private benefit from the funds entrusted to the bank, causing it to fail and be unable to repay its creditors. This moral hazard problem places a limit on banks' leverage, and leads them to charge an interest rate spread which acts as an incentive payment that induces "good behavior", as it makes the hidden action financially unattractive. The loans banks extend are for one period and carry an interest rate that is ex ante fixed in nominal terms. Banks accumulate net worth from retained profits, and loan supply is proportional to net worth.

10. When a bank accepts deposits, it must hold a minimum level of reserves at the central bank that depends on the reserve requirement ratio (RR). In the model, banks have no use for reserves other than to satisfy their reserve requirement. Reserves are remunerated at the central bank's policy rate. As deposits are also remunerated at the policy rate, banks do not suffer a direct bottom-line impact from reserve requirements; there is no "tax on banks". However, reserves are assumed to occupy balance sheet "space": the requirement to hold reserves raises banks' overall leverage (the ratio of loans plus reserves to net worth), meaning that all else equal banks face a tighter incentive constraint than otherwise. That in turn leads them to charge higher spreads on loans, and reduces their lending capacity. However, a key assumption in our model is that the bank's creditors consider reserves to be better collateral than loans, which are more opaque than reserves, non-traded, and likely require the banker to undertake possibly costly actions such as monitoring in order to make them perform. The tightness of the constraint on banks therefore depends on the mix of loans and reserves they hold, as well as overall leverage.