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Enhancing Monetary Policy Transmission in Algeria

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Enhancing Monetary Policy Transmission in Algeria

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ABSTRACT: Algeria is actively pursuing reforms to modernize its monetary policy framework, with a focus on enhancing the role of interest rates in achieving price stability. The new monetary and banking law provides the necessary operational and organization tools while the authorities are improving the capacity in macroeconomic forecasting. This paper analyses the monetary policy transmission in Algeria. The results suggest that the interest rate channel is relatively weak as the BA focuses on liquidity operations. A focus on interest rate tools, financial sector reform and central bank independence would help to improve monetary policy transmission in Algeria.

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SELECTED ISSUES PAPERS

Enhancing Monetary Policy Transmission

Algeria

Prepared by Gian Plebani and William Gbohoui[1]

[1] The authors would like to thank Charalambos Tsangarides and Valeriu Nalban for their valuable and insightful contributions. Thanks also go to the Algerian authorities for their invaluable assistance in providing data and for constructive comments received during the presentation and discussions of this work at the mission's outreach event. Sofia Cerna Rubinstein provided excellent editorial support.

ENHANCING MONETARY POLICY TRANSMISSION IN ALGERIA[1]

Algeria is actively pursuing reforms to modernize its monetary policy framework, with a focus on enhancing the role of interest rates in achieving price stability. The new monetary and banking law (MBL) provides the necessary operational and organization tools while the authorities are improving the capacity in macroeconomic forecasting. This paper analyses the monetary policy transmission in Algeria. The results suggest that the interest rate channel is relatively weak as the BA focuses on liquidity operations. A focus on interest rate tools, financial sector reform and central bank independence would help to improve monetary policy transmission in Algeria. Section A describes the monetary policy framework and the medium-term macroeconomic environment in Algeria. Section B contains empirical analysis and the results. Section C describes the current structural impediments to a more effective monetary policy transmission and section D concludes with policy recommendations to enhance the effectiveness of the monetary policy transmission.

A. Algeria's Monetary Policy Framework

Macroeconomic Background

1. Hydrocarbon exports have been the main determinant of bank liquidity in Algeria since the 2000s. The period between 2007 to 2015 was characterized by high hydrocarbon prices and export revenues, which translated into large accumulation of net foreign assets and abundant liquidity in the banking system (Figure 1). Therefore, until 2015, the Bank of Algeria (BA) was predominantly concerned with absorbing excess liquidity in the financial system. It kept reserve requirements at high levels (Figure 2 panel 1) and absorbed additional liquidity in bilateral operations with the banks. Furthermore, during times of high hydrocarbon revenues, fiscal savings were accumulated in the FRR ("Fonds de regulation des recettes").[2]

2. The collapse of oil prices in 2015 brought about a change in Algerian monetary policy. In 2015, the collapse of oil prices led to lower deposit growth and steady decline in net foreign assets up until 2021 (Figure 2 panel 2). As a result, the system-wide bank liquidity declined, triggering a change in the BA's monetary policy regime. In 2016, banks started to use refinancing operations, the BA lowered the reserve requirement ratio significantly (Figure 2 panel 1) and started to publish the "taux directeur", the reference policy rate in 2017 (Figure 4 panel 1). In this new environment, the BA became more active in managing liquidity in the banking system. It continued to absorb liquidity bilaterally when export revenues rose, as was the case over the last three years on the back of the Russia-Ukraine conflict and actively injects liquidity in open market refinancing

[1] Prepared by Gian Plebani and William Gbohoui. The authors would like to thank the authorities for their invaluable assistance in providing data and for constructive comments received during the presentation and discussions of this work at the mission's outreach event.

[2] FRR refers to the revenue regulation fund of the Algerian finance ministry which is used to store fiscal savings.

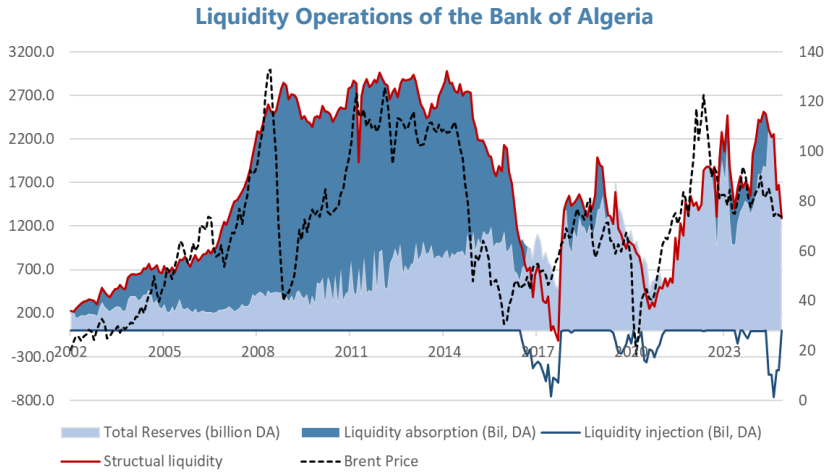
operations when necessary. The BA injected liquidity during the COVID-19 pandemic and most recently, on the back of strong demand for government credit and falling oil prices (Figure 1).

3. Large government financing needs dominate the liquidity demand side. Credit to the government as a share of total credit has been on the rise since 2015 and stood at 53 percent in 2024 (Figure 3). In times of low hydrocarbon prices and large fiscal deficits, the BA faces pressure to help financing the government. In 2017, Algeria resorted to direct monetary financing and in 2021/22 the government swapped 11.3 percent of GDP worth of SOE loans for government bonds with SOBs, to help the SOBs refinance the economy and the government under a special refinancing operation *("Plan Spécial de Refinancement", PSR)*.

4. Monetary policy has broadly kept price stability despite occasional spikes in inflation. The large liquidity absorptions during times of high export revenues, price controls, and a relatively stable exchange rate, helped keep inflation under control in Algeria. The most recent surge in inflation globally after the COVID-19 pandemic reopening led to a peak of 10 percent of headline inflation year over year but was contained relatively quickly down to 3 percent by end of 2024 (Figure 2 panel 4).

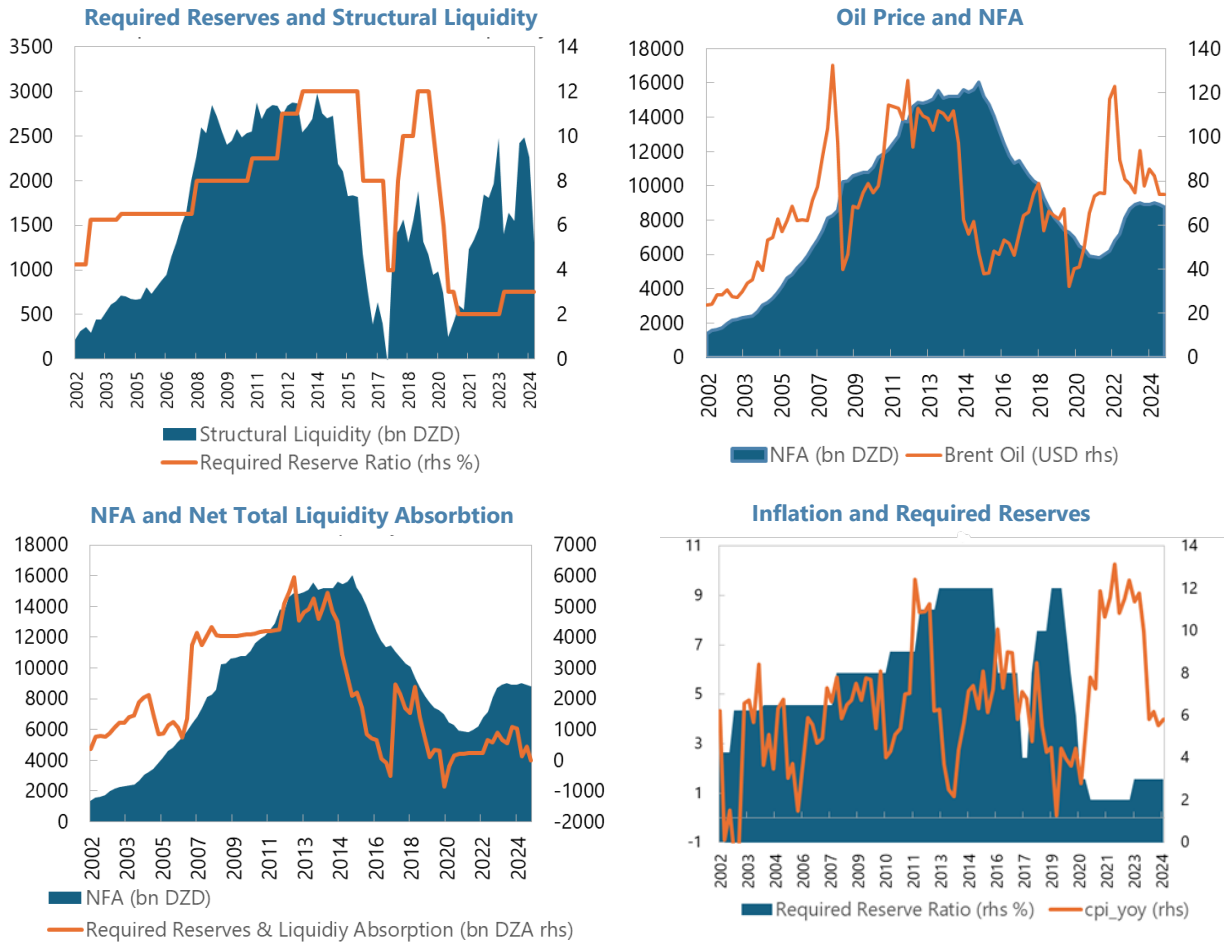
5. Given the structure of the banking system in Algeria liquidity developments may differ across banks. One structural difficulty of the Algerian monetary system is that the liquidity profile of the different banks is highly asymmetric. Most assets are concentrated among a few SOBs whilst the one bank of the state-owned oil enterprise receives almost all export revenues. It has a structural liquidity surplus while the rest of the system may be in deficit. The BA actively balances this out by applying bilateral liquidity absorption (with this bank) and injects liquidity more broadly via open market operations. The uneven distribution of liquidity makes the broad tool of reserve requirement adjustments less useful. The interbank market is growing as it went through a structural shift after 2015 when liquidity in the system started to become scarce (Figure 4 panel 4). However, it is not yet effective enough to fully compensate for the asymmetry in the system.

Figure 1. Oil Prices and Liquidity Management in Algeria



Sources: Bank of Algeria; IMF staff calculation.

Figure 2. Bank of Algeria's Monetary Policy Operations, NFA and Inflation 2002-2024

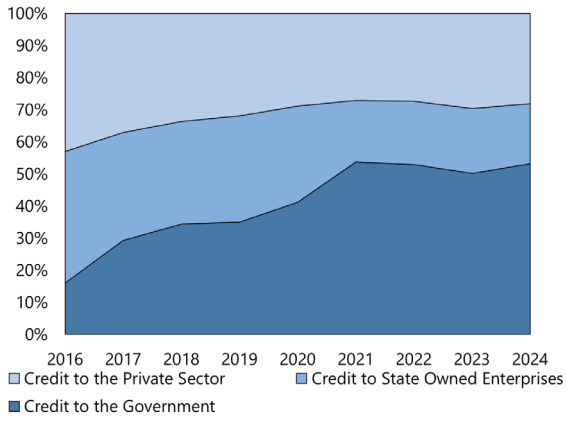


Sources: Bank of Algeria; IMF staff calculation.

Monetary Policy Tools and Objectives

6. The BA has three policy tools at its disposal: liquidity management, interest rates and the exchange rate.[3] The liquidity management tools consist of the required reserves and open market operations with a seven-day, three-and six-months auctions facilities, bilateral absorptions, the marginal lending and the excess reserves deposit facilities. Potential policy rates are the "taux

Figure 3. Credit to the Government is Rising



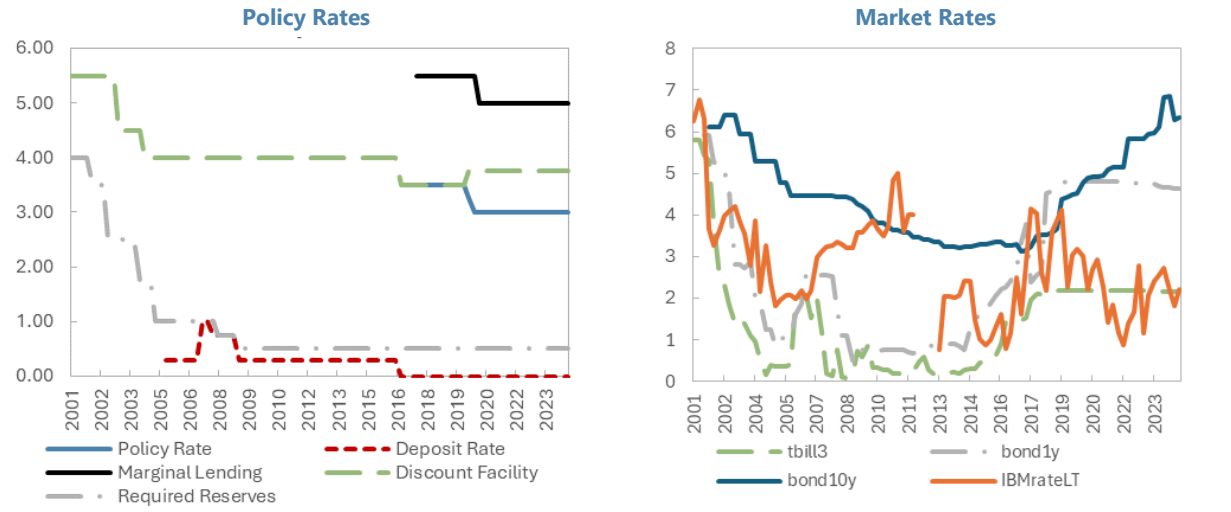
Sources: Bank of Algeria; IMF staff calculation.

[3] Homepage of the "cadre reglementaire of the BA: https://www.bank-of-algeria.dz/cadre-reglementaire-2/

directeur" introduced in 2017,[4] the discount rate and the effective interest rates from the various open market operations mentioned above. The exchange rate has occasionally been used to contain price pressures, a policy that is easily implemented due to the price-maker status of the BA on the forex market.

7. As an intermediate objective, the BA de facto targets M2 growth by adjusting the reserve requirement ratio and actively managing bank liquidity with open market operations. Although the monetary policy framework in Algeria has not established an explicit quantitative target for money supply growth, the structural liquidity of the banking system is a key driver of monetary policy implementation. To achieve its implicit objective of 8-10 percent M2 growth and balanced liquidity supply, the BA has predominantly relied on a combination of open market operations and adjustments of the reserve requirement ratio along with foreign exchange interventions.[5] Despite the introduction of the policy rate ("taux directeur") in 2017 and continuous publication of the discount rate ("taux de reescompte") since 2002, policy interest rates in Algeria play a little role and have been left unchanged for most of the time (Figure 4 panel 1).

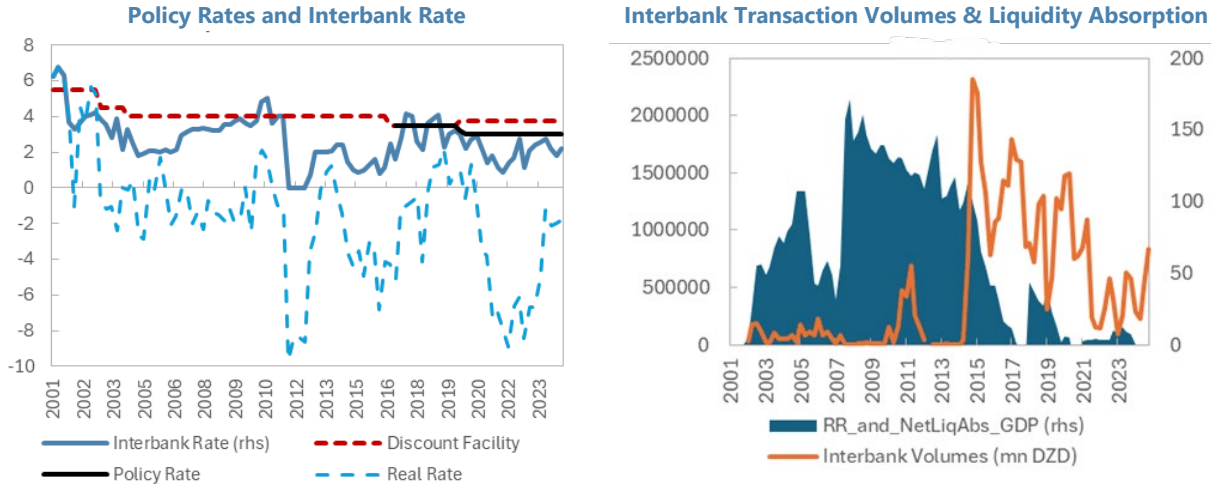
Figure 4. Interest Rates and Bank Liquidity



[4] The "taux directeur" is the target interest rate of the main, seven-day refinancing facility, continuously published on the BA homepage.

[5] The BA operates a managed floating exchange rate regime and sets the external value of the currency as main supplier in the interbank FX market. The BA targets a medium-term equilibrium REER based on an empirical model, while day-to-day transactions occur within a narrow buy/sell band (currently set at DZD 0.015 per USD).

Figure 4. Interest Rates and Bank Liquidity (concluded)



Sources: Bank of Algeria; IMF staff calculations.

8. While price stability is the ultimate objective of monetary policy in Algeria, the new Monetary and Banking Law (MBL), states several objectives for the BA. The 2023 MBL states four main objectives of the BA: (i) ensure price stability, (ii) create and maintain the most favorable conditions for sustained economic development, (iii) ensure monetary and financial stability to safeguard the safety and soundness of the banking system and finally, and (iv) support financial inclusion.[6] The MBL has also reorganized the institutional framework of the BA and introduced new monetary policy instruments, including the formalization of an emergency liquidity assistance framework (ELA) to support banks that are solvent but in liquidity stress, and the issuance of central bank bills as a liquidity-absorbing instrument.[7] Both of which are work in progress. Once implemented, they support macro-financial stability, improve the interbank market and manage the structural asymmetry of the system. These reforms can therefore enhance the BA's capacity to implement more effective monetary policies, potentially paving the way for an interest rate-based framework in the future.

9. The MBL allows monetary financing with limited guardrails. According to MBL, the BA is allowed to provide advances to the treasury for up to 240 days within one calendar year and within the limit of 10 percent of state revenues in the previous financial year. In "exceptional and unpredictable crisis," there is no limitations or safeguards to the provision of advances to the treasury.

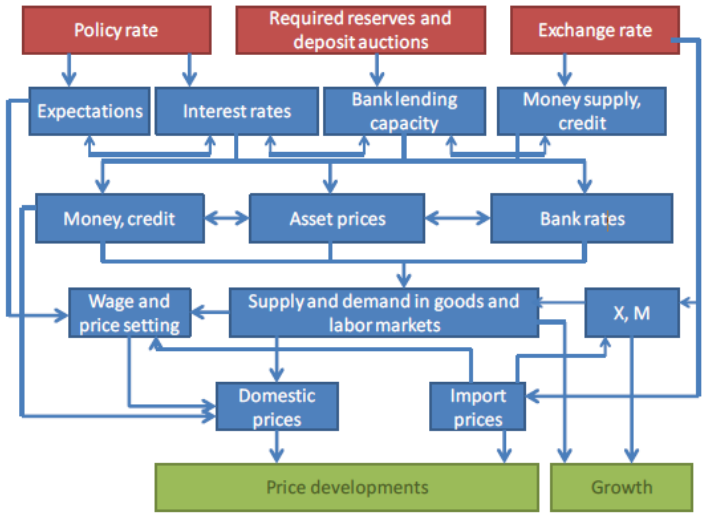
[6] Article 35 of « Loi n° 23-09 du 3 Dhou El Hidja 1444 correspondant au 21 juin 2023 portant loi monétaire et bancaire ».

[7] Articles 43-47 of the new Monetary and Banking Law.

Monetary Policy Transmission Channels

10. There are five monetary policy transmission channels typically identified in the literature.[8] These are (i) the expectations channel, (ii) the interest rate channel, (iii) the credit channel, (iv) the exchange rate channel, and (v) the asset price channel (Figure 5).

Figure 5. Monetary Policy Transmission Channels



Source: IMF 2014 SIP: Enhancing the effectiveness of monetary policy in Algeria

- **The interest rate channel.** Changes in the BA policy rates ("taux directeur", discount rate, standing facilities rates) should affect the money market interest rates (T-bills and interbank rate) and therefore the funding cost of banks. This should be reflected in retail lending and deposit rates, impacting aggregate demand and prices. However, T-bills are not marketed, and the policy interest rates are stagnant in Algeria for over seven years, which makes them ineffective as monetary policy transmission channel. The interbank interest rates tend to be the most reactive and representative of the monetary policy stance (Figure 4 panel 1 and 2). However, the interbank market rates do not consistently follow the policy rates. Long periods of excess liquidity and BA absorption facilities at very low rates have suppressed the market and led to interbank rates that are structurally below the policy rates and negative in real terms (Figure 4 panel 3). A deepening of the interbank market and BA's liquidity operations within a narrow policy rate corridor would support the interbank market relevance.

- **The credit channel.** This channel captures the effects of changes in money supply through reserve requirements and BA's liquidity management (volume of liquidity absorption or injection). This channel should influence banks' reserves and hence their lending capacity and

[8] Reference literature includes Bernanke and Gertler (1995), Mishkin (1995), Mishra and others (2012), Mishra and Montiel (2013). Mishkin (1995): Symposium on the monetary policy transmission mechanism.

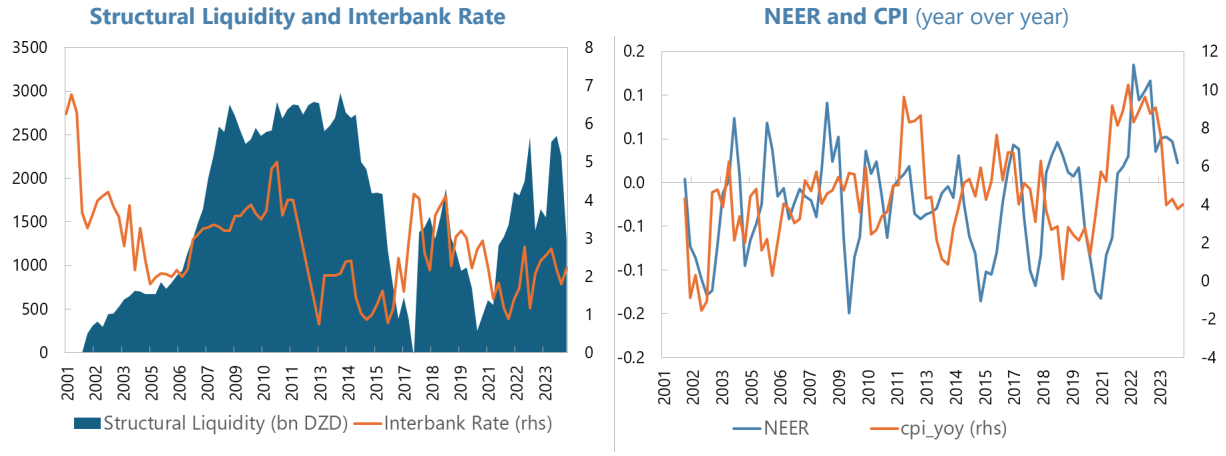
credit supply to the economy and the government. As the BA is focused on money supply growth and actively manages the bank liquidity, this channel is the most promising for effective monetary policy transmission in Algeria. Occasionally decreases in structural liquidity are associated with increases in interbank market rates and vice versa, suggesting that the BA's liquidity management might have the intended effect on money market rates. However, a significant share of Algeria's loans by public banks profit from subsidized rates and therefore reduce the effectiveness of the credit transmission (Figure 6 panel 1).

- **The exchange rate channel.** This reflects the transmission of changes in the exchange rate to net foreign assets (NFA) and domestic prices. As the money supply is largely dominated by NFA, monetary policy might be effectively transmitted through the exchange rate. The positive pass-through to inflation has the potential to impact aggregate demand, but due to tight price controls, the channel is potentially limited in Algeria (Figure 6 panel 2).

- **The asset price channel.** Interest rates affect bond prices, real and financial assets through the changes in the discounting rate leading to valuation changes, and the cost of mortgages. However, this effect is severely limited in Algeria as there are no notable capital markets or secondary markets for fixed income securities.

- **The expectation channel.** Changes in monetary policy actions also affect the expectations of economic agents about future economic conditions, which in turn alter their spending and investment decisions. This effect is difficult to measure in Algeria due to a lack of survey data and no regular communication of monetary policy decisions from the BA.

Figure 6. Transmission on the Interbank Rate, the Exchange Rate, and Inflation



Sources: Bank of Algeria; IMF staff calculations.

B. Empirical Analysis of the Monetary Policy Transmission in Algeria

11. We first investigate the channels of monetary policy transmission in Algeria using bivariate and trivariate VARs. We build on the approach in the 2014 SIP,[9] using bivariate VARs to measure the effect of the three policy instruments: (i) liquidity management tools, (ii) policy interest rates, and the (iii) exchange rate on the two intermediate transmission channels of market interest rates and credit creation and subsequently the final targets of inflation and real non-hydrocarbon GDP growth. Additionally, we apply a trivariate VAR between the exchange rate, net foreign assets and inflation. To identify significant relationships between the variables, we test for Granger causality using VARs with four lags. Our sample is quarterly data over Q2 2002 to Q4 2024. We test the relationship between the following policy, intermediate, and final target variables:[10]

Policy Variables:

- *(i) Liquidity management tools*: required reserves (log-difference: ld_rreserv), net liquidity injections: injections minus absorptions (percentage change: dl_netliquid), net liquidity management: the sum of required reserves and net liquidity absorptions (percentage change: pc_RR_and_NetLiqAbs).
- *(ii) Interest rates*: discount rate (change in: d_discrate), effective open market interest rate[11] (change in: d_OMRcombo).
- *(iii) Exchange rate*: nominal effective exchange rate (log-difference: ld_NEER).

Intermediate Transmission Channel:

- *Market interest rates:* change in the 3-month T-bill (d_tbill3), 6-month T-bill (d_tbill6), 3-year government bond (d_bond3y), 10-year government bond (d_bond10y), overnight interbank rate (d_IBMrate24h) and the medium-term interbank rate (d_IBMLT).
- *Credit creation:* credit to the economy (log-difference: ld_credec), credit to the private sector (log-difference: ld_credpriv) and credit to the central government (log-difference: ld_credCGALL).

Final Targets:

- Inflation: year-over-year CPI (change in: ld_cpi_yoy).
- Change in real non-hydrocarbon GDP (log-difference: ld_PIBreeelHH).

[9] IMF 2014 SIP: Enhancing the Effectiveness of Monetary Policy in Algeria.

[10] All variables are stationary; amounts are in log-differences or percentage changes and interest rates are first-differenced.

[11] The effective open market interest rate is the seven-day auction rate at which the BA absorbs or injects liquidity.

12. We complete the analysis with a recursive structural VAR with exogenous variables. We follow the standard recursive scheme, using Cholesky ordering with two lags and these variables in order: real non-hydrocarbon GDP growth, inflation, the nominal effective exchange rate, effective open market rate, net liquidity management. This embeds the Taylor-rule type monetary policy reaction function, and it considers the exchange rate to be used as a policy tool rather than a market-based price. The choice of the effective open market rate as the preferred policy interest rate and the net liquidity management as the preferred liquidity management tool, is based on the results from the bivariate VAR and follows the approach of the 2014 SIP. The exogenous variables in the model are the change in Algerian government expenditure to GDP, change in the brent oil price, change in the fed funds rate, change in the VIX12 and change in log-difference of EU GDP. Controlling for government expenditure and the oil price, reflects their importance in driving Algerian liquidity. In line with the literature, the VIX controls for global uncertainty, the fed funds rate for the us interest rates and the EU growth controls for external demand (WB 2024). Chow tests around the oil price shock (Taper Tantrum 2015) and the COVID-19 pandemic don't indicate structural changes to our variables.

Bivariate Analysis Results

Intermediate Transmission Channels

13. Estimations find that the BA's liquidity management tools have a significant impact on credit to the government but no significant effect on credit to the economy and the market interest rates. All liquidity management tools, the main instrument of BA's monetary policy, i.e., changing the reserve requirements or adjusting liquidity through open market operations have a significant effect on credit to the government (appendix table 3 and 4 and figure 1). The effect is relatively strong with a standard deviation increase in reserve requirements or liquidity absorptions, to reduce credit to the government between 2 and 4 percent. This highlights that liquidity management is the main policy instrument that the BA is applying. However, we couldn't measure a passthrough to credit to the economy and the private sector, and, more broadly, to market interest rates, highlights the dominance of the central government in the Algerian economy.

14. We find an effect of policy interest rates on government bonds but no measurable impact on credit to the economy. We find evidence of a significant but small effect of the discount rate on the 10-year government bond (appendix table 1 and 2). However, the effect is small, a standard deviation positive shock to the discount rate increases the 10-year bond rate by 0.06 percent. The most effective policy rate turns out to be the effective open market rate which has significant, albeit small positive effects on the 3-year and the 10-year bond. A standard deviation increase in the effective open market rate, increases the 3-year rate by 0.1 per cent and the 10-year rate by 0.05 percent after 4 quarters. This also highlights that the BA can steer market interest rates by executing open market operations with interest rates close to the targeted policy rate. We could, however, not find a measurable effect on the credit creation in the economy.

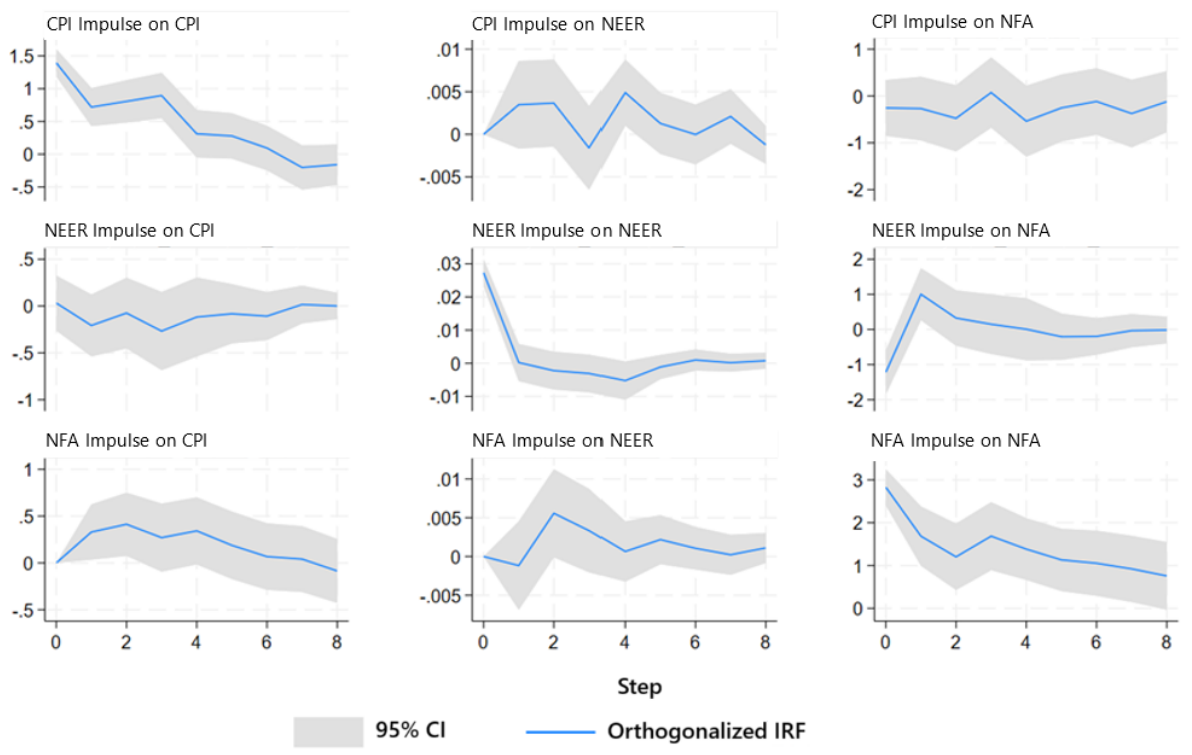
[12] Volatility of the US S&P 500 equity index

Final Targets

15. Our estimations find no significant relationship between the monetary policy instruments and inflation and real non-hydrocarbon growth. Our bivariate VAR analysis couldn't detect significant relationships between the BA's monetary policy instruments and the final targets of inflation and real non-hydrocarbon growth (Appendix Table 5). However, the investigated relationships are in the right direction albeit not significant. Furthermore, to establish true relationships among the relevant variables, we need to control for external shocks and interdependencies, with a multivariate system of structural VAR and exogenous variables as applied in our multi-variate analysis below.

16. We can find a significant effect of a shock to the nominal effective exchange rate on the net foreign assets in the economy. An appreciation of the exchange rate would therefore reduce NFA and liquidity in the system. A reduction of NFA can lead to lower inflation. While an appreciation of the exchange rate is associated with lower inflation, the effect is not s statistically significant (Figure 7 below).

Figure 7. Impulse-Response Functions of Exchange Rate, Inflation, and NFA



Source: IMF staff calculations.

Multivariate Analysis Results

17. Estimations find that the BA's liquidity management has the intended effect on inflation and the exchange rate while we cannot find a measurable effect on real growth; and the effects of open market interest rates are insignificant. Our empirical analysis finds that a standard deviation in net liquidity absorption (1.2 percent of GDP), leads to a reduction in inflation of 0.4 percent over the next 4 quarters (Figure 8). Net liquidity management also has a marginal but significant effect on the exchange rate. Most other relationships are in line with theoretical predictions but statistically insignificant. An increase in the effective open market interest rate decreases inflation[13] and real GDP. An increase in liquidity absorptions has the mentioned significant effect on inflation and the exchange rate but no effect on the real GDP. An appreciation of the exchange rate tends to reduce inflation and real GDP.

18. Overall, our findings suggest limited monetary policy transmission in Algeria. Results of the empirical investigation suggest that the interest rate channel of monetary policy transmission is weak, with no significant impact on inflation and growth. However, we find stronger evidence from liquidity operations, which affect inflation and the exchange rate, but not real growth. These results are robust to alternative specifications.[14]

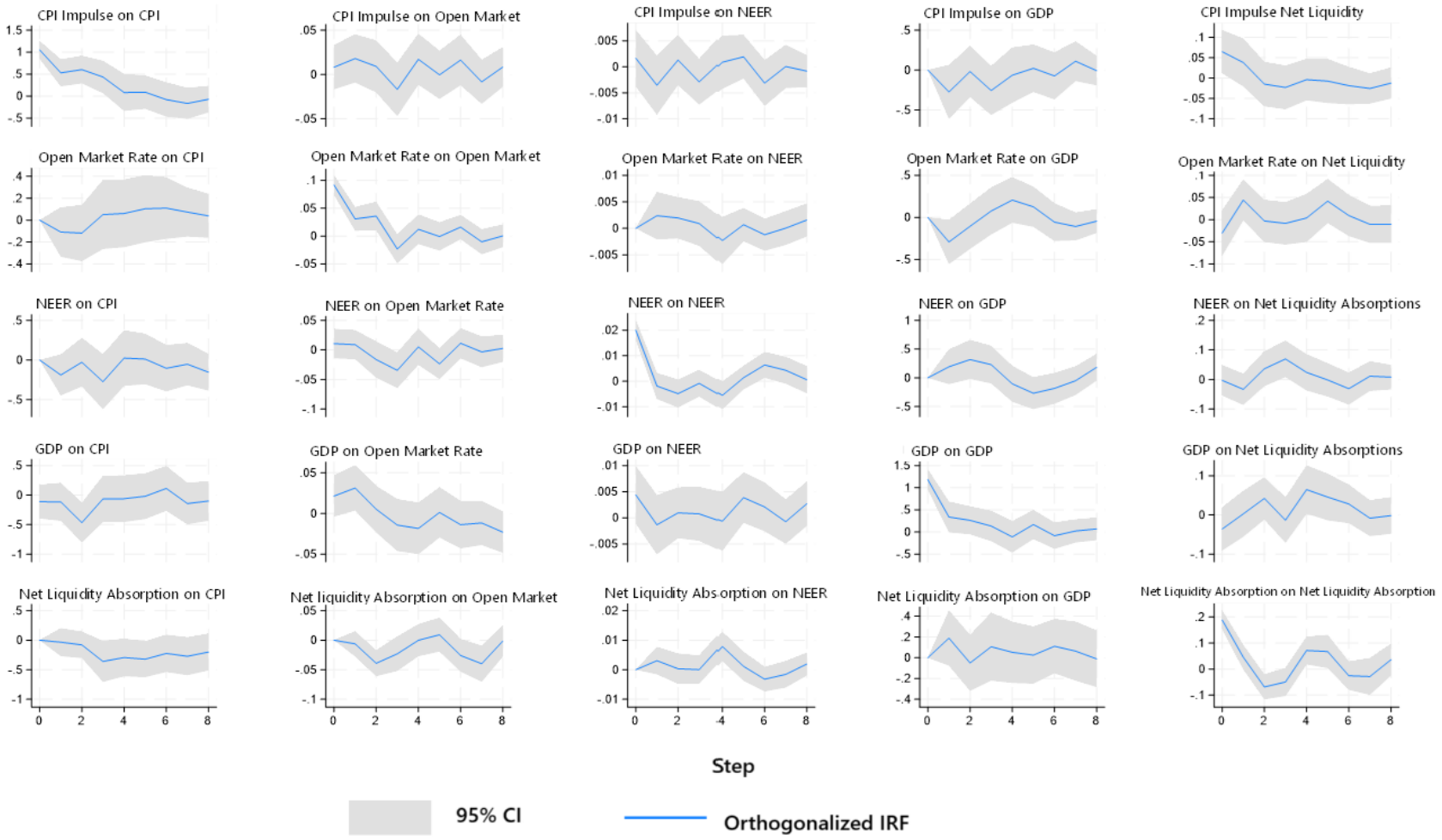
C. Structural Impediments to Monetary Policy Transmission in Algeria

19. The literature identifies structural impediments to monetary policy effectiveness in emerging and developing economies. Limited financial sector depth, underdeveloped credit and capital markets, an uncompetitive financial sector, inflexible exchange rate regimes, public sector dominance and excess liquidity conditions, all contribute to weak monetary policy transmission in a broad variety of countries (Mishra and Montiel (2012). These may explain the finding of a limited monetary policy transmission in Algeria.

[13] The literature in emerging market often finds a positive relationship between interest rates and inflation, the so-called price puzzle (WB 2014). When we use the standard specification with the discount rate, we also find the price puzzle, but by using the effective rates from open market operations, we get more consistent results.

[14] Alternative orderings do not change the results substantially. We also reproduced the 2014 SIP specification and a standard specification from the literature (WB 2024) not finding substantial differences.

Figure 8. Impulse Response Functions of Structural VAR for Monetary Policy Transmission



Source: IMF staff calculation.

20. Some specific characteristics and impediments to the effectiveness of monetary policy in Algeria may include the following:

- **Excess liquidity in the banking system reduces the effectiveness of interest rate adjustments**. Due to high hydrocarbon export revenues, the Algerian banking system experienced long periods of structural excess liquidity which reduced the effectiveness of monetary policy transmission (Saxegaard, 2006) and inhibited the development of effective interbank markets. Also, banks operate in an environment characterized by structural excess liquidity, primarily due to past fiscal injections, public sector financing through the central bank, and limited demand for credit. Since commercial banks rarely need to borrow in the interbank market or from the central bank, the role of the policy rate and its adjustments is weakened.

- **Underdeveloped financial markets limit the transmission of policy rate changes to the broader economy.** The Algerian financial system is mostly reliant on bank financing with a limited role for capital markets. In combination with low bank penetration, access to credit for private sector and households is limited. Therefore, market interest rates, credit availability and asset prices have a limited effect on inflation and real activity. The absence of instruments such as repos, Treasury bills, and commercial paper restricts the Bank of Algeria's ability to conduct effective open market operations and manage short-term liquidity.

- **The role of the interest rate channel is limited in Algeria.** The interest rate channel—the most direct mechanism for monetary transmission—is underutilized in Algeria. It has not had enough time to operate and serve as a credible reference rate as it has only been established in 2017, with one rate adjustment since. Additionally, banks do not actively adjust their lending and deposit rates in response to policy changes. The discount rate has been published since 2001 but with very few actual transactions taking place at that rate. The corridor between the deposit rate for excess reserves (currently at 0.5 percent) and the marginal lending rate (currently at 5 percent) is too wide to establish an interest rate channel that guides other market interest rates. Open market operations are often executed below the policy rates which resulted in an interbank rate consistently lower than the policy rate and real interest rates to be negative (Figure 4 panel 3).

- **Fiscal dominance can undermine the central banks independence and weaken the monetary policy transmission.** Unconventional deficit financing arrangements—such as the 2017-18 central bank financing and the 2021 special financing program—can lead to constraints on the central banks' ability to manage inflation and interest rates effectively, thereby undermining the central banks independence and monetary policy transmission.

D. Policy Implications

21. A comprehensive reform agenda is needed to address the above-mentioned impediments and improve the effectiveness of monetary policy. The 2023 LMB provides a good foundation, and the authorities are taking significant steps toward modernizing its monetary policy framework and enhancing the role of interest rates. Continued reforms are needed across financial

markets, liquidity operations, and central bank tools, central bank independence and transparency, as well as capacity-building efforts.

22. Managing excess liquidity and proactive absorptions at the policy interest rate help strengthen the interest rate channel of monetary policy. The BA should enhance its liquidity forecasting capabilities and regularly absorb excess liquidity in the banking system. Due to the asymmetric distribution of liquidity, bilateral absorptions are a useful tool. However, open market operations and bilateral liquidity absorption should take place at the policy rate as to direct lending conditions and market interest rates accordingly. Reliance on central bank financing should be curtailed, as it directly injects liquidity into the system and undermines monetary control.

23. Enhancing the role of market-based monetary instruments including a narrow and symmetric standing facility corridor around the policy rate will improve interest rate transmission. The interest rates of the two standing facilities, deposit rate (currently at 0.5 percent) and the marginal lending rate (currently 5 percent) should form a narrower +/- 2 percent symmetrical corridor around the policy rate (currently at 3 percent). The higher remuneration of excess reserves through the deposit facility would be transmitted to the economy. The implementation of the newly created ELA framework of the 2023 MBL will allow the BA to address any residual idiosyncratic situation of liquidity stress. Creating a clear interest rate corridor would allow market rates to converge around the central policy rate and anchor short-term rates more effectively and make the monetary policy stance clearer to financial markets.

24. Deeper and more diversified financial markets help transmit policy interest rates. The BA should continue to deepen the interbank market to help with the distribution of liquidity within the banking system. Also, the lack of a robust secondary market for government securities limits the central bank's ability to guide market interest rates. Establishing a benchmark yield curve through regular and transparent issuance of government bonds would provide reference rates across maturities, facilitating transmission of policy rate changes. Private sector and consumer credit should be encouraged accompanied by well-defined prudential rules while the use of cash in the economy should be curbed. Further progress on digital payment infrastructure would be welcome.

25. Further strengthening BA's independence, governance, and price stability mandate is essential including through the implementation of the MBL. The 2023 MBL grants the BA greater autonomy, a focused mandate on price stability, and improved governance structures. Establishing an independent monetary policy committee with transparent decision-making and published meeting minutes will further enhance policy accountability. Regular communication of monetary policy decisions builds credibility and helps to form expectations in the economy. The BA's ongoing efforts to expand the use of forecasting models and building with the intention to start regular communication on its monetary policy decisions is a step in the right direction.

Appendix I. Econometric Results

Table 1. Algeria: Bilateral Granger Causalities of Interest Rates on Credit Variables

Sample: 2003q1 thru 2024q4
Lags 4

Null Hypothesis:	Obs	Chi-sq	Prob
Credit to the economy does not Granger Cause Discount rate	86	13.43	0.009
Discount rate does not Granger Cause Credit to the economy	86	3.34	0.502
Credit to private sector does not Granger Cause Discount rate	86	14.64	0.001
Discount rate does not Granger Cause Credit to private sector	86	39.16	0.000
Credit to the government does not Granger Cause Discount rate	86	0.87	0.928
Discount rate does not Granger Cause Credit to the government	86	1.39	0.845
Credit to the economy does not Granger Cause Open market absorption rate	86	4.63	0.327
Open market absorption rate does not Granger Cause Credit to the economy	86	1.22	0.88
Credit to private sector does not Granger Cause Open market absorption rate	86	21.31	0.137
Open market absorption rate does not Granger Cause Credit to private sector	86	6.98	0.000
Credit to the government does not Granger Cause Open market absorption rate	86	5.39	0.249
Open market absorption rate does not Granger Cause Credit to the government	86	1.25	0.869
Credit to the economy does not Granger Cause Open market rate	86	3.53	0.473
Open market rate does not Granger Cause Credit to the economy	86	1.31	0.86
Credit to private sector does not Granger Cause Open market rate	86	17.33	0.002
Open market rate does not Granger Cause Credit to private sector	86	6.59	0.159
Credit to the government does not Granger Cause Open market rate	86	8.35	0.079
Open market rate does not Granger CauseCredit to the government	86	0.49	0.975

Source: IMF Calculations.
Note: Open market absorption rate: (change) in open market absorption rate average of short-lang-term
Open market rate: (change) in open market absorption and injections rate.
Credit to the economy: (log difference of) credit to the economy; Credit to private sector: (log difference of) credit to the private sector; Credit to the government: (log difference of) credit to the government.

Table 2. Algeria: Bilateral Granger Causalities of Policy Rates and Market Interest Rates

Sample: 2002q2 thru 2024q4
Lags 4

Null Hypothesis:	Obs	Chi-sq	Prob
3 months T-bill does not Granger Cause Discount rate	91	11.57	0.021
Discount rate does not Granger Cause 3 months T-bill	91	1.83	0.768
3 year bond does not Granger Cause Discount rate	70	0.40	0.983
Discount rate does not Granger Cause 3 year bond	70	7.77	0.100
10 year bond does not Granger Cause Discount rate	88	6.78	0.148
Discount rate does not Granger Cause 10 year bond	88	18.96	0.001
Overnight Interbank Rate does not Granger Cause Discount rate	53	2.57	0.633
Discount rate does not Granger Cause Overnight Interbank Rate	53	5.16	0.272
Long-term Interbank Rate does not Granger Cause Discount rate	82	1.06	0.900
Discount rate does not Granger Cause Long-term Interbank Rate	82	11.03	0.026
3 months T-bill does not Granger Cause Open market absorption rate	55	5.85	0.211
Open market absorption rate does not Granger Cause 3 months T-bill	55	6.07	0.194
3 year bond does not Granger Cause Open market absorption rate	39	0.86	0.000
Open market absorption rate does not Granger Cause 3 year bond	39	0.86	0.931
10 year bond does not Granger Cause Open market absorption rate	55	18.41	0.001
Open market absorption rate does not Granger Cause 10 year bond	55	13.41	0.009
Overnight Interbank Rate does not Granger Cause Open market absorption rate	35	2.51	0.642
Open market absorption rate does not Granger Cause Overnight Interbank Rate	35	1.58	0.812
Long-term Interbank Rate does not Granger Cause Open market absorption rate	42	1.09	0.896
Open market absorption rate does not Granger Cause Long-term Interbank Rate	42	2.00	0.735
3 months T-bill does not Granger Cause Open market rate	53	9.1995	0.056
Open market rate does not Granger Cause 3 months T-bill	53	3.654	0.455
3 year bond does not Granger Cause Open market rate	38	0.81696	0.936
Open market rate does not Granger Cause 3 year bond	38	34.251	0.000
10 year bond does not Granger Cause Open market rate	53	17.322	0.002
Open market rate does not Granger Cause 10 year bond	53	29.505	0.000
Overnight Interbank Rate does not Granger Cause Open market rate	24	2.5389	0.638
Open market rate does not Granger Cause Overnight Interbank Rate	24	0.243	0.993
Long-term Interbank Rate does not Granger Cause Open market rate	44	4.2317	0.376
Open market rate does not Granger Cause Long-term Interbank Rate	44	4.49	0.344

Source: IMF Calculations.
Note: Open market absorption rate: (change) in open market absorption rate average of short-lang-term
Open market rate: (change) in open market absorption and injections rate.
Credit to the economy: (log difference of) credit to the economy; Credit to private sector: (log difference of) credit to the private sector; Credit to the government: (log difference of) credit to the government.

Table 3. Algeria: Bilateral Granger Causalities of Liquidity Management on Interest Rates

Sample: 2003q2 thru 2024q4
Lags 4

Null Hypothesis:	Obs	Chi-sq	Prob
3 months T-bill does not Granger Cause Required reserves	87	0.61	0.96
Required reserves does not Granger Cause 3 months T-bill	87	0.63	0.961
6 months T-bill does not Granger Cause Required reserves	87	0.69	0.953
Required reserves does not Granger Cause 6 months T-bill	87	0.34	0.987
3 year bond does not Granger Cause Required reserves	87	2.65	0.618
Required reserves does not Granger Cause 3 year bond	87	2.71	0.607
10 year bond does not Granger Cause Required reserves	87	3.71	0.447
Required reserves does not Granger Cause 10 year bond	87	2.08	0.722
Overnight Interbank Rate does not Granger Cause Required reserves	87	11.06	0.026
Required reserves does not Granger Cause Overnight Interbank Rate	87	4.67	0.323
Long-term Interbank Rate does not Granger Cause Required reserves	87	5.35	0.028
Required reserves does not Granger Cause Long-term Interbank Rate	87	10.86	0.253
3 months T-bill does not Granger Cause Required Reserves & net liquidity absorptions	87	6.52	0.163
Required Reserves & net liquidity absorptions does not Granger Cause 3 months T-bill	87	3.80	0.434
6 months T-bill does not Granger Cause Required Reserves & net liquidity absorptions	87	1.31	0.86
Required Reserves & net liquidity absorptions does not Granger Cause 6 months T-bill	87	6.33	0.176
3 year bond does not Granger Cause Required Reserves & net liquidity absorptions	87	1.29	0.864
Required Reserves & net liquidity absorptions does not Granger Cause 3 year bond	87	2.71	0.608
10 year bond does not Granger Cause Required Reserves & net liquidity absorptions	87	1.29	0.862
Required Reserves & net liquidity absorptions does not Granger Cause 10 year bond	87	5.12	0.276
Overnight Interbank Rate does not Granger Cause Required Reserves & net liquidity absorptions	87	9.92	0.042
Required Reserves & net liquidity absorptions does not Granger Cause Overnight Interbank Rate	87	14.01	0.007
Long-term Interbank Rate does not Granger Cause Required Reserves & net liquidity absorptions	87	15.96	0.003
Required Reserves & net liquidity absorptions does not Granger Cause Long-term Interbank Rate	87	8.66	0.07

Source: IMF calculations
Note: Overnight Interbank Rate (difference) in overnight interbank market rate.
Long-term Interbank Rate (difference) in interbank market rate medium-term.
Required Reserves and net liquidity absorptions: (percent change) in required reserves and net liquidity absorptions.

Table 4. Algeria: Bilateral Granger Causalities of Liquidity Management on Credit Creation

Sample: 2003q2 thru 2024q4
Lags 4

Null Hypothesis:	Obs	Chi-sq	Prob
Credit to the economy does not Granger Cause Required reserves	87	0.84	0.933
Required reserves does not Granger Cause Credit to the economy	87	12.79	0.012
Credit to private sector does not Granger Cause Required reserves	87	1.11	0.481
Required reserves does not Granger Cause Credit to private sector	87	3.48	0.893
Credit to the government does not Granger Cause Required reserves	87	4.38	0.357
Required reserves does not Granger Cause Credit to the government	87	13.47	0.009
Credit to the economy does not Granger Cause Net liquidity injections	87	0.93	0.627
Net liquidity injections does not Granger Cause Credit to the economy	87	3.09	0.213
Credit to private sector does not Granger Cause Net liquidity injections	87	0.31	0.856
Net liquidity injections does not Granger Cause Credit to private sector	87	0.06	0.969
Credit to the government does not Granger Cause Net liquidity injections	87	2.13	0.272
Net liquidity injections does not Granger Cause Credit to the government	87	23.92	0.004
Credit to the economy does not Granger Cause Required Reserves & net liquidity absorptions	87	1.37	0.85
Required Reserves & net liquidity absorptions does not Granger Cause Credit to the economy	87	7.54	0.11
Credit to private sector does not Granger Cause Required Reserves & net liquidity absorptions	87	0.99	0.912
Required Reserves & net liquidity absorptions does not Granger Cause Credit to private sector	87	1.83	0.767
Credit to the government does not Granger Cause Required Reserves & net liquidity absorptions	87	3.01	0.557
Required Reserves & net liquidity absorptions does not Granger CauseCredit to the government	87	22.57	0.000

Source: IMF calculations
Note: Credit to the economy: (log difference of) credit to the economy; Credit to private sector: (log difference of) credit to the private sector; Credit to the government: (log difference of) credit to the government.
Required reserves: (log difference of) required reserves volume; Required Reserves and net liquidity absorptions: (log difference of) deposit auction volume. Net liquidity injections: (percent change) of liquidity injections.

Figure 1. VAR Impulse-Response Functions of Liquidity Management on Credit Creation

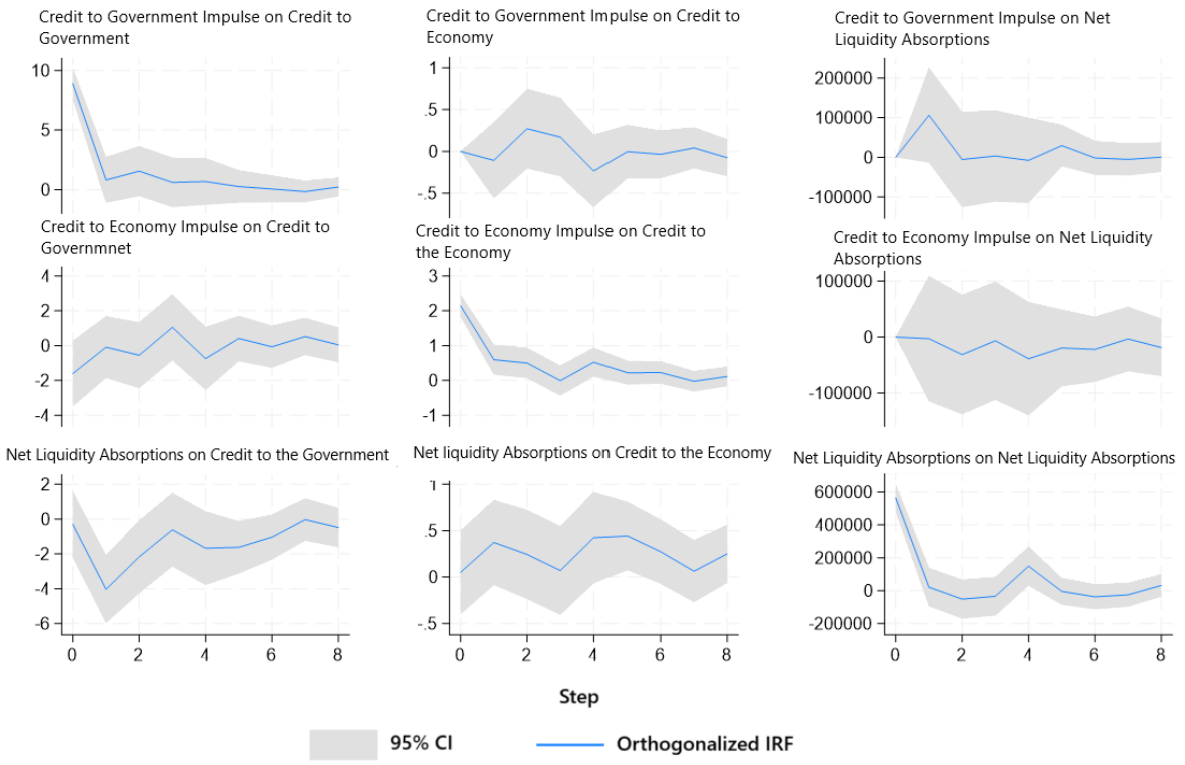


Table 5. Algeria: Bilateral Granger Causalities of Policy Variables on Final Targets, Growth and Inflation

Sample: 2002q2 thru 2024q4
Lags 4

Null Hypothesis:	Obs	Chi-sq	Prob
Inflation does not Granger Cause Discount rate	87	8.98	0.13
Discount rate does not Granger Cause Inflation	87	7.12	0.062
Inflation does not Granger Cause Open market rate	53	4.22	0.480
Open market rate does not Granger Cause Inflation	53	3.49	0.378
Inflation does not Granger Cause Required reserves	86	6.05	0.195
Required reserves does not Granger Cause Inflation	86	5.55	0.235
Inflation does not Granger Cause Net liquidity injections	85	0.64	0.959
Net liquidity injections does not Granger Cause Inflation	85	5.04	0.283
Inflation does not Granger Cause Required Reserves & net liquidity absorptions	86	0.47	0.976
Required Reserves & net liquidity absorptions does not Granger Cause Inflation	86	4.7649	0.31
Nonhydro GDP does not Granger Cause Discount rate	84	1.42	0.84
Discount rate does not Granger Cause Nonhydro GDP	84	2.63	0.622
Nonhydro GDP does not Granger Cause Open market rate	53	0.79	0.812
Open market rate does not Granger Cause Nonhydro GDP	53	1.58	0.94
Nonhydro GDP does not Granger Cause Required reserves	83	14.50	0.006
Required reserves does not Granger Cause Nonhydro GDP	83	4.37	0.358
Nonhydro GDP does not Granger Cause Net liquidity injections	82	2.26	0.689
Net liquidity injections does not Granger Cause Nonhydro GDP	82	8.59	0.072
Nonhydro GDP does not Granger Cause Required Reserves & net liquidity absorptions	83	2.22	0.001
Required Reserves & net liquidity absorptions does not Granger Cause Nonhydro GDP	83	7.85	0.097
Inflation does not Granger Cause NEER	87	11.25	0.024
NEER does not Granger Cause Inflation	87	3.89	0.421
Inflation does not Granger Cause Nonhydro GDP	84	3.08	0.545
Nonhydro GDP does not Granger Cause Inflation	84	4.16	0.385
Inflation does not Granger Cause NEER	87	11.25	0.024
NEER does not Granger Cause Inflation	87	3.89	0.421
NEER does not Granger Cause Nonhydro GDP	84	2.99	0.56
Nonhydro GDP does not Granger Cause NEER	84	0.07	0.999

Source: IMF calculations
Note: Non-hydro GDP: (log-difference) in Real non-hydrocarbon GDP
Credit to the economy: (log difference of) credit to the economy; Credit to private sector: (log difference of) credit to the private sector; Credit to the government: (log difference of) credit to the government.
Required reserves: (log difference of) required reserves volume; Required Reserves and net liquidity absorptions: (log difference of) deposit auction volume. Net liquidity injections: (percent change) of liquidity injections.

Table 6. Algeria: Bilateral Granger Causalities of Exchange Rate on NFA and Inflation

Sample: 2002q2 thru 2024q4
Lags 4

Null Hypothesis:	Obs	Chi-sq	Prob
NFA does not Granger Cause NEER	87	23.83	0.499
NEER does not Granger Cause NFA	87	3.36	0.000
Inflation does not Granger Cause NEER	87	11.25	0.024
NEER does not Granger Cause Inflation	87	3.89	0.421
NFA does not Granger Cause Inflation	87	7.03	0.134
Inflation does not Granger Cause NFA	87	3.29	0.511

Source: IMF calculations
Note: NFA: (log difference) in net foreign assets; NEER: (log difference) in nominal effective exchange rate; Inflation the annual headline inflation rate.

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