

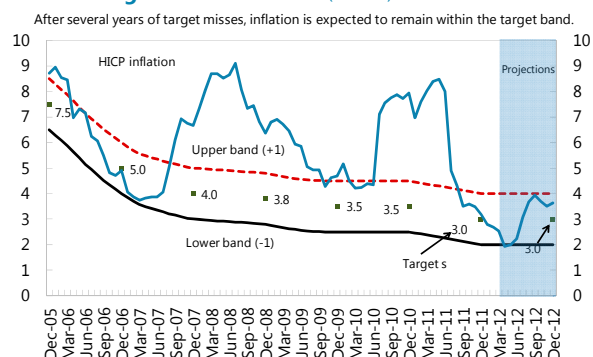
V. THE EFFECTIVENESS OF INTEREST RATE TRANSMISSION IN ROMANIA¹

1. **This note assesses the effectiveness of interest rate transmission in Romania and the factors that determine it.** A good understanding of the interest rate transmission mechanism is crucial for an inflation targeting regime that uses reference interest rates as its primary policy instrument. The Romanian banking system has a history of structural excess liquidity and deviations of money market rates from policy rates, prompting some observers to question the effectiveness of monetary policy. The analysis contributes to this discussion by, first, comparing the speed and magnitude of pass-through in Romania to other countries and, second, identifying factors that may determine its effectiveness.²

2. **Direct inflation targeting was introduced as a new monetary policy regime in Romania in August 2005.**

The inflation targeting framework gives the NBR sole responsibility for monetary and exchange rate policy. It targets a headline inflation rate around which an inflation band of ± 1 percentage points anchors expectations. Announcements of targets two years in advance emphasize the focus on medium-term developments. Romania's exchange rate regime is a managed float, consistent with using inflation targets as a nominal anchor.

Inflation Targets and Outcomes (Percent)



Source: Haver; and IMF staff estimates.

3. **The policy rate is the central bank's primary policy tool and determines the interest rates used in open market operations and the central bank's standing facilities.**

- **Standing facilities** aim to absorb and provide overnight liquidity. Interest rates on the NBR's lending and deposit facilities form a symmetrical corridor of ± 4 percentage points around the policy rate. The wide corridor allows money market rates to deviate from the policy rate, and makes the use of standing facilities costly relative to interbank transactions.
- **Open market operations** have been given the main role in managing liquidity and controlling short term interest rates since the introduction of inflation targeting.
- **Reserve requirements** have varied over time as well as between domestic and foreign currency bank liabilities and can in principle contribute to liquidity management.

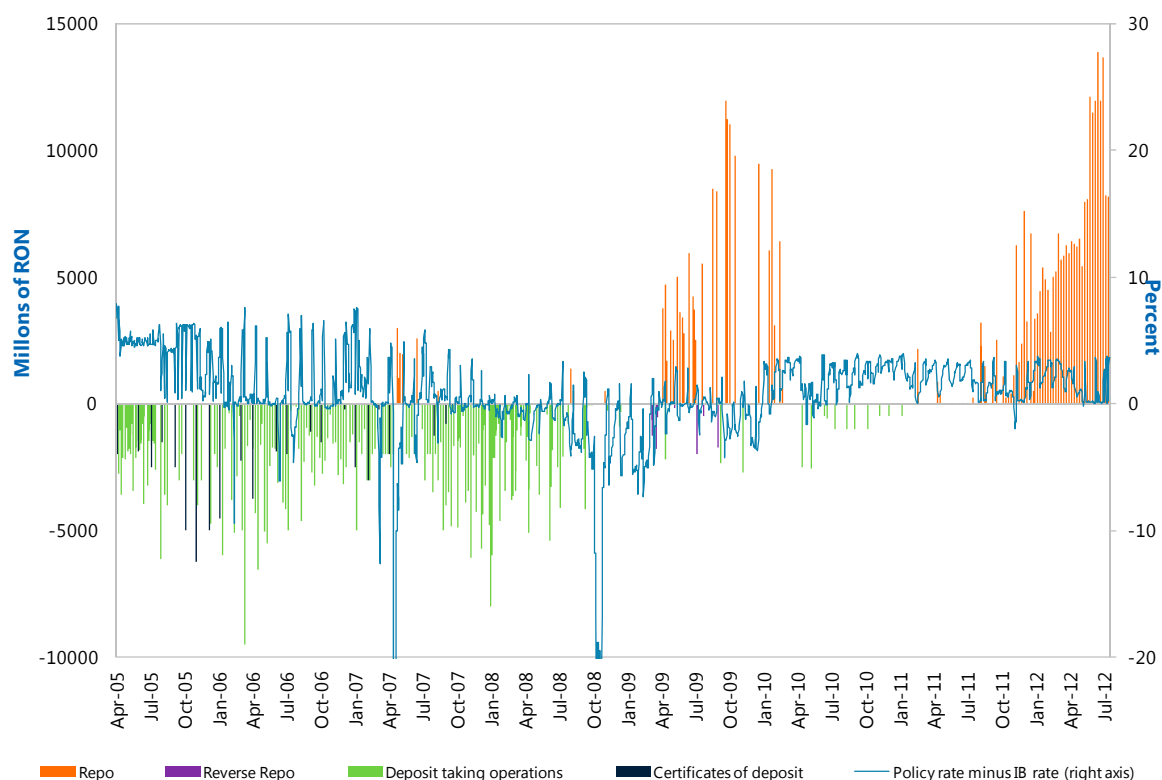
¹ Prepared by Christian Saborowski. Sebastian Weber contributed to the analysis in Section B.

² Data sources are described in the Appendix.

Interest is paid on reserves at varying rates depending on the asset's currency of denomination.

4. **The inflation targeting regime inherited a structural liquidity surplus in the financial system as a result of foreign reserves accumulation.** Since the end of the 1990s, foreign exchange inflows represented the NBR's most important money creation instrument. The NBR steadily accumulated foreign reserves while liquidity effects were only partly offset through absorbing open market operations. As a result, money market rates often deviated strongly from the policy rate (AntoŃi, Undrea, and Braun, 2003).
5. **The liquidity surplus turned into deficit during the global crisis but reappeared as funding strains eased.** Amid strong depreciation pressures the NBR intervened heavily in the foreign exchange market, draining liquidity at a large scale. Repo operations and changes in reserve requirements offset the liquidity effect partially. Liquidity conditions later improved despite further foreign exchange intervention. Most recently, banking sector fragmentation led to situations in which the NBR acted as a net lender to the system although money market rates signaled abundant liquidity in the system as a whole.

Monetary policy operations

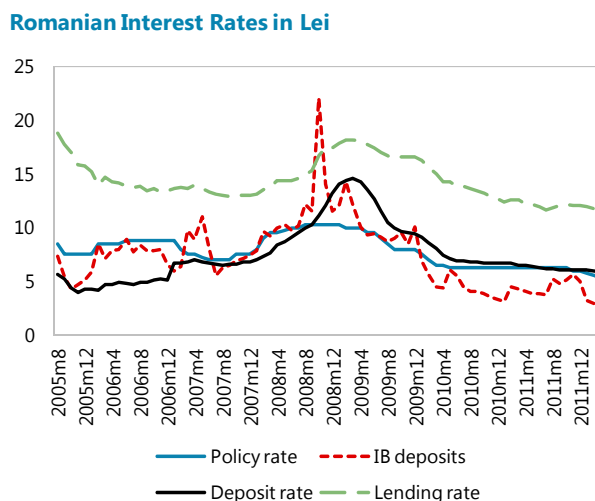


A. Interest Rate Pass-Through in Romania Under the Direct Inflation Targeting Regime

6. Pass-through from policy rates to retail lending rates can differ in speed and magnitude across countries. In a

developed financial system, a fall in the policy rate would normally be implemented through purchases of government securities or reduced deposit taking operations by the central bank. The resulting increase in commercial banks' excess reserves would affect the short-term money market rate and the amount of resources banks intermediate. As credit supply rises, the cost of finance for the non-bank sector falls. As a result, both retail lending and deposit rates across the yield curve drop, starting from short

maturities. As central banks operate at the lower end of the yield curve, a change in the policy rate typically translates into an almost immediate change in the interbank rate.³ Pass-through to retail lending rates can be delayed and incomplete and may vary greatly across countries (Mishra et al, 2010).



7. **We assess the speed and magnitude of pass-through in Romania in a simple two-variable setup in which interbank and retail lending rates are modeled as functions of the policy rate.** The analysis uses monthly data for the period 2005M8–2012M4. An appropriate econometric specification must take account of the dynamic nature of the relationship and allow for lagged responses of market rates to policy changes. Moreover, the order of integration of the interest rate data is central: while pre-inflation targeting data indeed suggests a cointegrating relationship between policy and market rates (Tieman, 2004), standard tests mostly reject this hypothesis in the period covered in this note.⁴

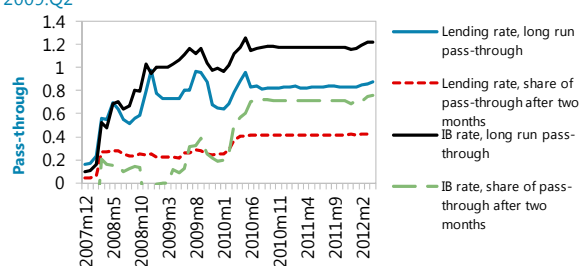
8. **We choose an Autoregressive Distributed Lag (ARDL) model in first differences as a first approximation of the data.** Market rates are modeled as functions of the policy rate and three lags of both variables. This specification allows for a dynamic relationship between the interest rate series and is appropriate as long as policy rates are largely

³ The crisis has shown that this is not the case when the bank lending channel is weakened.

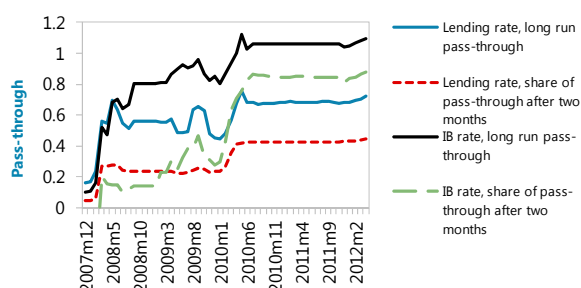
⁴ Interest rates are sometimes found to be non-stationary in transition economies where they exhibit a declining trend. If a cointegrating vector exists, non-stationary modeling techniques are appropriate.

exogenous to movements in market rates. It is then straightforward to calculate both short- and long run impacts. We first estimate the pass-through from policy to money market rates and subsequently to retail lending rates. To the extent that long-run pass-through is complete, we would expect a one percent increase in the policy rate to be reflected in a one percent increase in the respective market rate.

Long- and Short Run Pass-Through: ARDL Model
Rolling Regressions not Controlling for 2008:Q2-2009:Q2



Long- and Short Run Pass-Through: ARDL Model
Rolling Regressions Controlling for 2008:Q2-2009:Q2



9. **Results suggest that long-run pass-through to money market rates is close to complete, but policy impulses are transmitted slowly.** We used the ARDL model to calculate pass-through to market rates in rolling regressions to help understand whether estimates changed over time. The preferred specification controls for the height of the global crisis.⁵ Pass-throughs for a given date are estimated based on the sample period up to that point.⁶ The results suggest that long-run pass-through to money market rates was initially below 80 percent but has since been close to one. The speed of transmission also improved but continues to be low: in the early years, only a third of the total pass-through was reflected in interbank rates within the first two months. Later, short term pass-through reached about 80 percent of the total.

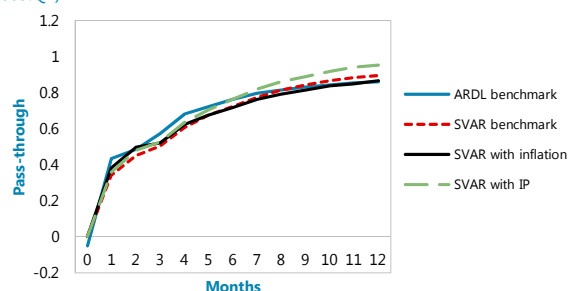
10. **Pass-through to lending rates was initially weak but now compares well to other emerging markets.** The estimation suggests that pass-through to lending rates reached over 70 percent for the period as a whole, placing Romania above the median emerging markets according to most studies on the matter (e.g. Medina Cas, 2011; Mishra et al, 2010). Short-run pass-through, on the other hand, is found to be low in the early years of inflation targeting—just above 20 percent of the total—and increases to a moderate 60 percent of the total in later years. We also experimented with Structural vector autoregression (SVAR) specifications that allow us to explicitly control for factors such as inflation and economic activity in the regressions as well as to relax the assumption that the policy rate is strictly

⁵ We include a dummy for the period 2008Q4-2009Q2 in the regression as well as interactions of the dummy with the policy rate and all its lags.

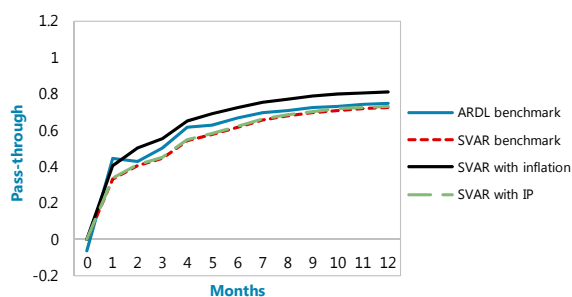
⁶ The initial sample window for the 2007M9 estimates starts in August 2005 and thus contains 24 observations. For the subsequent periods, one more data point at a time is added to the sample.

exogenous to market rates.⁷ The results do not change markedly and suggest that our findings are relatively robust to these specification changes.

Robustness: ARDL and SVAR Specifications
Lending Rate Response (Not Controlling for 2008:Q2-2009:Q2)



Robustness: ARDL and SVAR Specifications
Lending Rate Response (Controlling for 2008:Q2-2009:Q2)



B. What are the Factors that Determine the Effectiveness of Interest Rate Transmission?

11. **We proceed to identify factors that determine the effectiveness of interest rate transmission in a large cross-country panel.** The country sample was chosen based on the availability of monthly interest rate data for the period 2000–11. The analysis uses a structural cross-country panel VAR augmented by interaction terms. The technique allows estimating impulse response functions for lending rates to changes in policy rates and evaluating these at different percentiles of the distribution of given country characteristics (Towbin and Weber, 2011).⁸ We have thus identified a variety of factors relevant to Romania that appear to determine pass-through across countries and time periods.

12. **We find that a strong policy mandate is associated with more effective transmission, flanked by a high-quality overall regulatory environment and a healthy and well developed financial system.** The analysis suggests that a variety of factors condition the effectiveness of interest rate transmission. These include the degree of exchange rate flexibility, the quality of the regulatory environment, financial dollarization and development as well as banking sector health, concentration and excess liquidity. In this regard, Appendix Figure compares impulse responses at the lower and upper quartiles of each of the relevant country characteristics and tests whether differences in magnitudes are statistically significant. We proceed to discuss the intuition behind each of the individual factors we identified.

⁷ We use a Choleski ordering to identify the impulse response functions in which policy rates (inflation/industrial production) are contemporaneously exogenous to lending rates (both types of interest rates).

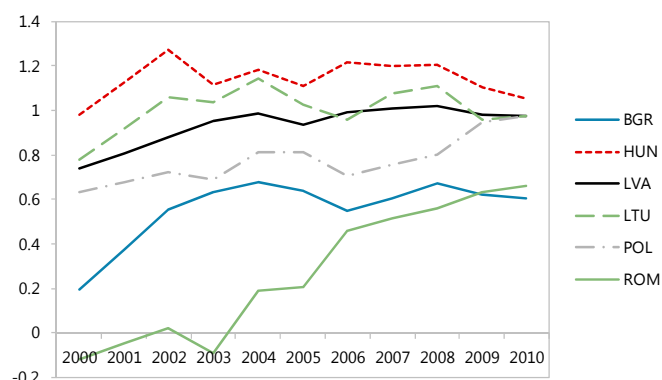
⁸ Impulse response functions are identified by way of the same Choleski ordering as in the Romania specific example in the previous section.

13. **Interest rate transmission is effective when policy rate changes are perceived as strong signals for the central bank's monetary policy stance.** The central bank's control over market rates is likely to be tighter when policy rates are set as part of a transparent and rules based framework that is largely independent of fiscal and exchange rate policy. A lack of exchange rate flexibility, for instance, may signal that the policy rate is not the primary monetary policy tool. Indeed, pass-through appears to be significantly higher in countries with flexible exchange rate regimes (Appendix Figure). In Romania, the NBR has sole responsibility for the conduct of monetary and exchange rate policy, and the policy rate is its primary policy instrument. While reserve accumulation often complicated monetary policy making, the NBR used open market operations extensively in an effort to bring money market rates close to policy targets and emphasize the signaling function of the policy rate.

14. **A weak overall regulatory environment increases the cost of financial intermediation, making market rates less responsive to policy changes.** A poorly functioning regulatory environment creates uncertainty in the financial system and can lead to a deformatization of financial transactions and a higher cost of financial intermediation. As a result, bank rates become less sensitive to changes in the policy rate.

In fact, the small size of financial intermediation in many developing

World Bank Regulatory Quality Index



economies is likely related to a weak regulatory environment (Mishra, et al., 2010). The Appendix Figure illustrates that a weak regulatory environment is indeed associated with lower pass-through. Romania has improved its score on the World Bank index of regulatory quality but room for improvement exists.

15. **In highly dollarized financial systems the central bank has only limited control over market interest rates in local currency.** The cost of foreign currency funds is linked to external factors that are mostly outside the control of the central bank. To the extent that financial market participants can choose between domestic and foreign currency instruments, the policy rate can thus have only partial control over market interest rates (Appendix

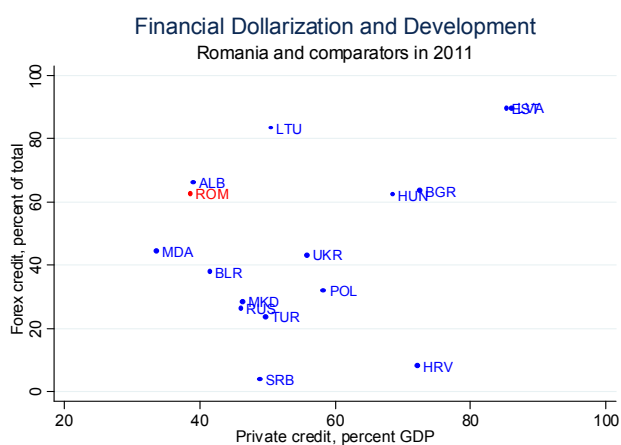
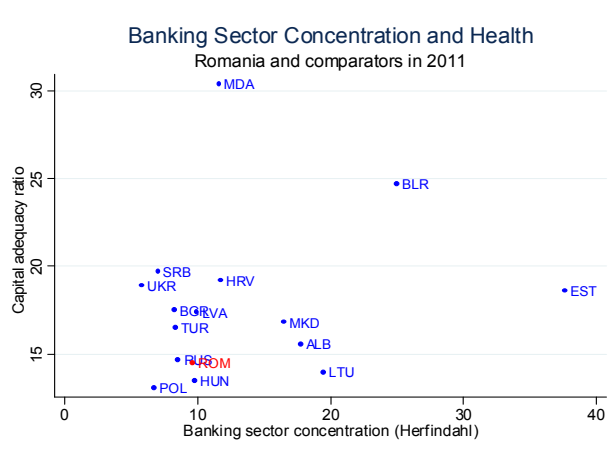


Figure). Moreover, a high degree of dollarization makes bank balance sheets vulnerable, leading to a fear of floating that can be detrimental for effective interest rate transmission (Leiderman et al, 2006). In Romania, two thirds of private loans and one third of deposits are denominated in foreign currency.⁹

16. Market interest rates in developed financial systems are more responsive to policy rate changes as these offer a larger variety of alternative forms of investment.

Deeper financial markets are associated with increased competition between financial products. Market interest rates are thus more responsive to policy rate changes because profit margins are constrained (Cottarelli, et al., 1994). A lack of financial development is also an important source of dollarization (Leiderman et al., 2006), and a weak interbank market can lead to excess liquidity (Mishra et al, 2010). Excess liquidity, in turn, weakens interest rate transmission because policy rate changes are unlikely to cause movements in credit supply when liquidity is abundant. Indeed, the

Appendix Figure illustrates that both shallow financial markets and excess liquidity in the banking system are associated with less effective interest rate transmission. While Romanian markets have deepened in recent years, equity and bond markets remain shallow and long term investment opportunities are scarce. With a private credit to GDP ratio just below 40 percent, Romania continues to lag behind most of its peers. Excess liquidity in the banking sector is a well-known and periodically re-occurring phenomenon in Romania.



17. When banks have substantial market power, policy rate changes may translate into movements in spreads rather than market rates. Imperfectly competitive financial systems are often characterized by a small number of relatively large banks, an important role for government-owned banks and a weak role for nonbank financial intermediaries. Market power allows banks to expand profit margins in response to a fall in the policy rate rather than increasing the supply of loans and passing the price change on to consumers. The analysis indeed finds that pass-through is substantially higher when the banking sector is well diversified (Appendix Figure). In Romania, most banks are privately owned, and the banking system is relatively diversified compared to its peers.

⁹ The drivers of dollarization have been well documented and include, primarily, the interest differential, the lack of a long term yield curve in Lei, easy funding in euros from parent groups, and expectations of euro convergence.

18. **Banks with weak balance sheets may react to an expansive monetary policy stance by shoring up liquidity rather than extending credit at lower rates.** Financially weak banks may use additional liquidity to increase buffers and capital positions. A change in the policy rate may thus have a very limited impact on market rates. In essence, potential new loans are crowded out by the presence of bad loans on the balance sheet. Indeed, the analysis shows that a healthy banking system is associated with stronger pass-through (Appendix Figure). The Romanian banking system has kept solid capital buffers throughout the financial crisis but NPLs are sizable and have continued to rise in recent months.

C. Conclusion

19. **Interest rate transmission in Romania compares well to other emerging markets although policy signals are reflected rather slowly in market rates.** A one percentage point increase in the policy rate translates one for one into money market rates in the long run, and into a 0.7 percentage point increase in the retail lending rate. This places Romania above the median in a comparison with other emerging market economies. However, transmission to both money market and retail lending rates is slow, with only 60 percent of the overall pass-through to lending rates showing up during the first two months following the policy change.

20. **A more developed and better regulated financial system could alleviate dollarization and provide for more effective interest rate transmission.** Countries with effective interest rate transmission are those with a strong monetary policy mandate, a good regulatory environment and a well developed and healthy financial system. While the monetary policy framework in Romania is strong, financial markets remain shallow compared to most of its peers, are highly dollarized and prone to incidences of excess liquidity. Going forward, the authorities should continue to build credibility through transparent and rules based policy making, including by avoiding excessive intervention in foreign exchange markets. Moreover, efforts should be made to deepen equity and bond markets and raise investor interest in the Romanian economy by adopting legislation as needed to promote financial sector development and improving regulatory quality in the economy as a whole. The diversification of the banking sector in recent years is a welcome development, but the authorities should remain watchful to improve banking sector health and act forcefully to clean up deteriorating balance sheets should NPL ratios continue to increase.

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Data sources:

Variable	Source
Repo operations	National Bank of Romania
Reverse repo operations	National Bank of Romania
Deposit taking operations	National Bank of Romania
Certificates of deposit	National Bank of Romania
Policy interest rate	National Bank of Romania
Interbank deposit rate	National Bank of Romania
Retail lending rate	International Financial Statistics
CPI inflation	International Financial Statistics
Real GDP growth	International Financial Statistics
Loan dollarization	International Financial Statistics
Exchange rate flexibility	Reinhart and Rogoff (2004)
Regulatory quality	World Bank Governance Indicators
Private credit to GDP	World Development Indicators
Liquid reserves to total assets	World Development Indicators
Banking sector concentration	Bank Scope

Appendix Figure: Impulse response functions evaluated at lower (upper) quartile