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EXCHANGE RATE AND ECONOMIC GROWTH NEXUS—A STRUCTURAL MODEL TO ASSESS THE TRADE AND FINANCIAL CHANNELS[1]

Conventional models predict that real currency appreciation impedes growth due to expenditure switching away from domestic to foreign goods. But in emerging market economies with large foreign currency debts, the linkages between the exchange rate and economic growth are complicated by the financial channel, which can have an opposite effect on output. The ability of countercyclical monetary policy to curb excess demand is harder to assess under these circumstances, as currency appreciation reduces the domestic value of foreign currency debts, strengthens balance sheets and can therefore amplify the cycle. To better understand this policy trade-off, the paper estimates a small open economy model that allows quantifying the relative strength of the trade and financial channels in Romania, Hungary and Poland. The Bayesian results indicate that both the trade and financial channels are strongest for Romania, possibly due to the expansion of financial balance sheets and lower integration into global supply chains. For all countries, tighter domestic monetary conditions result in reduction of output and currency appreciation, albeit the magnitude of appreciation is less in Romania compared to peers. The trade channel is also dominant in the transmission of foreign monetary policy shocks, which result in output losses and currency depreciation.

A. Introduction

1. When foreign and domestic monetary conditions tighten, they are likely to affect Romania's exchange rate. At the current juncture, policy normalization is underway in the US while inflation in Europe has recently been picking up. Anticipated monetary tightening by major central banks could weaken local CESEE currencies, including Romania's. On the domestic front, underlying inflation and credit growth remain subdued but rising inflation in trading partners, tight labor market conditions, and the additional fiscal impulse are expected to put upward pressure on prices.[2] In light of these considerations, IMF staff has recommended in the 2017 Article IV consultation that the National Bank of Romania start tightening monetary conditions by raising short-term market interest rates and eventually raise the policy rate later this year.

2. The effectiveness of monetary policy for stabilizing purposes may be limited by a high degree of financial dollarization. Balance sheet dollarization, a distinguishing feature of many emerging market economies, can deepen output collapses during crises and have persistent effects on economic growth (Cerra and Saxena, 2008; Berkmen and Cavallo, 2010). When a large proportion of balance sheets is denominated in foreign currency, the financial system may not be sensitive to changes in domestic monetary policy (IMF, 2015a), giving rise "to multiple trade-offs among multiple objectives" (Obstfeld, 2015). In particular, monetary tightening and the resulting currency appreciation can have significant wealth effects on unhedged FX borrowers, which benefit from

[1] Prepared by Vlad Barnaure and Swarnali Ahmed Hannan. The authors would like to thank Nemanja Jovanovic for his excellent research assistance.

[2] See Romania's 2017 Staff Report.

carry trade (Carare and Popescu, 2011). As noted by Shin (2015), if the balance sheet effects are strong enough, the enhanced credit positions of borrowers can reinforce and amplify the economic and financial cycles, undermining the effectiveness of monetary policy. In addition to this financial stability concern, many central banks display a fear of floating due to the negative effect that currency appreciation has on export competitiveness (Obstfeld, 2015).

3. Against this backdrop, this paper investigates the relationship between the real exchange rate and growth, and how monetary policy shocks—both foreign and domestic—can influence it. A small-scale DSGE model is used to assess the two key channels through which exchange rate movements affect economic growth:

a. *The trade channel,* also known as the demand substitution effect or expenditure switching mechanism, captures the idea that a currency appreciation dampens economic activity by making exports more expensive and imports cheaper, thereby bringing about substitution of domestic production with imports.

b. *The financial channel,* also known as the balance sheet effect or risk-taking channel, captures the idea that a currency appreciation supports economic activity by lowering the value of foreign currency debts, resulting in an easing of financial conditions. The latter emanates from valuation effects that strengthen the balance sheets of unhedged FX borrowers. In an environment of asymmetric information where lenders measure the creditworthiness of debtors as a function of leverage, improved balance sheets reduce risk premia, enhance borrowers' debt servicing capacity and ease lending standards.

The two channels thus act in offsetting manner, with a currency depreciation leading to higher economic output due to the trade channel but lower output due to the financial channel. The net impact of currency depreciation on economic growth depends upon the relative strength of these two channels.

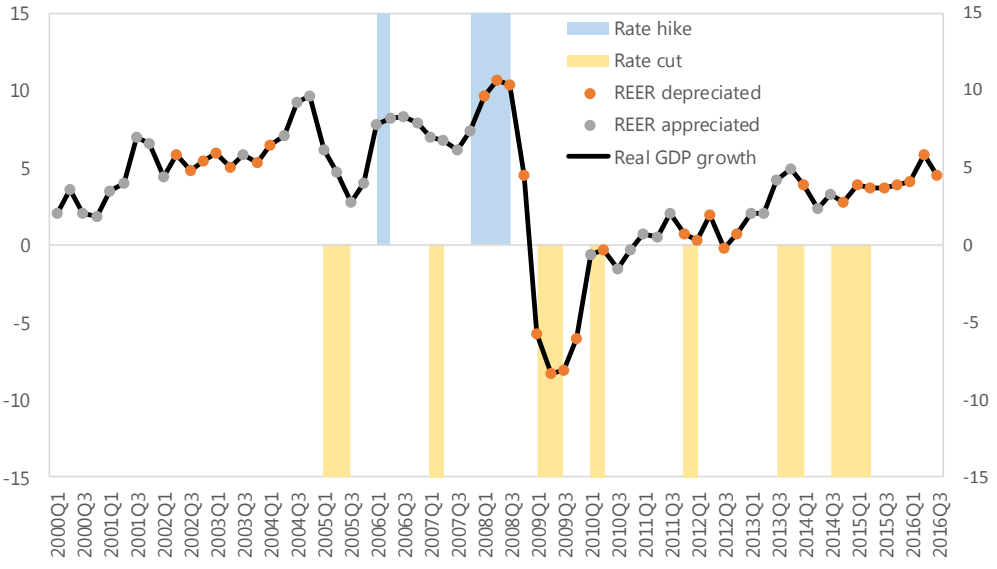
4. While several earlier studies have examined the real exchange rate-growth nexus using macroeconometric models, to the best of our knowledge, this is the first attempt to estimate a consistent DSGE model for Romania, Hungary and Poland. The paper thus helps not only to understand the strength of financial and trade channels in Romania, but also sheds light on the policy trade-offs from a cross-country perspective. The cross-country perspective helps to better understand the relative strength of the financial and trade channels compared to regional peers. This is useful information, particularly for understanding how global and domestic monetary shocks can impact Romania compared to its peers.

B. Stylized Facts — The Evolution of Exchange Rates and Economic Growth in Romania

5. Assessing the relationship between the real exchange rate and growth in Romania is not straightforward. Figure 1 shows the evolution of real GDP growth, with each quarter showing if the real effective exchange rate appreciated or depreciated. Romania went through a phase of strong economic growth as well as real effective exchange rate appreciation from 2004 until the beginning of global financial crisis (GFC). For other periods, there are episodes of both currency depreciation corresponding with improved real GDP growth as well as episodes of currency appreciation corresponding with improved growth. Based on this evidence, it is important to note that the relation between the two variables is endogenous, being influenced by the types of shocks that hit the economy and other structural considerations.

6. There was strong economic growth over previous monetary tightening cycles, with the currency appreciating in the first episode and depreciating in the second. The bars show quarters where the policy rate was either raised or reduced, starting from 2005 when the inflation targeting regime was adopted. There were two rate-hike episodes (blue bars in Figure 1). The rate hike in the first half of 2006 was associated with strong economic growth as well as currency appreciation. The second monetary tightening cycle, from late 2007 until late 2008, was accompanied by strong economic growth and currency depreciation.

Figure 1. Real GDP Growth and Exchange Rate Change
(Percent change, y-o-y)



Sources: IFS; and IMF staff calculations.

7. Summary statistics suggest that average real GDP growth is generally higher for quarters when the currency appreciated compared to the quarters when the currency depreciated (Figure 2). However, this is predominantly driven by the 2004Q1-2009Q4 period with the latter years, 2013Q1-2016Q3, showing that the average real GDP growth was higher during quarters with currency depreciation and negative during quarters with currency appreciation. A simple bivariate regression suggests that currency depreciation is associated with stronger growth before the global financial crisis (2000Q1-2006Q4), but the sign of the relationship is reversed starting 2009Q3.

Figure 2. Real GDP Growth
(Percent change, y-o-y)

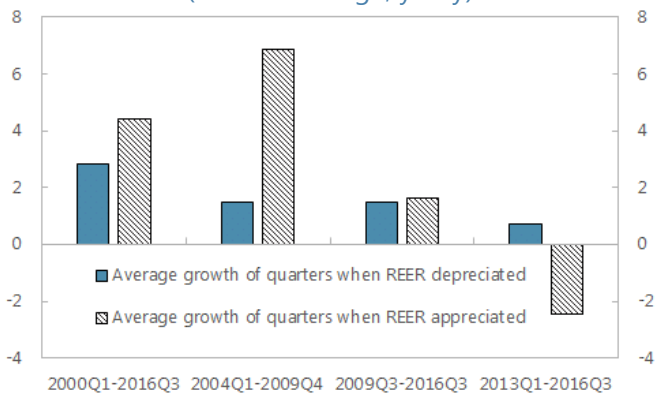
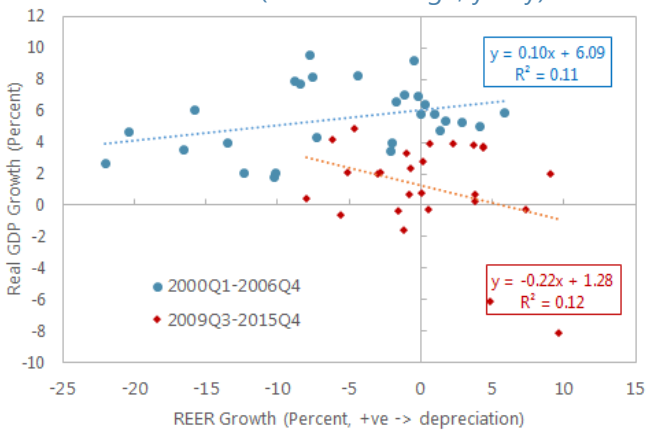


Figure 3. Economic Growth versus Currency Movement (Percent change, y-o-y)



Sources: IFS; and IMF staff calculations.

8. Broadly speaking, Romania's exchange rate-growth nexus is in line with the experience of other emerging markets (Figures 4 and 5). In particular, the period of 2004 until the start of the GFC is also marked with strong economic growth and currency appreciation when these indicators are averaged across key emerging markets. A simple bivariate regression between changes in the exchange rate and economic growth shows that currency depreciation is associated with less growth following the GFC—which is consistent with the evidence in Figure 3.

Figure 4. EM Real GDP Growth
(Percent change, y-o-y)

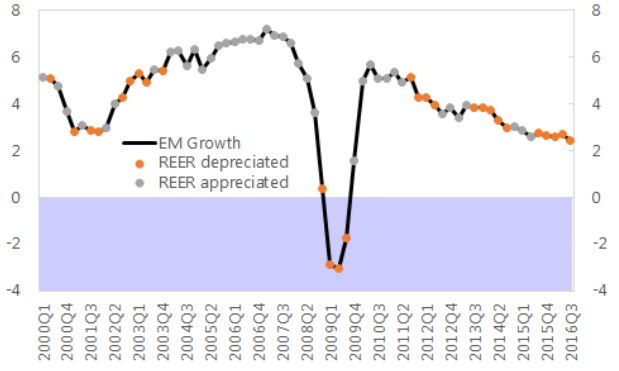
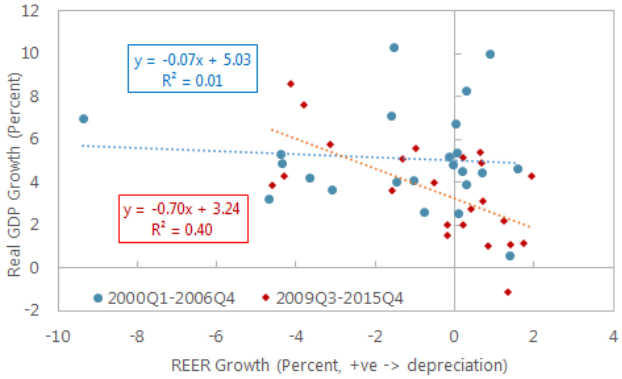


Figure 5. EM Economic Growth versus EM Currency Movement
(Percent change, y-o-y)



Sources: IFS; and IMF staff calculations.

9. The influence of the real exchange rate on growth has evolved over time in Romania. The path of external debt[3] as a share of exports is a good starting point for assessing the relative strength of the trade and financial channels. Compared to other emerging markets, Romania's external debt as a share of exports (at 658 percent in 2015) remains low (Figure 6). However, what is striking is the evolution of this indicator over time (Figure 7). In early 2002, Romania's external debt as a share of exports was below the interquartile range. Since then, there has been rapid increase in this indicator to the extent that Romania was above the interquartile range by end of 2007, and continued to increase until early 2009. More recently, Romania is towards the lower bound of the interquartile range.

Figure 6. External Debt as a Share of Exports
(2015, percent)

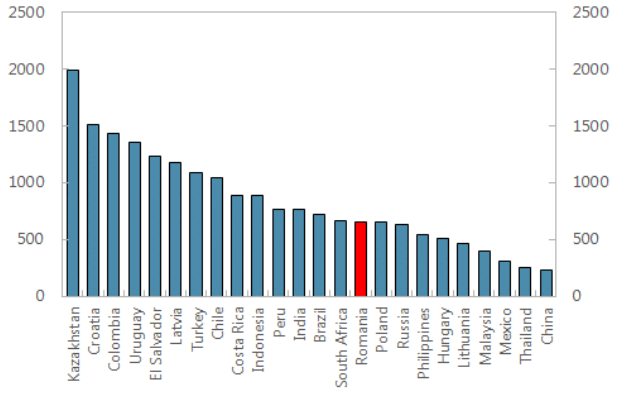
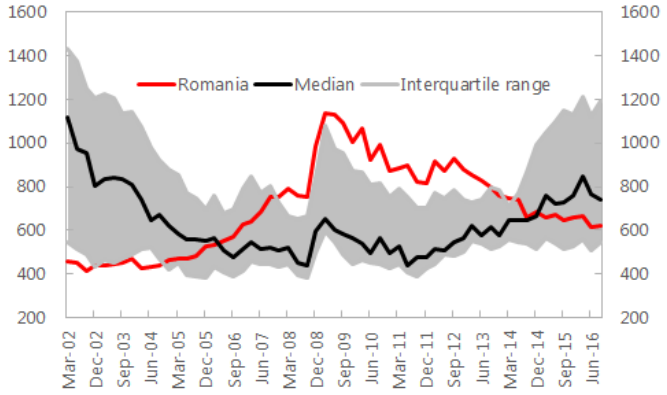


Figure 7. EM External Debt as a Share of Exports
(percent)



Source: IFS; National Sources; and IMF staff calculations.

C. Model Description

10. The relation between a country's real exchange rate and economic growth has been studied extensively. A recent paper from the BIS, Kearns and Patel (2016), evaluates the relative strength of trade versus financial channels for key emerging markets, and provides a brief review of the empirical literature. Using trade-weighted exchange rates and new BIS-constructed debt-weighted exchange rates to separate the trade and financial channels, the authors find that the financial channel partly offsets the trade channel for emerging market economies but the effect is weaker for advanced economies. A lot of research has also been done in a general equilibrium setting and our model builds on existing work (Kollmann, 2001; Cespedes et. al, 2004; Tovar, 2005, 2006; Elekdağ et. al, 2005; and Elekdağ and Tchakarov, 2007). From the perspective of Romania, a valuable addition to the literature is the work by Copaciu et. al (2015), who develop a small open economy model of the Romanian economy that is estimated using Bayesian techniques.

11. We develop and estimate a small-scale DSGE model that incorporates the financial accelerator mechanism. Following the seminal work by Cespedes et. al (2004) and others, balance

[3] Since data is not available for foreign currency debt, we use external debt as a proxy for foreign currency debt in the paper.

sheet effects of exchange rate fluctuations are studied by assuming credit markets frictions emerging from asymmetric information and costly state verification (as in Bernanke et. al, 1999). A key feature of the financial accelerator mechanism is that shocks to the economy are amplified by their effects on the net worth of entrepreneurs. These firms are required to pay an endogenous risk premium over the risk-free rate when borrowing from abroad, that increases with leverage. In line with Elekdag and Tchakarov (2007), all entrepreneurial debt is denominated in foreign currency. The presence of liability dollarization—a typical problem for emerging markets—makes corporate balance sheets and investment sensitive to movements in the exchange rate. Other features of the model are standard and further explained in Appendix A: trade in intermediate inputs, Calvo price- and wage-setting mechanisms, external habit formation in consumption, incomplete markets at the international level, and imperfect exchange rate pass-through. A full-system Bayesian likelihood approach is adopted to estimate the state-space model on Romanian, Polish and Hungarian data. The sample period is 2000Q2-2016Q3.

12. The expenditure switching effect, or the trade channel, is captured by the parameter $\theta>0$ which measures the elasticity of substitution between domestic and foreign intermediate inputs. As described in the introductory section, the trade channel works via the expenditure switching mechanism: a depreciation of the currency lowers the international price of exports and raises the cost of imports, inducing a substitution away from foreign to domestic goods. The parameter θ captures the extent to which this substitution occurs within an economy. Because of the simplified trade linkages in the model, the final good is nontraded, being used only for domestic consumption and investment purposes. Aggregate output is obtained by combining domestic and foreign intermediate inputs, Z_t^h and Z_t^f, using a CES (constant elasticity of substitution) technology:

$$Y_t = \left(\upsilon^{\frac{1}{\theta}} Z_t^{h\,\frac{\theta-1}{\theta}} + (1-\upsilon)^{\frac{1}{\theta}} Z_t^{f\,\frac{\theta-1}{\theta}} \right)^{\frac{\theta}{\theta-1}}$$

Where υ represents the share of domestic intermediate goods in GDP.

13. The strength of the balance sheet effect is proportional to μ, a parameter related to the monitoring cost incurred by the lender. As discussed in paragraph 3, in an environment of asymmetric information, lenders measure the creditworthiness of debtors as a function of leverage. Improved balance sheets of debtors reduce risk premia, enhance their debt servicing capacity and ease lending standards. Following the literature, the external finance premium that entrepreneurs pay on their loans has a functional form that varies inversely with the entrepreneurs' net worth. The rise in the risk premium caused by leverage is proportional to μ, a parameter associated with the monitoring costs incurred by the lender.

D. Estimating the Strength of Trade and Financial Channels

Model Results

14. Both the trade and financial channels are stronger for Romania, compared to Hungary and Poland. Figures 8 and 9 shows the posterior estimates for the parameters representing the strength of the expenditure switching and balance sheet effects, respectively. For the trade channel, the expenditure switching effect is the strongest in Romania, followed by Poland and Hungary. In terms of magnitude, Romania's expenditure switching effect is visibly much stronger than for the other two countries, while the strength of the trade channel for Poland and Hungary is close. Balance sheet effects are also strongest for Romania, followed closely by Poland and then (by a larger margin) by Hungary.

Figure 8. Strength of the Expenditure Switching Effect

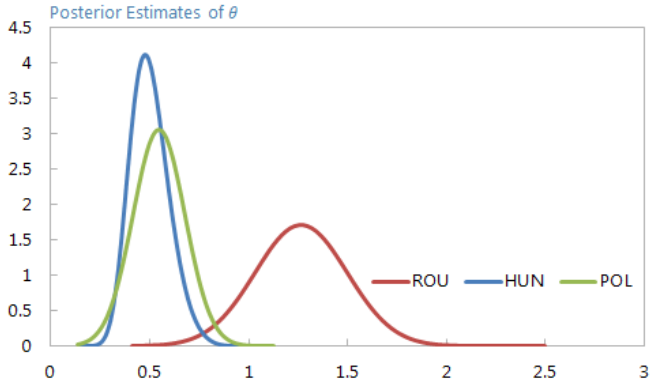
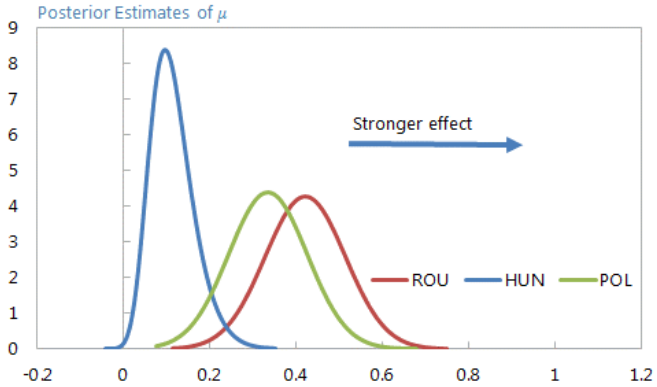


Figure 9. Strength of the Balance Sheet Effect



Source: IMF staff model estimates.

Intuition Behind the Results

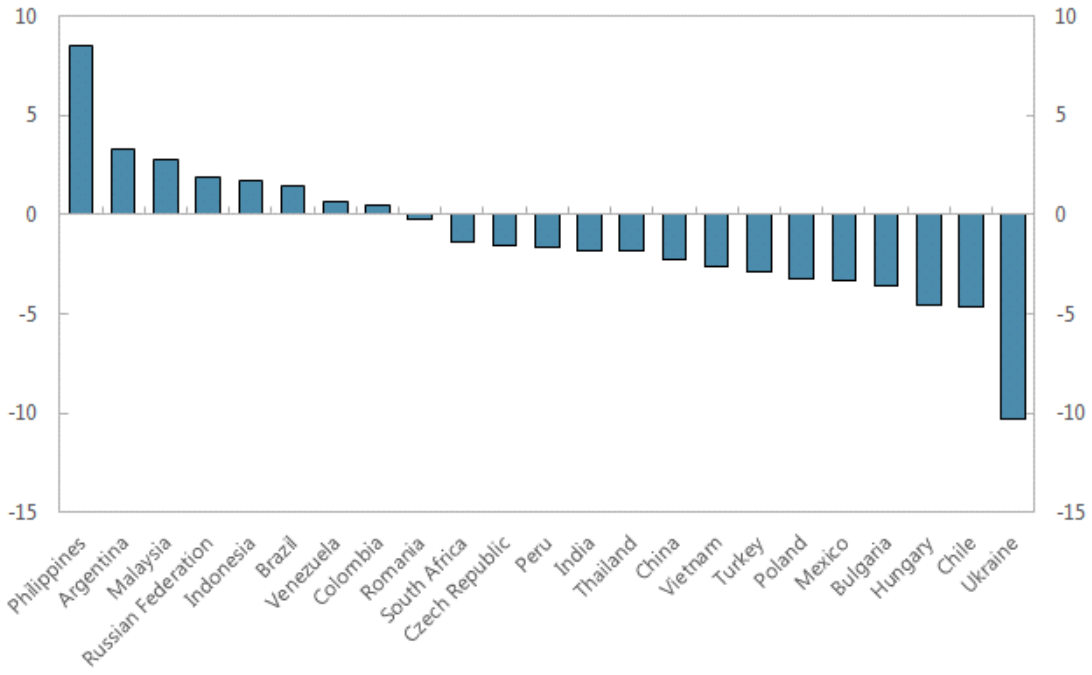
The Trade Channel

15. Romania's stronger trade channel can be partly attributed to less integration with global supply chains. The domestic value-added share of total exports in Romania has remained almost flat over 2005-2012, declining by 0.2 percentage points. On the other hand, the domestic value added share of total exports fell by 3.2 and 4.6 percentage points in Poland and Hungary, respectively (Figure 10). This can be attributed to the fact that, since the 1990s, a German-Central European supply chain has evolved, resulting in rapid expansion of bilateral trade linkages between Germany and the Czech Republic, Hungary, Poland and the Slovak Republic (IMF, 2013).

16. Why do global value chains matter for the strength of trade channel? Recent research shows that the rise of global value chains has weakened the relationship between exchange rates and trade in global value chain-related products (IMF, 2015b). As discussed in Ahmed et. al (2017), when there are backward linkages (i.e. foreign value-added embedded in gross exports), a

depreciation increases the cost of imported inputs used in final-good production, thereby decreasing the competitive gain.[4] Interestingly, the order of the strength of trade channel estimated by the model (Romania, followed by Poland and then Hungary) matches the order of the decline in the domestic value added portion of total exports revealed by the data (Figure 10). Romania's relatively stronger trade channel could be due to the dampening of this channel for Poland and Hungary owing to their presence in the German supply chain.

Figure 10. Change in Domestic Value Added Share of Total Exports
(2005-2012 percentage points)



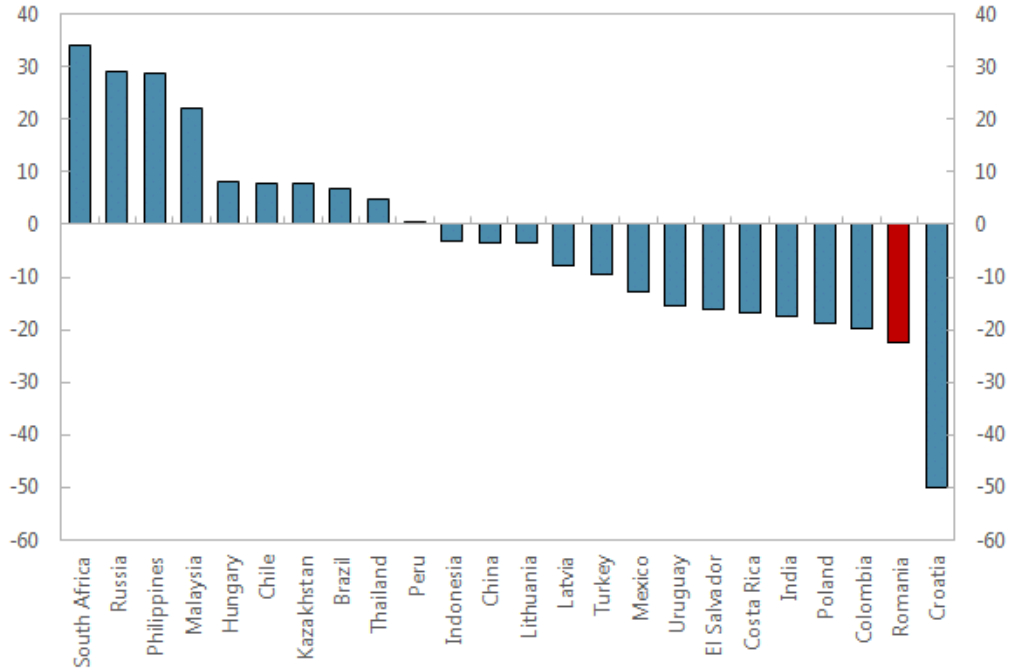
Source: Duval *et. al* (2014). The underlying data comes from OECD-WTO.

The Financial Channel

17. Romania's stronger financial channel can be ascribed to the rapid expansion of its balance sheet over the past decade (Figure 11). The change in Romania's net international investment position as a share of GDP (NIIP) has been one of the highest amongst emerging markets, only second to Croatia in the sample of countries considered (Figure 11). Poland's NIIP has also declined, but less than Romania's. On the other hand, Hungary's NIIP has increased. This ordering—the most rapid balance sheet expansion by Romania, followed closely by Poland, and then decline in balance sheet of Hungary—is matched by the relative strength of the financial channels estimated by the model. This indicates that the stronger financial channel in Romania is due to the rapid expansion of the balance sheet in the last ten years or so.

[4] With forward linkages (i.e. domestic value added exported in intermediates re-exported to third countries), a depreciation also increases the competitiveness of downstream producers, which stimulates demand for their goods.

Figure 11. Change in Net International Investment Position as a Share of GDP
(2005-2015, percentage points)



Sources: IMF staff calculations.

E. The Impact of Shocks on Output and Real Exchange Rate using the Impulse Response Functions (IRFs)

18. This section looks at the impulse response functions of output and the real exchange rate to various shocks. This is a standard procedure for determining if the model specification is consistent with economic theory (Copaciu et. al, 2015). Although the model includes several other shocks, the discussion focuses on three particular innovations that have a higher likelihood of affecting the region in the near term: a demand impulse, sudden stops and monetary policy tightening—both domestic and external. We consider the output and real exchange rate responses to a one percent shock with a persistence parameter of 0.95. The responses are computed at posterior mean estimates of the structural parameters.

Preference Shocks

19. A positive demand shock in the economy induces higher output growth and currency appreciation. A preference shock is demand impulse that generates temporary shifts in the discount factor and impacts the intertemporal substitution of consumption. In simple terms, the shock induces the household agent to bring forward consumption, resulting in higher output and appreciation of the real exchange rate. As shown in Figures 12 and 13, the output impact is stronger in Romania and Hungary compared to Poland, while the impact of real exchange rate in terms of the

extent of appreciation is weaker in Romania compared to the other countries. One of the reasons for the positive output as well as currency appreciation in Romania over the period 2004 until the GFC could be due to the presence of positive preference shock. At the same time, the slowdown in real GDP growth as well as currency depreciation since GFC until late 2009 could be attributed to the negative preference shock owing to the negative sentiment associated with the GFC. These results are also corroborated by the findings of Copaciu et. al (2015).

Figure 12. The Impact of Preference Shock on Output 1/

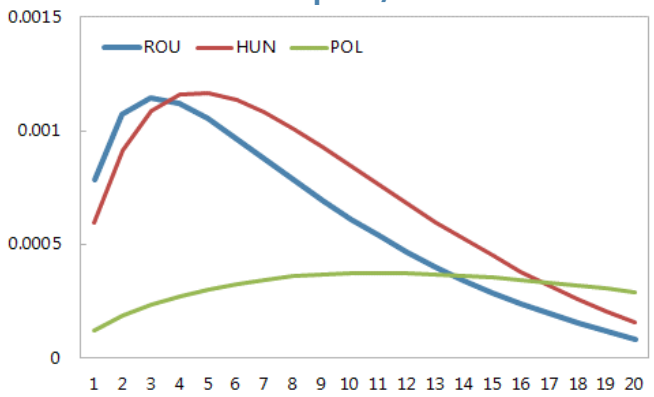
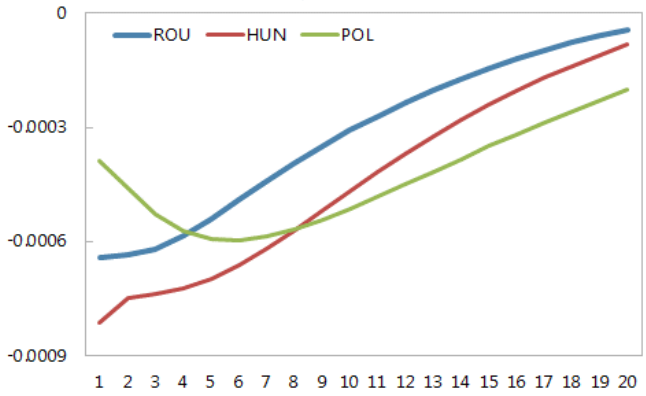


Figure 13. The Impact of Preference Shock on Real Exchange Rate 1/, 2/



1/ y-axis shows percent deviation from the steady state in response to a shock of 1 percent deviation from the steady state of the relevant variable. The persistence parameter of the AR(1) shock process is set at 0.95.
2/ A positive value indicates currency depreciation.
Source: Fund staff model estimates.

Sudden Stop Shocks

20. A sudden stop in capital flows—captured by the risk premium shock—leads to weaker output growth and currency depreciation (Figures 14 and 15). A sudden stop shock reflects a fall in capital flows to the economy. The impulse response function indicates that such a shock leads to reduction in output and depreciation of the real exchange rate. The impact on output is stronger in Romania and Hungary compared to Poland, while the impact on real exchange rate is weaker in Romania than in peer countries. This is an important result in understanding the positive output and currency appreciation in Romania from 2004 until GFC. The Romanian economy essentially went through a negative sudden stop shock with large capital inflows. Monetary conditions were accommodative and the real effective exchange rate appreciation was compensated with sharp reduction in real interest rates (IMF, 2016). The influx of capital inflows thus explains why years of real effective exchange rate appreciation before 2009 are associated with positive and high real GDP growth.

Figure 14. The Impact of Sudden Stop Shock on Output 1/

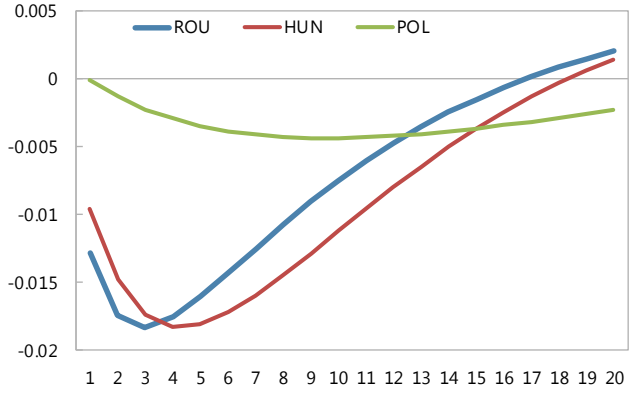
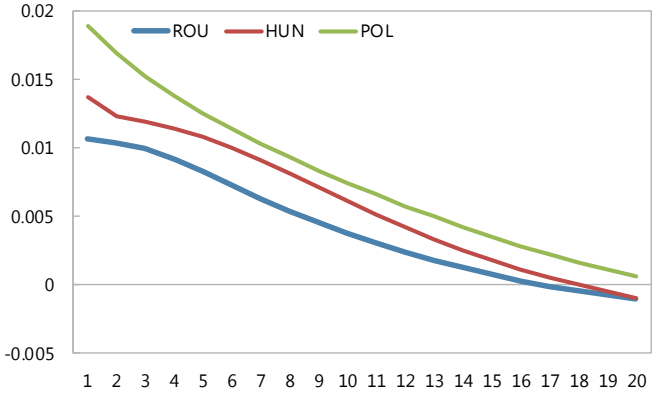


Figure 15. The Impact of Sudden Stop Shock on Real Exchange Rate 1/, 2/



1/ y-axis shows percent deviation from the steady state in response to a shock of 1 percent deviation from the steady state of the relevant variable. The persistence parameter of the AR(1) shock process is set at 0.95.
2/ A positive value indicates currency depreciation.
Source: IMF staff model estimates.

Monetary Policy Shocks

21. A domestic interest rate hike leads to lower output and appreciation of the currency in Romania, but the magnitude of the impact (particularly on currency) is weaker than in Hungary and Poland (Figures 16 and 17). A positive monetary policy shock in the domestic economy reflects an increase in policy rates by the domestic central bank. The impulse response functions indicate that a rate hike would lead to a reduction in output. Roughly speaking, the model predicts a growth slowdown (from the steady state/balanced growth path) of less than 2 percent for a 100 basis point tightening of interest rates (from the steady state). A 100 basis point increase in interest rates leads to around 0.01 percent real appreciation of the currency (from the steady state). Both the reduction in output and the real exchange rate appreciation are smaller compared to Hungary and Poland.

22. A rise in foreign interest rates lowers output growth and induces currency depreciation (Figures 18 and 19). The impulse response functions indicate that foreign monetary policy tightening reduces output in Romania—a 100 basis point rise in foreign rates reduces output by less than 1.5 percent (from steady state) and depreciates the real exchange rate by 1 percent (from steady state). The magnitude of the impact, both for output as well as real exchange rate, is comparable to Hungary.

Figure 16. The Impact of Domestic Monetary Policy Shock on Output 1/

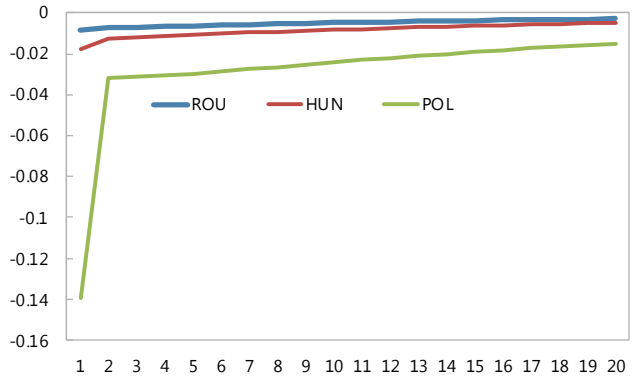
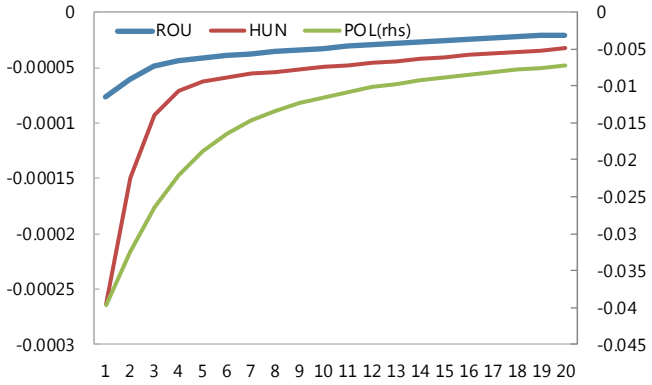


Figure 17. The Impact of Domestic Monetary Policy Shock on Real Exchange Rate 1/, 2/



1/ y-axis shows percent deviation from the steady state in response to a shock of 1 percent deviation from the steady state of the relevant variable. The persistence parameter of the AR(1) shock process is set at 0.95.
2/ A positive value indicates currency depreciation.
Source: IMF staff model estimates.

Figure 18. The Impact of Foreign Monetary Policy Shock on Output 1/

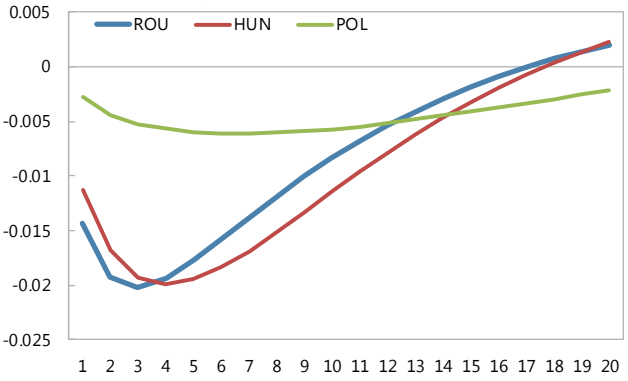
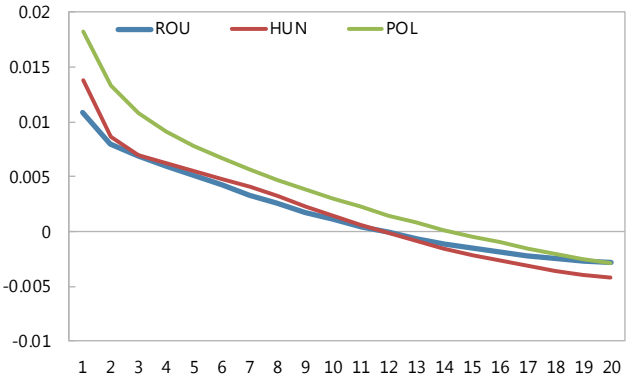


Figure 19. The Impact of Foreign Monetary Policy Shock on Real Exchange Rate 1/, 2/



1/ y-axis shows percent deviation from the steady state in response to a shock of 1 percent deviation from the steady state of the relevant variable. The persistence parameter of the AR (1) shock process is set at 0.95.
2/ A positive value indicates currency depreciation.
Source: IMF staff model estimates.

F. Concluding Thoughts

23. Using a consistent DSGE framework estimated for Romania, Hungary, and Poland, this selected issues paper finds that the trade and financial channels—the two key channels through which exchange rates impact growth—are stronger in Romania. The relatively stronger trade channel can be attributed to the relatively less integration into global supply chains. While domestic value-added as a share of exports fell rapidly in the last decade for Hungary and Poland owing to the rapid expansion of the German supply chain in these countries, that of Romania remained almost flat. Similarly, the stronger financial channel for Romania can be explained by the striking expansion of the financial balance sheets which is not only high compared to peers, but also compared to other emerging markets.

24. The model results suggest that the increase in output and exchange rate appreciation from 2004 until pre-crisis can be explained by demand shocks and capital inflows. This was a period characterized by high capital inflows, accommodative monetary conditions and low real interest rates. Since the GFC and until late 2009, weaker output growth as well as real exchange rate depreciation partly reflect domestic demand adjustments induced by the crisis.

25. Monetary policy tightening, both domestic and external, will lead to output reduction. A rise in domestic interest rates will also appreciate the real exchange rate; however, the magnitude of the appreciation is small, both in absolute terms and from a cross-country perspective. An increase in foreign interest rates is projected to depreciate the real exchange rate with the magnitude of the impact being comparable to Hungary's.

Appendix I. Building Blocks of the Model[1]

Agents

There are four agents in the model.

Households: The economy is populated by a continuum of households, indexed by *j*. Differentiated labor services and staggered wage-setting are assumed. The individual consumer maximizes expected lifetime utility, with preferences being additive and separable in consumption and hours:

$$E_0 \sum_{t=1}^{\infty} \beta^t \overline{\omega_t} \left[\frac{\left(C_{jt} - H_t\right)^{1-\sigma}}{1-\sigma} - \varsigma_t \frac{L_{jt}^{1+\eta}}{1+\eta} \right]$$

σ denotes the coefficient of relative risk aversion, while $\frac{1}{\eta}$ is the elasticity of labor supply with respect to the real wage.

Habits are included in the preference structure through the term $H_t = \gamma C_{jt-1}$, which is proportional to past consumption and taken as given in the optimization problem. γ represents the degree of external habit persistence. The period utility function is affected by two preference shocks, denoted by $\overline{\omega_t}$ and ς_t. The former generates temporary shifts in the discount factor and impacts on the intertemporal substitution of consumption. The second shock (ς_t) introduces a wedge in the relationship between consumption and labor.

Intermediate- and final-good producers: The intermediate goods sector is populated by domestic producers and importers. The domestic producers combine capital and labor to produce goods that are sold domestically and exported. Capital is homogenous and traded in economy-wide rental markets. In terms of pricing of goods, the model assumes standard Calvo pricing with no indexation. The importers import goods from abroad and resell them domestically and also set prices in a staggered manner. The nominal inertia in the model is consistent with low degree of exchange rate pass-through.

[1] Details of the model are available from the authors upon request.

The aggregate output of the final good producer is obtained through combining domestic and foreign inputs using a CES technology (Equation given in the main text). It is assumed that the aggregate output is nontraded and employed solely for domestic consumption and investment purposes.

Entrepreneurs: The entrepreneurs are subject to credit constraints as in Bernanke, Gertler, and Gilchrist (1999). They invest in risky projects that are financed using equity and foreign debt. There is asymmetric information between borrowers and lenders, and costly state verification. To access the external finance, the entrepreneurs pay an endogenous risk premium over the risk-free rate when borrowing from abroad, that increases with leverage. All entrepreneurial debt is denominated in foreign currency. As described in the main text, the presence of liability dollarization makes corporate balance sheets and investment sensitive to movements in the exchange rate.

The Central Bank: Monetary policy is delegated to an independent central bank, that adjusts nominal interest rates in response to deviations of inflation and output from steady-state. Following the open economy literature, the feedback rule incorporates interest rate inertia and responds also to changes in the real exchange rate.

Foreign variables are exogenous and follow AR(1) processes.

Bayesian Estimation Methodology and Other Model Details

To close the model, a set of market clearing conditions are applied in the input, product and bond markets. The model is estimated on Romanian, Polish and Hungarian data over the 2000Q2-2016Q3 period. The underlying data (log changes in real GDP per capita, log changes in private consumption per capita, log changes in nominal exchange rates, hours, inflation and short-term interest rates—with all variables demeaned) is from national sources, IFS, and Eurostat.

Inference about the parameters is done employing Bayesian estimation techniques in five steps:

1. Solve the linear approximation of the model using standard procedures (e.g. generalized Schur decomposition in Dynare).
2. Derive the state space representation and complement it with measurement equations relating to endogenous variables to the observables.
3. Evaluate the likelihood function using the Kalman filter.

4. Specify a prior distribution over the parameters and combine it with the likelihood function to form a posterior density function.
5. Use a MCMC algorithm to numerically derive the marginal posterior density of the parameters.

Appendix II. Posterior Estimates

Structural Parameters		Prior Distribution[1]			Posterior Distribution (generated by the MH algorithm[2]) RO 2000:2-2016:3				HU 2000:2-2016:3				PL 2001:1-2016:3			
		Type	Mean	S.d	5%	Mean	95%	S.d	5%	Mean	95%	S.d	5%	Mean	95%	S.d
θ	Expenditure switching effect	Gamma	3.0	1.0	0.87	1.25	1.64	0.22	0.34	0.50	0.65	0.11	0.33	0.55	0.76	0.13
μ	Balance sheet effect	Normal	0.4	0.1	0.27	0.42	0.57	0.09	0.03	0.11	0.19	0.04	0.18	0.33	0.49	0.09
σ	Relative risk aversion	Normal	3.0	1.0	0.90	1.86	2.83	0.47	0.45	1.45	2.39	0.65	1.59	3.12	4.63	1.06
γ	Habit persistence	Beta	0.5	0.2	0.33	0.53	0.72	0.09	0.62	0.75	0.90	0.11	0.90	0.94	0.98	0.02
η	Inv. elasticity of labor subst.	Gamma	3.0	1.0	5.23	7.67	10.10	1.39	5.69	7.99	10.37	1.36	1.98	3.81	5.51	1.00
ψ_w	Calvo wage inertia	Beta	0.5	0.2	0.00	0.04	0.07	0.02	0.00	0.02	0.03	0.01	0.46	0.58	0.71	0.08
ψ_p	Calvo price inertia	Beta	0.5	0.2	0.01	0.06	0.10	0.03	0.01	0.05	0.10	0.03	0.01	0.05	0.09	0.03
ϑ	Foreign elasticity of demand	Beta	3.0	1.0	0.88	0.99	1.10	0.06	0.73	0.83	0.93	0.07	0.80	0.90	1.02	0.07
χ_r	Interest Smoothing	Beta	0.5	0.2	0.04	0.18	0.31	0.09	0.18	0.39	0.59	0.14	0.77	0.82	0.87	0.03
α_π	Inflation feedback	Gamma	2.0	1.0	0.96	1.52	2.06	0.25	0.88	1.26	1.64	0.18	1.16	1.64	2.07	0.23
α_y	Output feedback	Gamma	0.5	0.2	0.07	0.18	0.28	0.05	0.04	0.12	0.19	0.04	0.11	0.30	0.46	0.10
α_s	Exchange rate feedback	Gamma	0.5	0.2	0.79	1.15	1.51	0.19	0.68	1.02	1.34	0.17	0.36	0.61	0.84	0.13

[1] Calibrated β=0.997; α=0.45; υ=0.6; ρ=7; φ=5 and ξ=0.01. Foreign shock parameters are also assigned fixed values, obtained from OLS regressions.

[2] Based on 500,000 draws from MH sampler, half of which were retained. For Romania, a sample of 800,000 points was drawn from the posterior distribution.

Structural Parameters		Prior Distribution			Posterior Distribution (generated by the MH algorithm) RO 2000:2-2016:3				HU 2000:2-2016:3				PL 2001:1-2016:3			
		Type	Mean	S.d/d.f.	5%	Mean	95%	S.d	5%	Mean	95%	S.d	5%	Mean	95%	S.d
ρ	productivity	Beta	0.5	0.2	0.95	0.97	0.99	0.01	0.93	0.95	0.98	0.02	0.88	0.92	0.96	0.03
ρ	preference	Beta	0.5	0.2	0.64	0.82	0.98	0.05	0.92	0.95	0.99	0.02	0.02	0.13	0.23	0.06
ρ	labor disutility	Beta	0.5	0.2	0.71	0.81	0.94	0.06	0.91	0.94	0.98	0.02	0.28	0.47	0.65	0.12
ρ	monetary	Beta	0.5	0.2	0.01	0.09	0.17	0.04	0.01	0.06	0.10	0.03	0.05	0.14	0.23	0.06
ρ	sudden stop	Beta	0.5	0.2	0.29	0.45	0.61	0.10	0.50	0.66	0.83	0.10	0.12	0.43	0.73	0.22
ρ	entrepreneur discount	Beta	0.5	0.2	0.94	0.97	1.00	0.01	0.90	0.94	0.98	0.02	0.64	0.77	0.91	0.09
σ	productivity	IGamma	0.2	2.0	0.05	0.06	0.07	0.01	0.04	0.04	0.05	0.00	0.04	0.05	0.06	0.00
σ	preference	IGamma	0.2	2.0	0.09	0.14	0.18	0.02	0.09	0.15	0.21	0.03	0.26	0.53	0.78	0.15
σ	labor disutility	IGamma	0.2	2.0	0.13	0.20	0.25	0.03	0.07	0.10	0.13	0.02	0.47	1.19	1.92	0.36
σ	monetary	IGamma	0.02	2.0	0.04	0.06	0.08	0.01	0.02	0.03	0.05	0.01	0.01	0.01	0.01	0.00
σ	sudden stop	IGamma	0.02	2.0	0.02	0.03	0.04	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.00
σ	entrepreneur discount	IGamma	0.2	2.0	0.11	0.16	0.20	0.02	0.03	0.07	0.11	0.02	0.06	0.09	0.13	0.02

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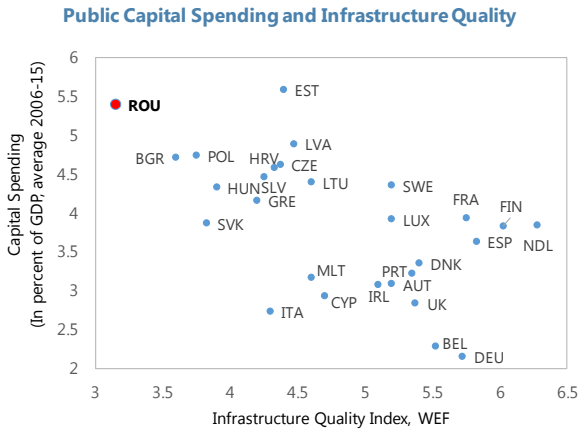
EFFICIENT PUBLIC CAPITAL, EU FUNDS, AND POTENTIAL GROWTH IN ROMANIA[1]

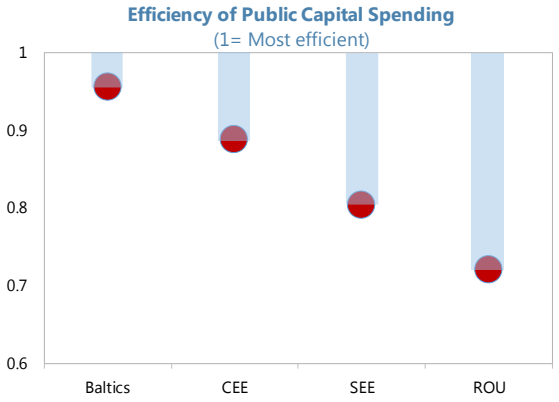
A. Introduction

1. Public capital spending in Romania has outpaced that of peers but the quality of its infrastructure is among the lowest in the EU. Public capital spending in Romania grew at an average rate of 5.4 percent in 2006-15, the second highest in Europe (Figure 1). However, the efficiency of public capital spending is among the lowest among Central, Eastern, and Southeastern European (CESEE) countries, and the quality of its infrastructure is relatively low.

Figure 1. Efficiency of Public Capital Spending



Sources: Eurostat; and World Economic Forum quality of infrastructure index (2015) on roads, railroads, seaports and air transport (average).



Sources: Sources: IMF (2016)
Note: The efficiency frontier is given by countries achieving the highest quality and access to infrastructure for a given level of public capital stock and income.

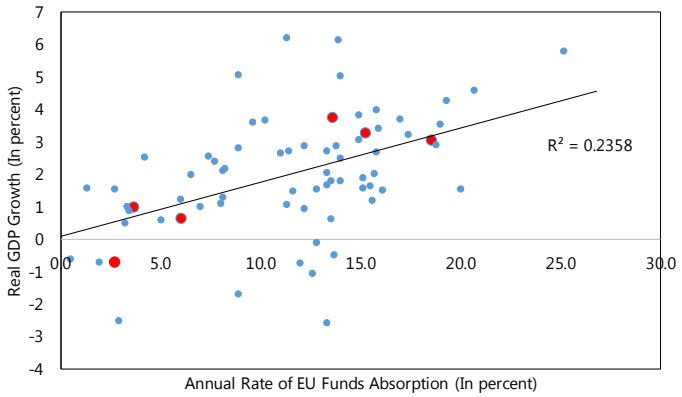
2. Increasing the share of EU-funded investment can help improve public investment efficiency, and thereby increase growth. EU-funded investment is better targeted, requires stronger feasibility studies, and is subject to ex-ante conditionality, resulting in higher quality of public investment. Higher spending efficiency, in turn, can amplify the impact of public investment on growth (IMF, 2014, 2015). Figure 2 illustrates the positive association between growth and EU funds absorption—payments relative to funding available—among CESEE-EU countries. In addition, improving public investment management and thereby increasing the rate of absorption of EU funds can help increase public investment without creating additional fiscal pressures. Higher

[1] Prepared by Ernesto Crivelli (EUR). The author is grateful to Tudor Grosu, Dan Matei, and participants at a seminar organized by the National Bank of Romania for helpful comments and suggestions.

efficiency of public investment means that the same quality and access can be achieved with less fiscal resources. Similarly, a greater share of EU-funded investment—currently only one third of total capital spending in Romania—can result in higher spending efficiency.

3. This paper empirically analyses the impact of EU funds on economic growth, by establishing the link between EU funds and efficient public capital accumulation. The paper argues that both the absorption of EU funds and the quality of public infrastructure can be raised by strengthening public investment management (PIM) institutions. It illustrates the potential gains from raising the rate of EU funds absorption by quantifying its impact on potential growth in Romania. Finally, the paper also looks at the critical areas where Romania could improve its PIM institutions and provides recommendations based on cross-country experience.

Figure 2. EU Funds and Growth
(CESEE-EU Countries, 2010–15)



Source: Eurostat; WEO; and IMF staff calculations.
Note: CESEE-EU countries=Bulgaria, Croatia, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Poland, Romania (red dots) Slovak Rep., Slovenia,

B. Efficient Public Capital, EU Funds, and Growth: An empirical model

4. A two-step estimation approach is used to empirically estimate the impact of EU funds on growth. First, the link between efficiency-adjusted public capital stock and growth is established, by estimating a growth equation. Second, the role of EU funds is considered by empirically analyzing the determinants of efficiency-adjusted public capital accumulation. The impact of EU funds on economic growth is then computed by combining the estimated coefficients from steps (1) and (2).

Efficient Public Capital and Growth

5. The contribution of public capital to growth is estimated using a production function approach. Following Gupta and others (2014), a Cobb-Douglas production function technology is specified as:

$$\ln Y_{it} = \alpha + \beta_1 lnS_{it} + \beta_2 lnK_{it} + \beta_3 lnG_{it} + \varepsilon_{it} \qquad (1)$$

Where Y_{it} is real GDP (or potential GDP); and S_{it}; K_{it}; and G_{it} are labor supply, the private capital stock, and the public capital stock, respectively. Equation (1) is estimated using a system generalized

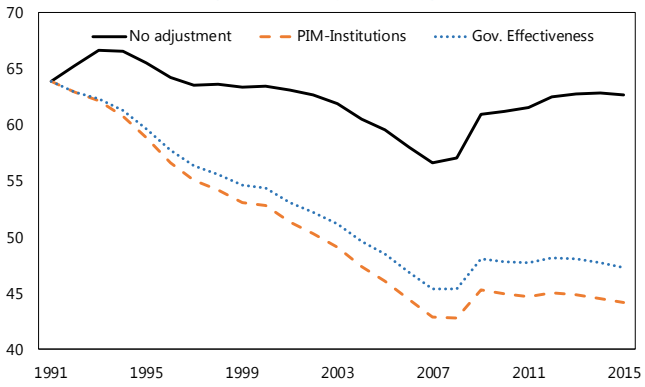
method of moments (GMM) that is better suited to address possible endogeneity. [2] The paper uses unbalanced panel data for 60 advanced and emerging (middle-income) economies over the period 1991-2015.

6. Capital stocks are constructed using a perpetual inventory equation. The equation for public capital stock (G) is modified to reflect the efficiency of public investment, taking into account the quality of PIM institutions and government effectiveness in each country:

$$G_{it} = G_{it-1} - \delta_{it} * G_{it-1} + q_{it} * I_{it-1} \qquad (2)$$

Where for each country *i*, G_{it} is the stock of public capital at time *t*, and *I* is public investment spending at time *t-1*, δ is country *i*'s time-varying rate of depreciation of the capital stock, and *q* is an index that captures the efficiency of public investment. This index varies between 0, when all public resources are totally wasted, and 1, when full efficiency is achieved for government spending. Two indicators are used as a proxy for *q*. The first one is a normalized index based on the IMF's Public Investment Management Assessment (PIMA) tool.[3] While this indicator is time-invariant, it is likely that structural reforms aimed at improving the efficiency of investment processes take time to implement. Still, to reflect the possibility that investment efficiency may evolve over time, a second, time-variant indicator is used as a proxy for *q*, based on the World Bank's Government Effectiveness Indicator. Figure 3 shows a large gap between the estimated average efficiency-adjusted and the unadjusted public capital stock series. The efficiency-adjusted public capital stock presents a more pronounced downward trend. However, the estimated series are very similar for both time-variant and time-invariant proxy indicators of public investment efficiency.

Figure 3. Public Capital Stock
(Percent of GDP, 1991–2015)



Source: Authors' calculations using data from Penn World Table, version 6.2, WEO, IMF (2016), and World Bank's Government Effectiveness Indicator.

[2] See for example Roodman (2009). System-GMM models use second and longer lags of the potentially endogenous variables (and their differences), making these variables predetermined (i.e. uncorrelated with the error term). Quantitatively similar results are obtained, however, with a simple specification using ordinary least squares with time fixed effects (OLS).

[3] PIMA is composed of 15 indicators grouped into four stages of the public investment management cycle: (i) Planning; (ii) Allocation; and (iii) Implementation (IMF, 2015). Countries are scored based on different indicators, which are then combined to construct the overall index. IMF (2015) provides details of the PIMA assessment, covered areas, and indicators. A more recent study (IMF, 2016) extends the coverage to all CESEE countries.

7. Efficient public capital has a larger impact on growth, especially among middle-income countries. Table 1 presents the results of estimating equation (1) using data on potential GDP.[4] Columns 1-2 use the unadjusted public capital stock series, while columns 3-6 present the results using efficiency-adjusted public capital stock. Overall, the estimated coefficients are comparable with earlier literature (see Gupta and others, 2014). However, this paper focuses on the comparison of the calculated marginal productivities (MPG=β_3 * GDP/G) for unadjusted and efficiency-adjusted public capital stock. The difference in marginal productivities is especially noticeable among middle-income countries: the MPG increases from 0.4 to 0.47 for PIM-adjusted series, and from 0.4 to 0.69 for government effectiveness-adjusted series. Comparison of results also suggests that using unadjusted public capital stocks leads to underestimating the contribution of private capital, which is reflected in a lower implied marginal productivity. These results imply that ignoring public investment inefficiencies leads to underestimating the impact of both private and public capital inputs on growth.

Table 1. Efficiency-adjusted Public Capital and Potential Growth

	No adjustment		PIM-Institutions		Gov. Effectiveness	
	ALL	MIC	ALL	MIC	ALL	MIC
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Labor	0.485***	0.520***	0.354***	0.348**	0.411***	0.273
	(0.143)	(0.180)	(0.110)	(0.145)	(0.121)	(0.239)
Δ Private Capital	0.094**	0.119*	0.141***	0.227***	0.143***	0.424***
	(0.042)	(0.068)	(0.036)	(0.066)	(0.032)	(0.133)
Δ Public Capital	0.505**	0.395*	…	…	…	…
	(0.104)	(0.217)				
Δ Efficiency-adjusted Public Capital			0.487***	0.471**	0.211*	0.690*
			(0.185)	(0.228)	(0.121)	(0.368)
Implied Marginal Productivities						
Private Capital	0.10	0.12	0.14	0.23	0.14	0.42
Public Capital	0.50	0.40	…	…	…	…
Efficiency-adjusted Public Capital	…	…	0.49	0.47	0.21	0.69
Hansen J-statistic (p-value)	0.791	0.385	0.727	0.591	0.773	0.299
Observations	1066	673	1066	673	1066	673
Countries	51	32	51	32	51	32

Note: Dependent variable is the log-difference of potential GDP. One step, robust, system GMM with instruments based on lagged differences in the log potential GDP, private capital, public capital, and labor (collapsed to avoid proliferation in the number of instruments) in levels equation, and lags of their levels in the differenced equation. Robust errors in parentheses; ***(**,*) indicate significance at 1(5,10) percent.

EU Funds and Public Capital Accumulation

8. Next, the paper considers the determinants of public capital accumulation. Following Sturm (2001), structural and economic determinants are taken into account, with a special focus on

[4] Results using data on real GDP are qualitatively very similar.

the impact of EU funds. Table 2 presents the results of estimating equation (3) below, using a system-GMM to address possible endogeneity:

$$d.\ln G_{it} = \alpha + \gamma_1 Structural_{it} + \gamma_2 Economic_{it} + \gamma_3 Grants_{it} + \varepsilon_{it} \quad (3)$$

Where $d.\ln G_{it}$ is the annual change in the public capital stock (in logs), and the determinants are grouped into structural and economic control variables, as well as grants (EU grants and other capital grants).

Table 2. Determinants of Public Capital Accumulation

	(1)	(2)	(3)	(4)
	System-GMM 1/			
	No adjustment		PIM Institutions	Gov. Effectiveness
Δ Public Capital, lagged	0.804***	0.262***	0.342***	0.281***
	(0.028)	(0.077)	(0.116)	(0.112)
Δ GDP	0.072***	0.432***	0.305***	0.207***
	(0.021)	(0.092)	(0.074)	(0.079)
Agriculture	0.024**	0.014**	0.003	0.007
	(0.011)	(0.007)	(0.005)	(0.006)
Public Debt	-0.005***	-0.036***	-0.031***	-0.052***
	(0.001)	(0.013)	(0.011)	(0.014)
Δ Private Capital, lagged	0.015**	0.040	0.102**	0.159***
	(0.007)	(0.043)	(0.052)	(0.061)
Δ Primary Balance	-0.033**			
	(0.017)			
Δ Capital Grants (Other)		0.313**	0.372***	0.368**
		(0.143)	(0.144)	(0.176)
Δ EU Grants		0.167	0.325**	0.363**
		(0.165)	(0.162)	(0.190)
Constant	0.004**	0.036***	0.020**	0.043***
	(0.001)	(0.010)	(0.008)	(0.011)
R-squared	0.769	...	...	...
Hansen J-statistic (p-value)	...	0.358	0.534	0.556
Observations	1069	905	905	905
Number of countries	59	55	55	55

Notes:

Dependent variable is log-difference of public capital. Robust errors, in parentheses; ***(**,*) indicate significance at 1(5, 10) percent.

1/ One step, robust, sytem GMM, including time fixed-effects, with instruments based on lagged differences in the log-difference of public capital, debt-to-GDP ratio, and log-difference of grants (collapsed to avoid proliferation in the number of instruments) in levels equation, and lags of their levels in the differenced equation.

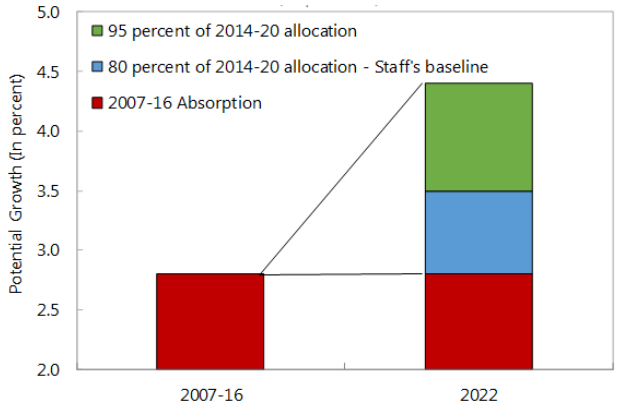
9. Most of the control variables are statistically significant and present the expected sign. The lagged dependent variable captures persistence in public capital accumulation over time, while the growth rate of real GDP corrects for cyclical effects. The share of agriculture in value-added is positively correlated to public capital accumulation, suggesting that rural areas are in relatively more need of public infrastructure investment. A higher level of public debt may lead to restrictive fiscal policy measures, thus negatively affecting public capital accumulation. A higher primary balance reflects in lower public capital accumulation, implying that at least part of public investment is deficit financed.[5] Finally, private capital accumulation is positively correlated with public capital accumulation, suggesting the existence of a crowding-in effect.[6]

10. EU funds contribute to efficient public capital accumulation. Column 2 looks at the impact of grants on public capital accumulation using the unadjusted series, while Columns 3-4 use the efficiency-adjusted public capital stock series. Although the growth rate of capital grants is significantly positively correlated with both the unadjusted and efficiency-adjusted public capital accumulation series, it appears that the growth rate of EU grants significantly and positively influences only the efficient public capital accumulation series. The estimated coefficient suggests that a 10 percent increase in EU funds raises efficient public capital by about 4 percent.

EU Funds and Potential Growth in Romania

11. The impact of EU funds on potential growth in Romania can be substantial. Assuming that the average potential growth in Romania during 2007-16 (about 2.8 percent) is consistent with the average rate of EU funds absorption during that period, the impact of an increase in EU funds absorption on potential growth over the period 2017-2022 can be estimated taking: (i) the estimated impact of EU funds on efficiency-adjusted public capital (the estimated γ_3 from equation (3)), (ii) the impact of the latter on potential growth (the estimated β_3 from equation (1)), and (iii) the annual average increase in EU funds over the period:

Figure 4. EU Funds and Potential Growth in Romania
(In percent)



Source: Author's calculations.

[5] This variable has been dropped in Columns 2-4 due to large collinearity with grants, as the latter is one of the determinants of the former. Inclusion, however, does not qualitatively affect the results on grants.

[6] An assumption of higher productivity of private investment induced by more public capital is used in simulations using the global DGSE-EAGLE model (Gomes and others, 2010) to establish the link between EU funds and output growth.

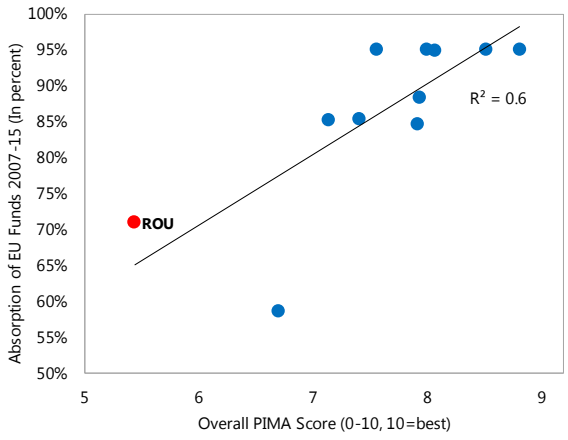
$$\Delta Potential\ Growth = \gamma_3 * \beta_3 * \Delta\ EU\ Funds \qquad (4)$$

The results of this paper imply that an increase in the rate of EU funds absorption to close to 95 percent of the new programming period would imply an increase in potential growth to about 4½ percent (Figure 4). In such a scenario, total public investment would increase by close to 2 percent of GDP over the medium term.

C. Raising EU Funds Absorption in Romania

12. Raising EU funds absorption in Romania requires a determined effort to improve the quality of PIM institutions. Earlier studies have found a strong positive association between the quality of PIM institutions—measured using the PIMA assessment tool—and the rate of absorption of EU funds among CESEE countries (Figure 5). Using the modified perpetual inventory equation (equation (2)) suggests that increasing the quality of PIM institutions in Romania to the average of the EU countries, would raise the efficiency-adjusted public capital stock by about 15 percent.

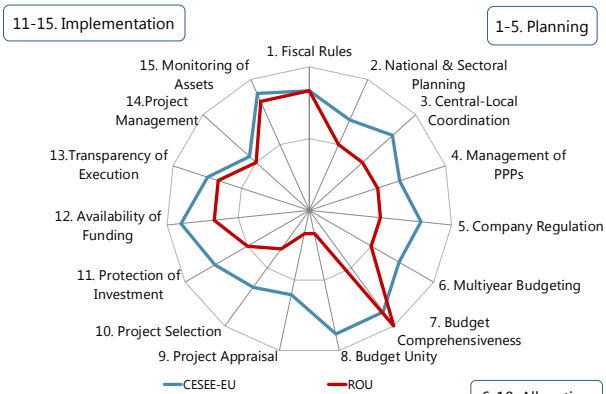
Figure 5. EU Funds' Absorption and PIM Institutions



Sources: Eurostat; and IMF (2016).

13. Romania should improve the areas of project selection and appraisal in particular, while also strengthening coordination with regional governments. Despite some improvement after the EU accession, *project appraisal*, *selection*, and *transparency of execution* could be further improved (Figure 6) by: (1) conducting strong feasibility assessments, especially for large infrastructure projects, (2) integrating project prioritization in the budget process, while ensuring a stable source of funding for strategic projects over the medium-term, and (3) undertaking an open and transparent procurement process and publishing results for major projects. The experience in the region (see Box 1 on the Polish experience) suggests that improved project management and transparency of execution, and especially simplifying administrative burden can help in accelerating EU funds absorption. Central-local coordination is also crucial, given that a significant share of public investment is allocated to regional budgets, which sometimes lack the technical capacity to benefit from EU funds.

Figure 6. Strength of Public Investment Management by Institution



Sources: IMF (2016), and author's calculations.

Box 1. Poland: Accelerating EU Funds Absorption through Improved Public Investment Management Performance

EU funding in Poland contributed to the efficiency of public infrastructure and higher growth. Poland upgraded its infrastructure over the 2006-13 period, through increased public investment in airports, roads and maritime transport infrastructure. EU funds going to Poland during this period amounted to 2.3 percent of GDP (about 40 percent of total government capital expenditure). The rate of absorption—payments relative to funding available—reached 95 percent by end-2015, the maximum allowed given that 5 percent of funding is held back until all the expenditure is approved. Almost half of the funds were invested in transport, for the construction of new roads and the modernization of railway lines, while a quarter supported enterprises and innovation (European Commission, 2016). According to EC estimates, EU-funded investment raised GDP in 2015 by over 4 percent above the level it would have been in the absence of this funding during the period.

To strengthen public investment management, Poland focused on project management and transparency of execution, as well as on coordination with local governments. Technical assistance funds were used to improve the capacity of regions and beneficiaries of project funds in *performance monitoring*. An Informational System for Monitoring and Controlling Structural and Cohesion Funds was put in place in 2007 to monitor the financial and physical progress of projects co-financed by EU-funds throughout their implementation which facilitated the certification process for the release of EU-funds. Each project was assigned a monitoring committee that carried out systematic assessments of the progress over its life (IMF, 2016). Poland is considered an example of good practice in policy evaluation: about a third of all evaluations of EU-funded programs during 2007–13 were on Polish programs. Regarding c*entral-local coordination* of investment, territorial contractual agreements were introduced to ensure coordination of initiatives implemented by regional governments. A forum was also established for coordination of strategic planning for EU investment funding.

Further reforms are underway to increase the effectiveness and accelerate the implementation of the 2014-20 programming agreement. Poland is committed to further reducing the procedural burden, and strengthening the integration of development programs for regions and sectors. In addition to these, prioritization of infrastructure projects—in line with a broad development strategy—should be improved, especially aiming at increasing allocations to areas where Poland would like to develop a competitive edge.

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Data Appendix

Countries in the sample. *Emerging*: Albania, Argentina, Belarus, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Cameroon, Chile, China, Croatia, Czech Rep., Estonia, Hungary, India, Indonesia, Jordan, Korea, Kosovo, Latvia, Lithuania, FYR Macedonia, Mexico, Moldova, Montenegro, Mozambique, Poland, Romania, Russia, Serbia, Slovak Rep., Slovenia, South Africa, Thailand, Turkey, Ukraine. *Advanced*: Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxemburg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Data on private and public capital stocks is taken from the IMF's Investment and Capital Stock Dataset (ICSD), constructed using a perpetual inventory equation (IMF, 2015, Appendix I) using data from the OECD Analytical Database (August 2014), Penn World Table (Version 8.0), and IMF's World Economic Outlook (WEO). Data on labor force, real GDP (PPP, 2011), the share of agriculture in GDP,

and the World Bank indicator on government effectiveness are taken from the World Bank's World Development Indicators. Data on general government's primary balance, and public debt are taken from the IMF's WEO, and International Financial Statistics (IFS). Data on capital grants are taken from Eurostat and the IMF's WEO. Data on EU structural and cohesion funds are taken from the European Commission's Directorate General for Regional and Urban Policy, available online at: https://data.europa.eu/euodp/en/data/dataset/funds-absorption-rate

MONETARY TRANSMISSION MECHANISM IN ROMANIA[1]

A. Introduction

1. This paper studies the monetary transmission mechanism in Romania. Earlier work in this area focused on the first segment of monetary transmission, namely the interest rate passthrough. Enache and Radu (2015) found that interest rate passthrough in Romania was near complete in the long run. In contrast, Saborwski (2012) found that the transmission of policy rate to both money market and retail lending rates was slow. Antohi et al. (2003) analyzed the connection between the financial sector and the real economy using theoretical intuitions. In this paper, we examine the relative importance of the various channels of monetary transmission using Vector Autoregressive Models (VARs).

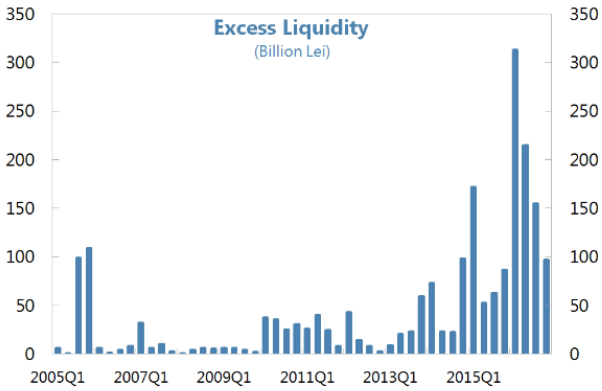
2. We find that the traditional interest rate channel and the exchange rate channel are relatively more important, as compared with the credit channel. Using the estimated model, we find that about a third of output variations at an eight-quarter horizon can be explained by policy rate changes. A comparison of the output responses to an interest rate shock—when the exchange rate channel is in play or is blocked off—shows that the inclusion of the exchange rate channel amplifies the output response and makes it more persistent. A similar exercise fails to establish an important role for the credit channel—output responses following interest rate shocks are similar when the credit channel is allowed to function or is excluded. Thus policy rate changes mainly affect the economy through changing the cost of capital but not the credit availability. This could be related to the relatively low credit penetration in Romania.

3. To inform policy formulation, we estimate the impact of monetary policy tightening—a policy stance foreseen in the near term—on output. Using the VAR model with four variables (real output, price level, policy rate and exchange rate) and estimated by allowing for the simultaneous feedback between the policy rate and the exchange rate, this paper finds that an interest rate hike of 0.5 ppt leads to a 1.2 percent decline in output in about 8 quarters. The result indicates the important role for monetary policy in managing domestic demand.

4. In addition, the paper seeks to understand if excess liquidity in the Romanian banking system, as observed recently, undermines the effectiveness of monetary transmission. Earlier research (e.g. Saxegaard (2006)) has generally concluded that excess liquidity in the banking system weakens the transmission of monetary policy. In this paper, we build a threshold VAR model, which allows for analyzing the impact of monetary policy changes on alternative regimes captured by

[1] Prepared by Li Lin.

different levels of excess liquidity. The results confirm that monetary policy is less effective in influencing price developments in an environment with higher excess liquidity. As a result, absorbing excess liquidity from the banking system and narrowing the interest rate corridor, thereby helping reduce the gap between the interbank rate and the policy rate, would help improve the monetary operation framework (Box 1).

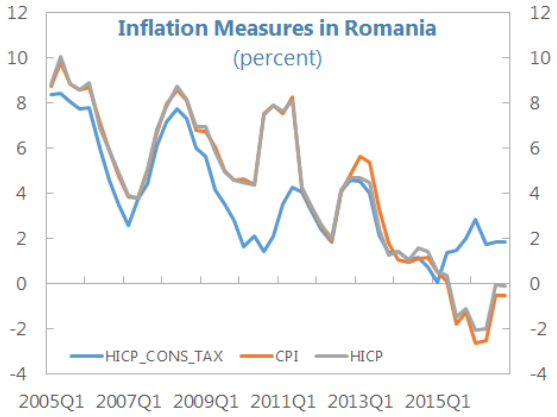


Note:Excess liquidity is meastured by deposits in the central bank's deposit facility.
Sources: NBR and IMF staff calculation.

B. A Baseline Model

5. As a starting point, the paper introduces a baseline VAR model with real GDP, HICP at constant tax and the monetary policy rate as endogenous variables, estimated over 2005Q3-2016Q4, with two lags. More specifically:

- The model includes HICP at constant tax, rather than the CPI index, as a measure of price developments. In recent years, tax policy changes have had material influences on price developments (text chart) and thus HICP at constant tax is considered a better measure of underlying inflation dynamics (text chart).



Source: Haver.

- The sample period starts at 2005Q3, to ensure that the monetary policy transmission mechanism is stable during the period. While a longer sample is available, considering that the NBR adopted the inflation targeting regime from August 2005, the monetary transmission mechanism prior to that could be rather different from the one in play afterwards.

- The output and price series are in log levels and thus the impulse response functions are interpreted as deviations from the baseline. Following Disyatat and Vongsinsirikul (2003), we choose to estimate the VAR in level other than in first difference, even though some variables in the model are likely non-stationary. Estimating the model in levels could capture the useful information on the long run relationships among the variables and still provide consistent estimators, even though this results in some efficiency losses.

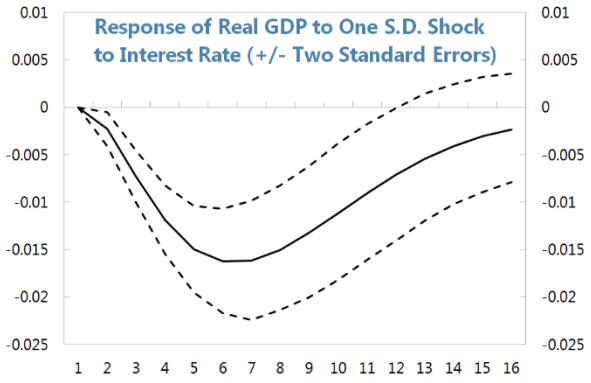
- The baseline VAR model was identified using a "recursive" Choleski decomposition by using the order of output, price level and interest rate. This assumes that changes in variables that come earlier in the list could influence subsequent variables contemporaneously. The assumptions—

output and price level respond to policy changes with a lag, while policy changes reflect information in contemporaneous output and price—are standard assumptions in the literature.

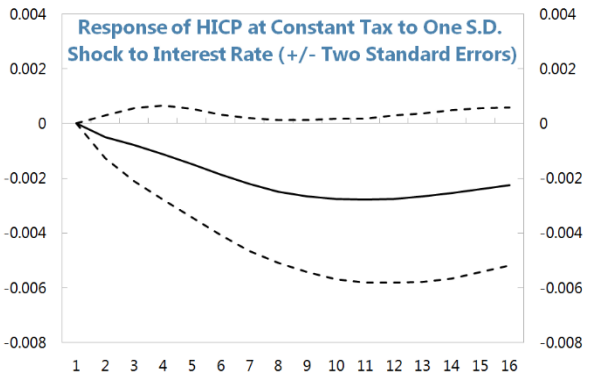
- Two lags are chosen for the model. Various information criteria, including the AIC, BIC and the HQ, suggest an optimal lag of two. Even though four lags might be needed to fully capture the seasonal effect, due to the limited length of the sample, we chose two lags to strike a balance between adequately capturing the dynamics of responses and maintaining a parsimonious model.

6. The baseline model suggests an important role for interest rate shocks in determining output while the passthrough of monetary tightening to price level was smaller (text chart and Figure 2).

- An unexpected tightening of monetary policy, corresponding to a 0.8 ppt increase in the policy rate, leads to a U-shape response in output, which reaches the trough at about 1.5 percent below the baseline in 6 quarters. The impact on output is rather persistent and only dissipates in about 16 quarters. The estimated price level response to monetary tightening, however, was smaller: it bottoms out at 0.3 percent below the baseline, but remains rather persistent. The impulse response functions also show that the central bank reacts to a positive shock to prices by increasing the policy rate, which has a negative impact on output.



Note: IRF generated by the recursive VAR (GDP, HICP at constant tax and policy rate).
Source: IMF staff estimation.



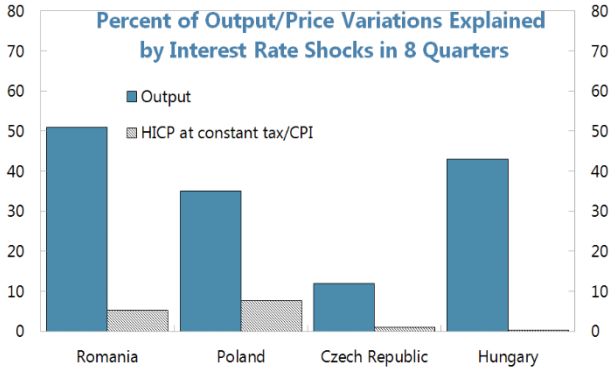
Note: IRF generated by the recursive VAR (GDP, HICP at constant tax and policy rate).
Source: IMF staff estimation.

- A variance decomposition also confirms the important role of interest rates in determining the output dynamic. The results indicate that, at an eight-quarter horizon, interest rate shocks account for about 50 percent of variations in output, while only explain about 5 percent of variations in prices at the same time horizon. Repeating the exercise for regional peers shows interest rate changes as a key driver for output variations in Poland and Hungary. The role of interest rates in influencing the price development is smaller in all countries considered.

Variance Decomposition of the Baseline Model

Period	GDP	HICP at constant tax	Policy rate
Variance decomposition of GDP			
4	76.8	0.9	22.3
8	46.9	2.1	51.0
12	41.2	2.7	56.2
16	40.9	3.0	56.1
Variance decomposition of HICP at constant tax			
4	1.4	97.4	1.2
8	3.7	91.0	5.3
12	4.8	85.3	9.8
16	5.1	82.7	12.2
Variance decomposition of the policy rate			
4	0.6	4.2	95.1
8	5.2	5.4	89.4
12	6.0	10.9	83.1
16	5.8	14.2	80.0

Source: IMF staff estimations.



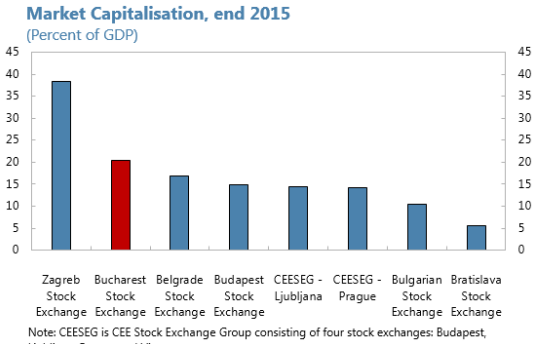
Note: Results generated by VARs (real GDP, HICP at constant tax, and policy rate) estimated in the same approach as the baseline model for Roamnia.
Source: IMF staff estimation.

C. Channels for Monetary Policy Transmission

7. We turn to study the channels through which monetary policy influences output. Besides the traditional interest rate channel, three other key channels are often considered in the literature:

- The credit channel works when the change in monetary stance through adjusting the policy rates not only adjusts the terms of financing but also the availability of credit. Therefore, the credit channel will amplify the impact of monetary policy changes.
- The exchange rate channel works when the change in monetary policy rates also affects net exports, in addition to domestic demand, due to the ensuing changes in exchange rates.
- The asset price channel works when changes in monetary policy leads to variations in equity prices, which have additional impact on business investment and household consumption decisions.

8. In this paper, we focus on the credit and exchange rate channels. Due to the small stock market capitalization in Romania (text chart), where only 86 companies are listed in Bucharest Stock Exchange, the asset price channel is unlikely to play an important role in the transmission of monetary policy. Even though fluctuations in real estate prices are also a potential conduit of monetary policy shocks, we choose not to proceed in this direction due to the relatively short data sample on property prices.



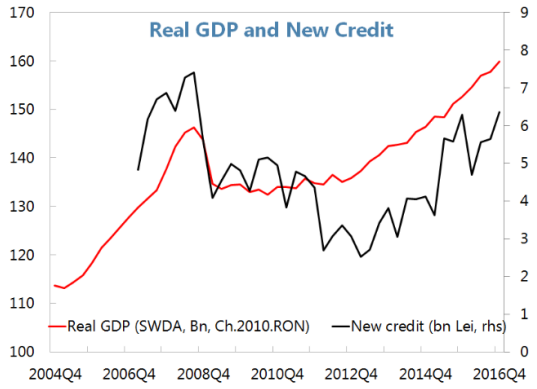
Note: CEESEG is CEE Stock Exchange Group consisting of four stock exchanges: Budapest, Ljubljana, Prague and Vienna.
Sources: FESE; Zagreb Stock Exchange; Bucharest Stock Exchange; Belgrade Stock Exchange; and Bratislava Stock Exchange.

9. To understand the relative importance of a specific channel, we compare the output response to monetary shocks when the variable of interest is treated, respectively, as an

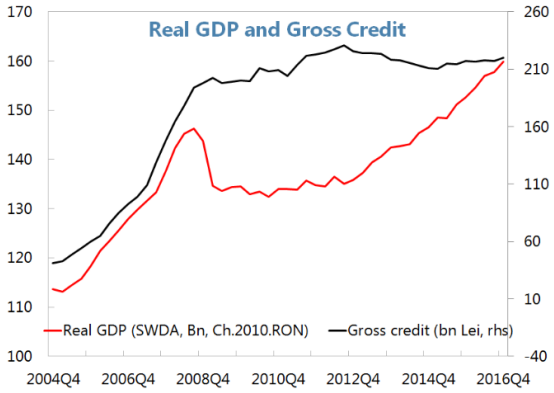
endogenous or exogenous variable in the VAR. To do so, we first estimate models with the variable of interest (i.e. bank credit or exchange rate) as endogenous variable and examine the interactions of the added variable with output, price and interest rate. Following Baqir (2002) and Disyatat and Vongsinsirikul (2003), we then compare the impact on output of a monetary shock when the respective channel is allowed to play or is blocked off. Our presumption is that the inclusion of the variable of interest as an endogenous variable should amplify the response of output to shocks, while blocking the variable's endogenous responses should dampen the output response.

Credit/bank lending channel

10. We augment the baseline VAR model with real new credit, estimated as a recursive VAR with data over 2005Q3 to 2016Q3 and with two lags. The order of the variables is real new credit, real GDP, HICP at constant tax, and policy rate. This assumes that the amount of credit does not respond to output, price and policy rate changes simultaneously, since it takes time to contract a loan, in particular corporate credit. We choose new credit extension instead of gross credit because the latter was influenced by NPLs write-offs and sales in recent years. As shown in the text charts, the new credit correlates better with output, while the gross credit leveled off post 2008 even though real output has been picking up.

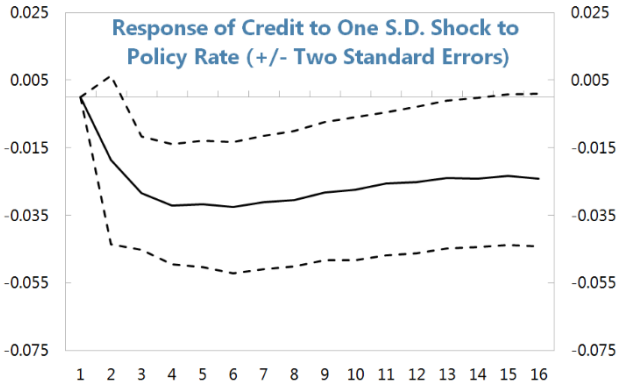


Sources: Haver and NBR.

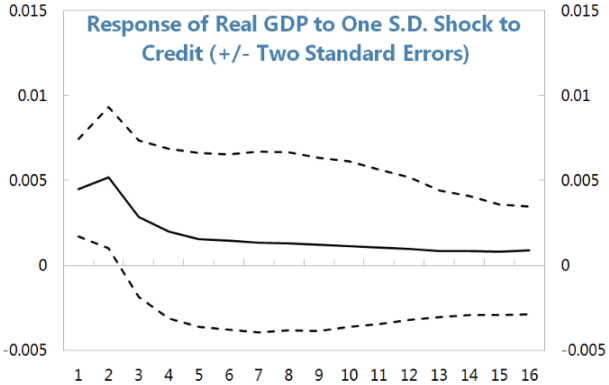


Source: Haver.

11. Impulse response functions show that monetary tightening reduces the availability of credit, and credit availability has a positive correlation with output changes (Figure 3 and text chart). An increase in the policy rate by one standard deviation (about 0.4 ppt) leads to a decline in new credit by about 3 percent in quarter four. Moreover, a one standard deviation shock to credit (about 18 percent) leads to an increase in output of about 0.5 percent in two quarters. Together these suggest a potential role for the credit channel, as a tightened monetary policy could lead to a decline of credit supply, which in turn has a negative effect on output. However, it also suggests that the credit channel may not be a strong one, as the change in policy rate may not be able to generate a change in credit availability that is sufficiently large to have a material impact on output. The interactions among other variables, including GDP, price level and interest rate, are on the same line as in the baseline model.

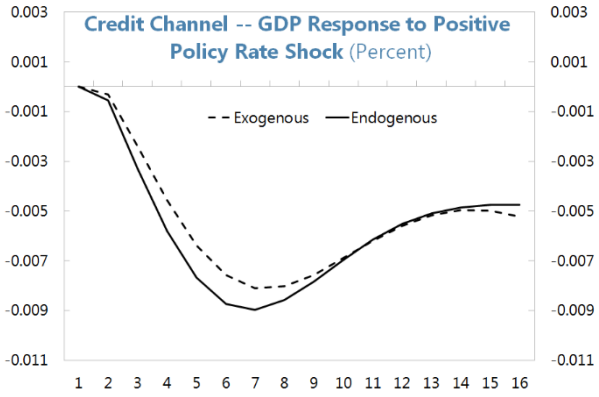


Note: IRF generated by the recursive VAR (real new credit, GDP, HICP at constant ta, and policy rate).
Sources: IMF staff estimation.



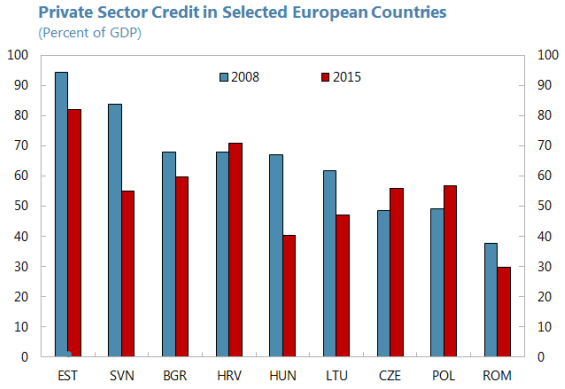
Note: IRF generated by the recursive VAR (real new credit, GDP, HICP at constant tax and policy).
Source: IMF staff estimation.

12. Our estimation shows a small difference in the impact of output when the credit channel is allowed to play or is blocked. As discussed above, to understand the role of the credit channel, we compare the output responses in models where the credit variable is treated as endogenous or exogenous, respectively. In the first case, when the real new credit is treated as an endogenous variable in the VAR model, we found that a positive interest rate shock of 0.4 ppt leads to a decline in output of about 0.9 percent at the most by about quarter seven. And the impact remains persistent. Treating real credit as an exogenous variable in the VAR model, leads to similar impact on output, both in terms of magnitude and persistence, even though the decline in output in smaller in this case.



Sources: IMF staff estimation.

13. The estimation indicates that the credit channel plays a small role in the transmission of monetary policy in Romania. This could be related to the relatively low credit penetration in Romania, as the private credit to GDP ratio is relatively low compared to peers (text chart). Anecdotal evidence suggests that, besides bank credit, Romanian companies also receive funding from retained earnings, parent companies aboard, and cross-border banks. The availability of these other funding sources, which are not captured by the credit issued by domestic banks, may explain the less sensitiveness of Romanian firms to domestic bank credit availability and therefore a small role for the credit channel in monetary transmission.

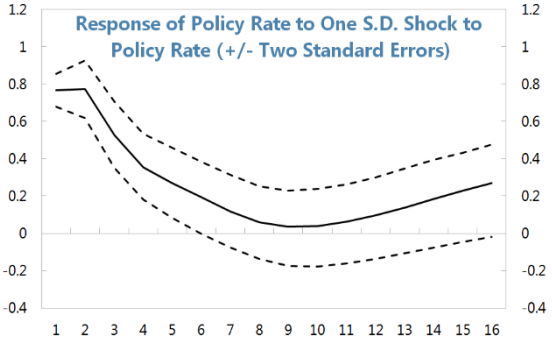


Sources: Haver Analytics; and IMF staff estimates.

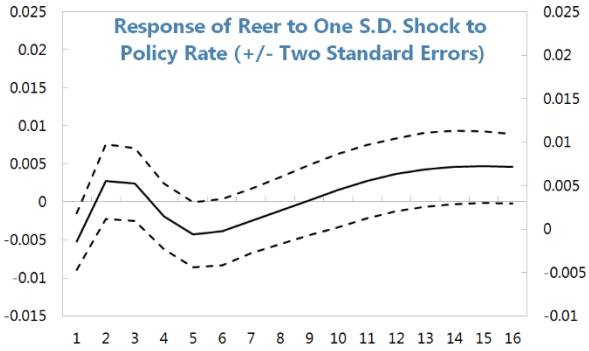
Exchange rate channel

14. We augment the baseline VAR model with the real effective exchange rate, estimated as a structural VAR also with data over 2005Q3 to 2016Q3, and with two lags.

- A structural VAR is chosen over the standard recursive VAR, since the latter[2] generates an "exchange rate puzzle", which is inconsistent with theory. A recursive VAR assumes either that interest rate does not simultaneously respond to exchange rate movement, or vice versa. This may violate the relationships of the above two variables in practice, where the two variables tend to respond to each other in a timely manner. In the case of Romania, impulse response functions from the recursive VARs generate an "exchange rate puzzle", namely exchange rate depreciation following a positive interest rate shock (text chart and Figure 4).



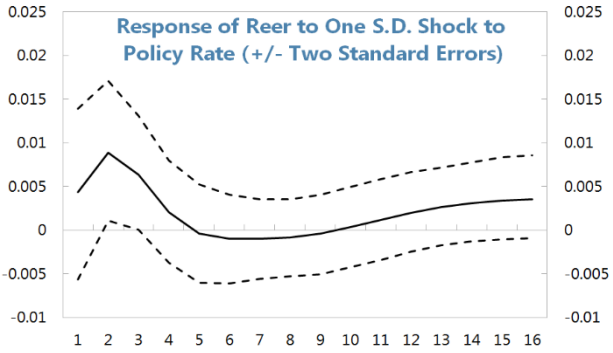
Note: IRFs generated by the recursive VAR (GDP, HICP at constant tax, policy rate, and reer).
Sources: IMF staff estimation.



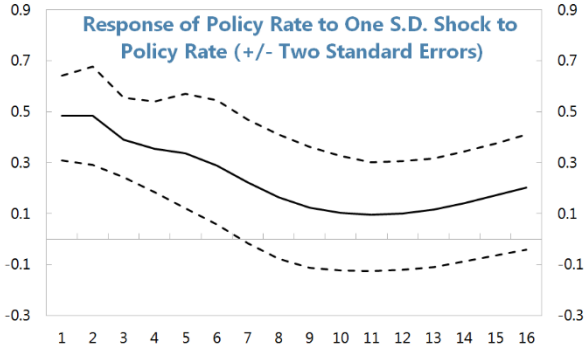
Note: IRFs generated by the recursive VAR (GDP, HICP at constant tax, policy rate, and reer).
Sources: IMF staff estimation.

[2] With the ordering of real GDP, HICP at constant tax, policy rate and reer.

- To solve the "exchange rate puzzle", following Bjornland (2009), we estimated a structural VAR which allows for a simultaneous relation between the exchange rate and the policy rate. To fully identify the model, we place a long-term restriction assuming that monetary policy changes are long-term neutral for the real exchange rate. The impulse response functions generated by the structural model show that the interest rate increased, instead of decreasing, following a positive interest rate shock (text chart and Figure 5).

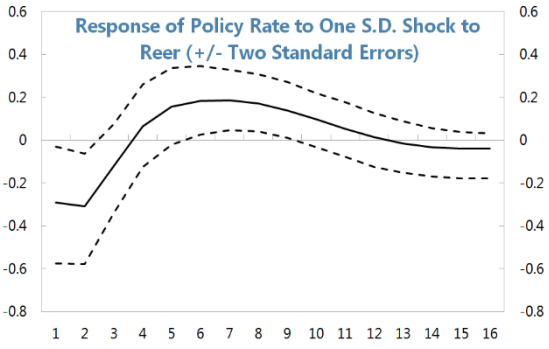


Note: IRFs generated by the structural VAR (GDP, HICP at constant tax, policy rate, and reer) which allows for simultaneous relation between policy rate and reer).
Sources: IMF staff estimation.

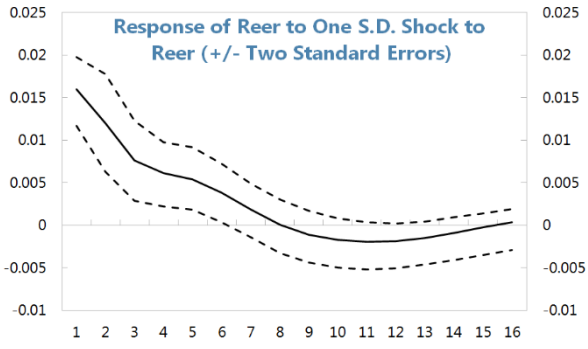


Note: IRFs generated by the structural VAR (GDP, HICP at constant tax, policy rate, and reer) which allows for simultaneous relation between policy rate and reer).
Sources: IMF staff estimation.

15. Other impulse response functions generated by the structural VAR are reasonable (text chart and Figure 5). As shown above, a one standard deviation shock to the policy rate (about 0.5 ppt) leads to an appreciation of the exchange rate by about 0.9 percent in the second quarter. The model also shows that a positive shock to the real effective exchange rate (about 1.6 percent) will lead to a decline in the policy rate of about 0.3 ppt in two quarters. This happens as the inflation targeting central bank reacts to exchange rate appreciation, which would lead to lower import prices, by reducing the policy rates. The model also shows that the same shock to the exchange rate leads to an increase in output of about 0.5 percent in four quarters. This is not surprising as other research also found similar results in countries including Poland and Czech Republic (Franta et al. (2014) and Arratibel and Michaelis (2014)), where the interest rate channel (positive effect on output, since interest rates decline following an appreciation) dominates the expenditure switching channel (negative effect on output, since exports decline due to the appreciation).

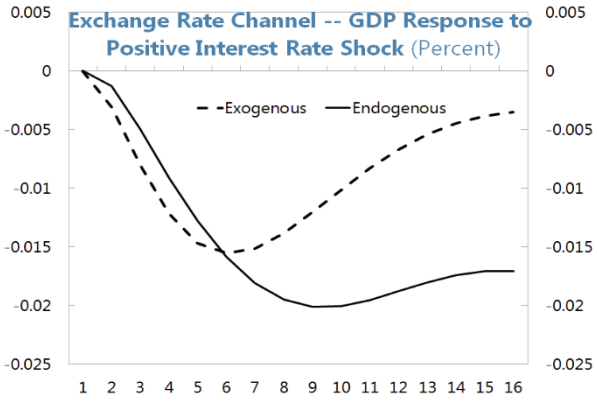


Note: IRFs generated by the structural VAR (GDP, HICP at constant tax, policy rate, and reer) which allows for simultaneous relation between policy rate and reer).
Sources: IMF staff estimation.



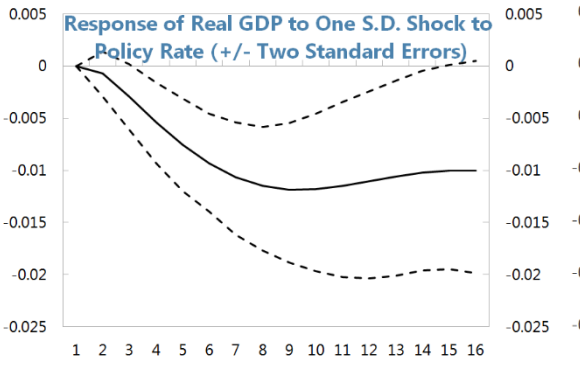
Note: IRFs generated by the structural VAR (GDP, HICP at constant tax, policy rate, and reer) which allows for simultaneous relation between policy rate and reer).
Sources: IMF staff estimation.

16. Our estimation shows that the exchange rate channel did serve to amplify the impact of the interest rate shock, by making the decline in real output larger and more persistent. As with the analysis of the credit channel, we estimate the output impact of a monetary policy tightening when the exchange rate variable is treated as exogenous or endogenous, respectively, in the VAR model. In the first case, we find that a positive interest rate shock of 0.8 ppt leads to a maximum decline in output of about 1.5 percent after six quarters. When the exchange rate is an endogenous variable in the VAR model, the same shock to the policy rate leads to a maximum decline of 2 percent of GDP in quarter eight. And the impact remains more persistent in this case. This shows that the exchange rate channel is in play and has a relatively important role in amplifying the output response to policy rate shocks. As discussed above, a policy rate hike not only increases the cost of capital in the economy, which reduces domestic demand, but also leads to an exchange rate appreciation and hence lower net exports.

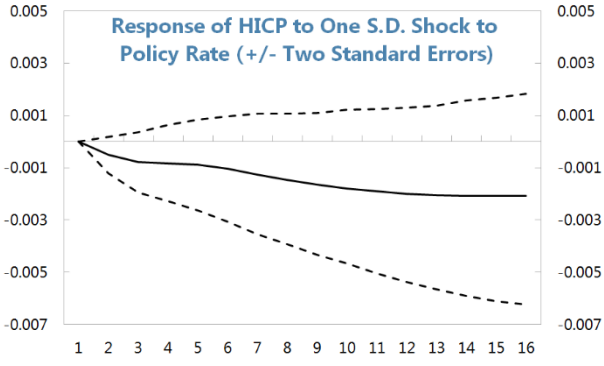


Sources: IMF staff estimation.

17. Using the structural VAR with the exchange rate channel, monetary policy is estimated to have an important role in managing domestic demand. A one standard deviation shock to the policy rate (about 0.5 ppt) would lead to a decline of GDP, which gradually bottoms out at about 1.2 percent below the baseline in about two years. The policy rate hike also leads to a decline in the price level, though the impact is not statistically significant. The variance decomposition shows that about a third of variations in output at an eight-quarter horizon could be explained by changes in policy rates, highlighting the important role of monetary policy in influencing domestic demand.



Note: IRFs generated by the structural VAR (GDP, HICP at constant tax, plicy rate, and reer) which allows for simultaneous relation between policy rate and reer).
Sources: IMF staff estimation.



Note: IRFs generated by the structural VAR (GDP, HICP at constant tax, policy rate, and reer) which allows for simultaneous relation between policy rate and reer).
Sources: IMF staff estimation.

D. Time Variation of the Monetary Transmission Mechanism

18. We use a threshold VAR to analyze the effect of monetary policy on economic activity depending on the conditions of excess liquidity. We introduce excess liquidity as a threshold variable into the baseline VAR and allow for different interactions among the endogenous variables depending on the specific regime of excess liquidity (i.e. High or Low). We then estimate the model and generate impulse response functions conditional on the two specific regimes for excess liquidity. More specifically, following Balke (2000), the threshold VAR is as follows:

$$Y_t = A^1 Y_t + B^1(L) Y_{t-1} + (A^2 Y_t + B^2(L) Y_{t-1}) I[S_{t-d} > \gamma] + U_t$$

- Y_t is a vector of endogenous variables containing real GDP, HICP at constant tax, policy rate and the threshold variable (excess liquidity). A^1 and A^2 are the contemporaneous matrices and $B^1(L)$ and $B^2(L)$ are the lag polynomial matrices. *I* is an indicator function that takes the value of 1 if the excess liquidity is higher than the threshold value of γ, and 0 otherwise. And d is the time lag for evaluating the regime. Both the contemporaneous effects and lag effects are allowed to vary across regimes.

- We assume that A^1 and A^2 have a recursive structure with the causal ordering of real GDP, HICP at constant tax, policy rate and excess liquidity.

- The model is estimated by least squares for all possible threshold values and the estimated threshold value is the one that maximize the log determinants of the "structural" residuals.

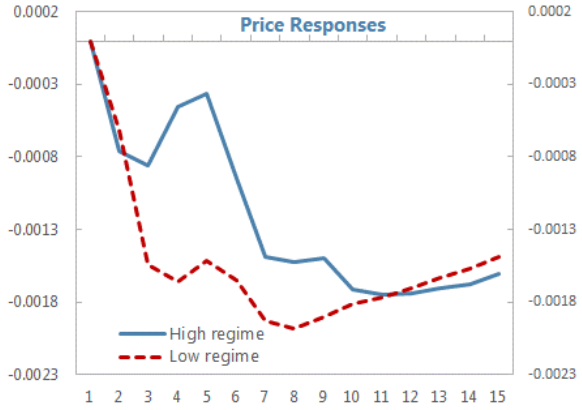
19. Our result suggests that monetary policy would be less effective in achieving its primary purpose of maintaining price stability in an environment with high excess liquidity (Figure 1). The estimated impulse responses show that, in an environment with low excess liquidity, a policy rate hike leads to larger decline in price level: a 0.25 ppt increase in policy rate results in a decline of price level by 0.15 percent, as compared to 0.03 percent in the case with high excess liquidity. As a result, in the latter case (i.e. the regime with high excess liquidity), to contain inflationary pressure, the policy rate has to be maintained at a much higher level than in the case with low excess liquidity, thereby generating larger output losses.

E. Conclusion

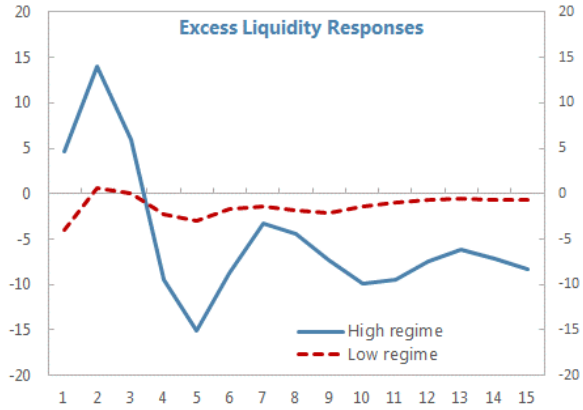
20. This paper contributes to the understanding of monetary policy transmission mechanism and policy discussions in Romania. It shows that the traditional interest rate channel and the exchange rate channel are more important than the credit channel and asset price channel in the transmission of monetary policy. The paper also estimates the impact of tightening monetary policy. It shows that a 0.5 ppt increase in the policy rate leads to a 1.2 percent decline in output. Finally, the paper offers empirical evidence that, in maintaining price stability, monetary policy is less effective in an environment with higher excess liquidity, which motivates the need for the authorities to mop-up excess liquidity in the interbank market, and would help improve the effectiveness of monetary policy transmission in Romania.

Figure 1. Impulse Responses to Policy Rate Shocks 1/

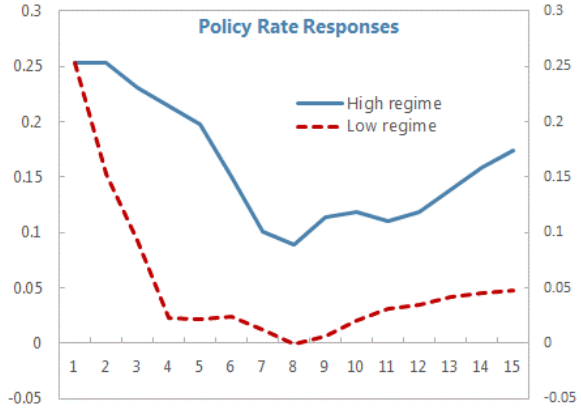
In a regime with low excess liquidity, the policy rate hike has faster and larger impact on prices as compared with…



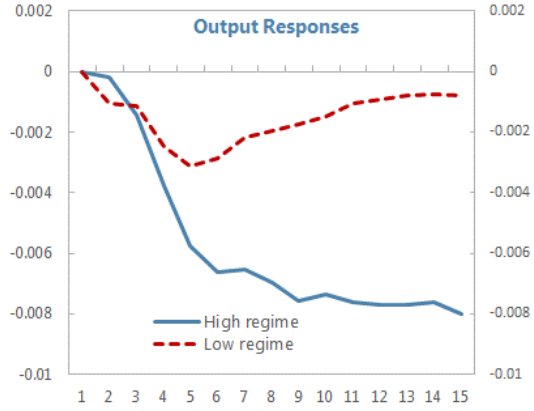
…an environment with abundant liquidity, where market is less sensitive to changes monetary policy stance.



As a result, policy rate has to be kept at a higher level to contain inflationary pressure in an environment with…



…higher excess liquidity, resulting in larger output losses.

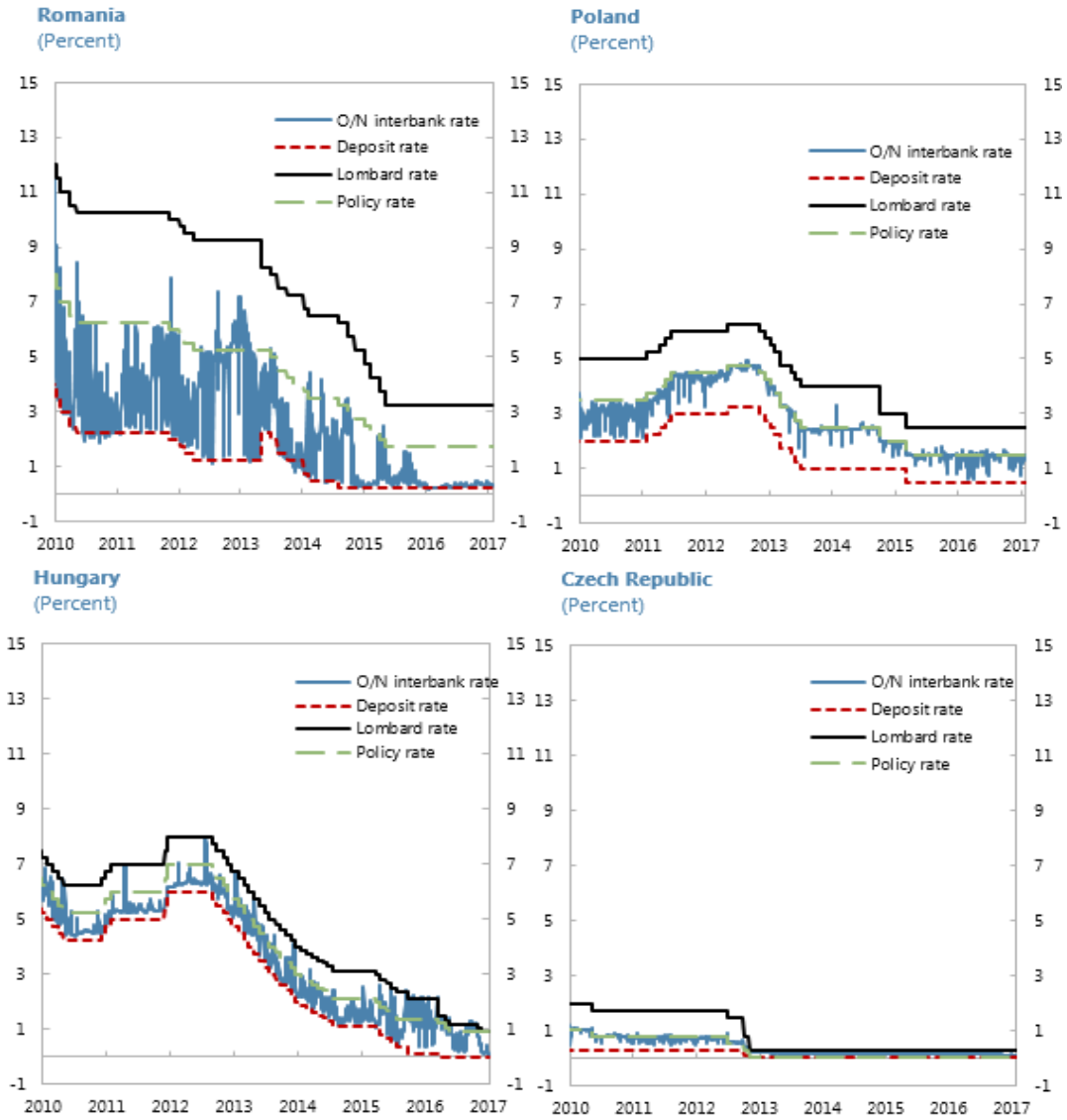


Note: the charts show the impulse responses to two standard deviation shocks to the policy rates. As the shocks have different magnitudes across regimes, we standardize the size of the interest rate shock and the responses in the regime with low excess liquidity using the size of the initial interest rate shock in the regime with high excess liquidity.

Box 1. Monetary Operation Framework in Romania

Romania operates an interest rate corridor system. NBR announces policy in terms of the interest rate for its main open-market operations, which currently are in the form of 7-day, tender-based, fixed rate repo operations. NBR also makes available the marginal lending and deposit facilities to inject and withdraw reserve money, respectively, which serve as the upper and lower bounds to the overnight interbank rates.

CE 4 Interest Rate Corridor and Interbank Rate Volatility



Sources: Bloomberg; and Haver Analytics.

Box 1. Monetary Operation Framework in Romania (concluded)

Compared with other CE4 countries, Romania operates the widest interest rate corridor, which is associated with higher interbank rate volatility in most of the past few years[3]. High volatility of the interbank rates can make it difficult to clear communicate the monetary policy stance. A tighter interest rate corridor will generally help reduce the volatility of interbank rates, in particular when liquidity could not be perfectly managed due to challenges in liquidity forecasting and also possible market segmentations. In line with staff's advice, NBR has narrowed the interest rate corridor gradually to 300 bps as of early 2017. Staff's view is that the corridor could be further tightened without jeopardizing the role of market intermediation. As discussed in a previous IMF report[4], it appears that, for all markets, a corridor narrower than 50 bps is too narrow to motivate interbank transaction. On the other hand, a corridor wider than 200 bps increases the opportunity cost of being short of reserve balance and motivates liquidity hoarding, which can discourage interbank transactions and lead to higher volatility in market rates.

Interbank rates have deviated from the policy rate due to the excess liquidity, potentially weakening the signaling power of policy decisions. Reductions of reserve requirements, partly an effort to harmonize with EU regulation, coupled with treasury operations related to the disbursement of EU funds and weak credit growth, has created excess liquidity in the banking system. Partly in light of concerns related to attracting capital inflows in a globally low interest environment, NBR has kept excess liquidity in the system. As a result, the market rates have been trading around the bottom of the corridor, leading to a gap between the interbank rates and the policy rate. The continued gap between the interbank rate and policy rates has undermined the effectiveness of the monetary policy framework, as highlighted in a IMF technical assistant report. Other countries in the region, however, were able to closely align the interbank rate with the policy rate.

Current domestic and global developments provide an opportunity for absorbing excess liquidity and narrowing the interest rate corridor in Romania. Given the prospects of higher than desirable inflation the forecast horizon, Staff has recommended that NBR moves to start absorbing excess liquidity and narrowing the interest rate corridor. As discussed above, this would also improve the clarity of monetary policy in Romania and lay the ground work for an eventual hike. Given the faster normalization of interest rate in US, a tightening move in Romania will less likely attract a new wave of capital inflow. Meanwhile, a gradual move to full-fledge inflation targeting would help mitigate concerns related to capital inflow.

[3] The volatility of interbank interest rates has declined in the recent period, against the background of the increase in the net liquidity surplus in the banking system.

[4] See Gray et al (2013) "Monetary Issues in the Middle East and North Africa Region, a Policy Implementation Handbook for Central Bankers".

Figure 2. Baseline Recursive VAR (real GDP, HICP at constant tax, policy rate

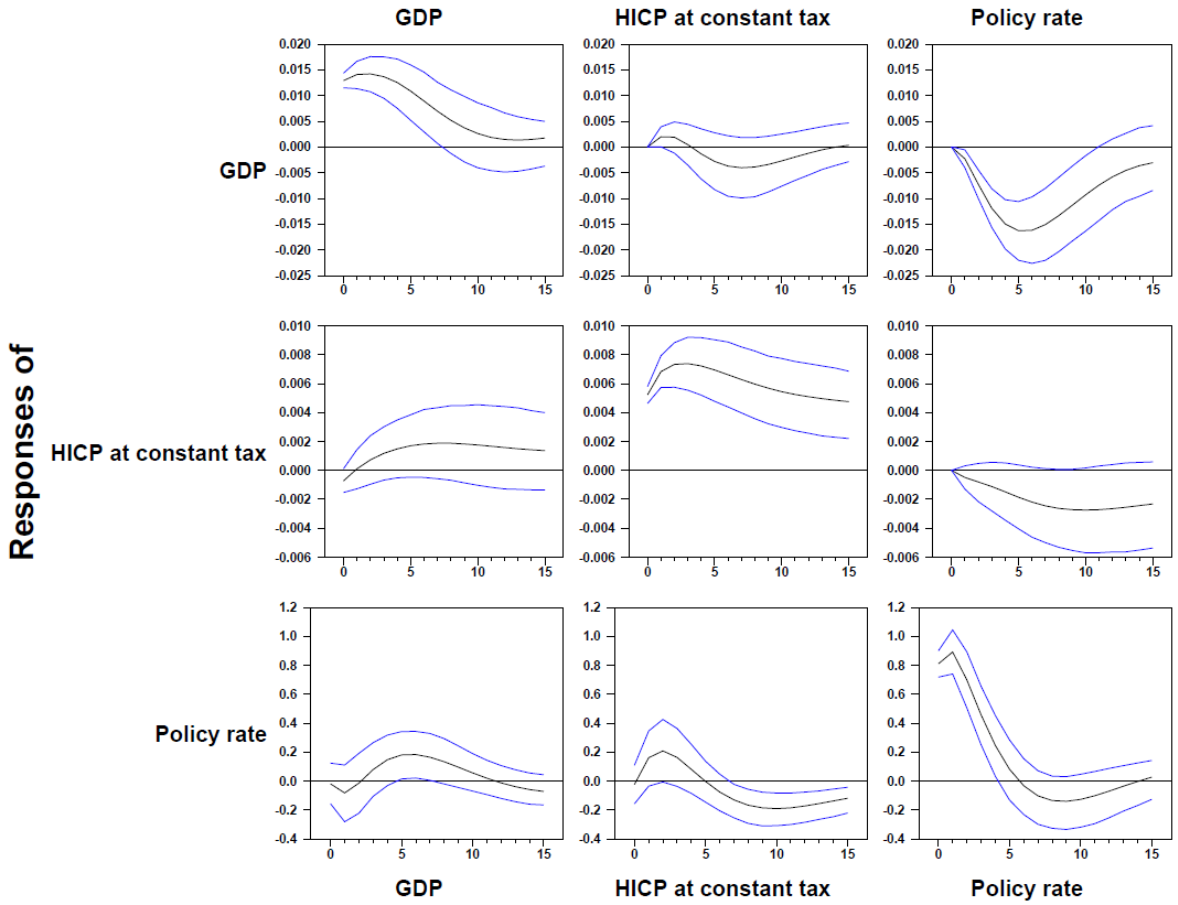


Figure 3. Recursive VAR (Real new credit, real GDP, HICP at constant tax, policy rate

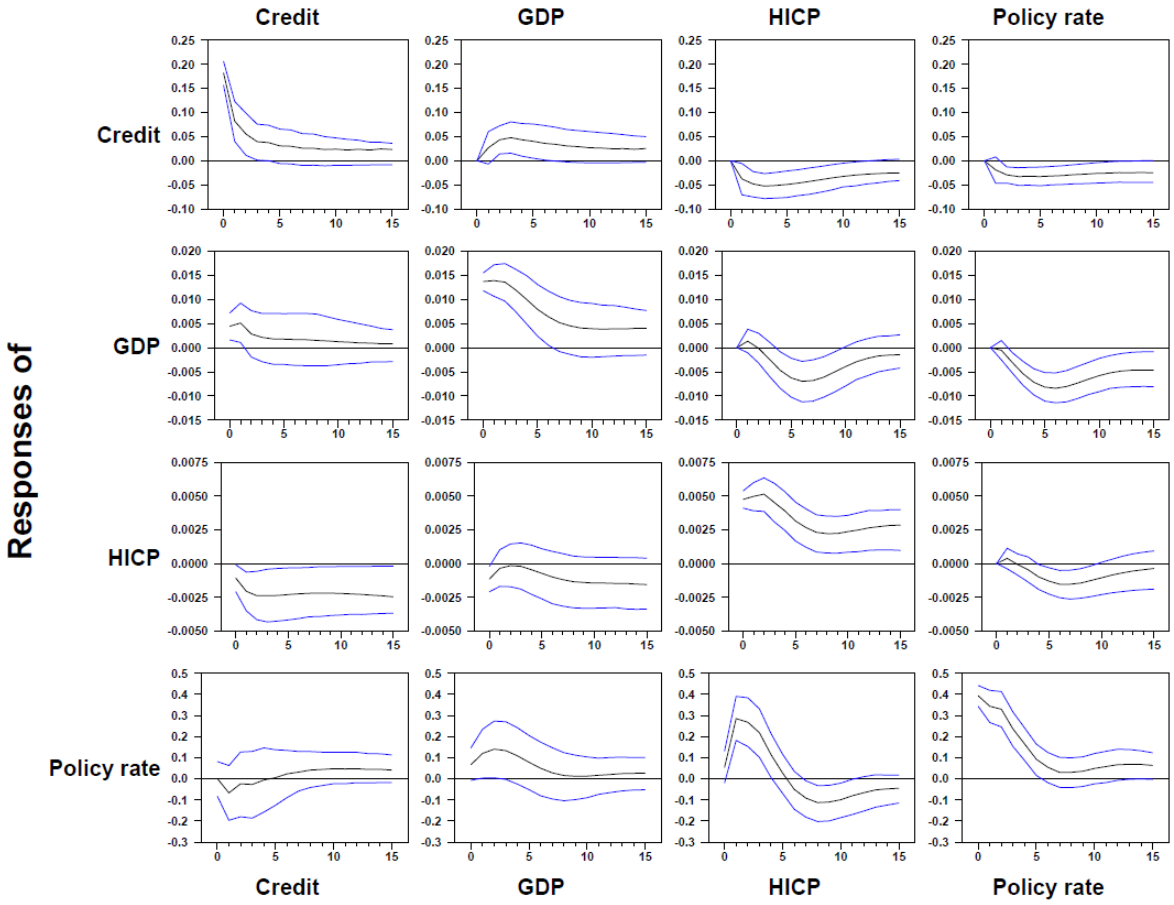


Figure 4. Recursive VAR (Real GDP, HICP at constant tax, policy rate and reer) and "Exchange rate puzzle"

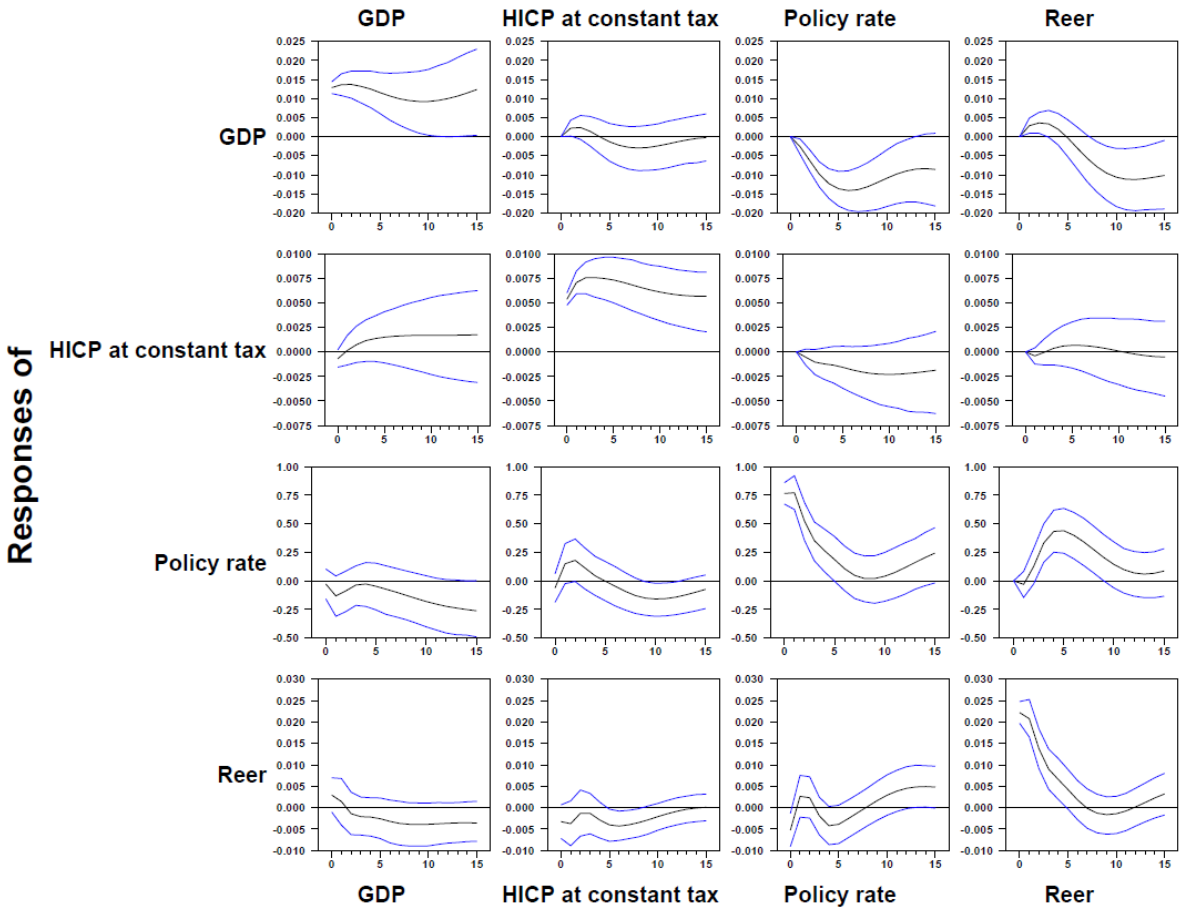
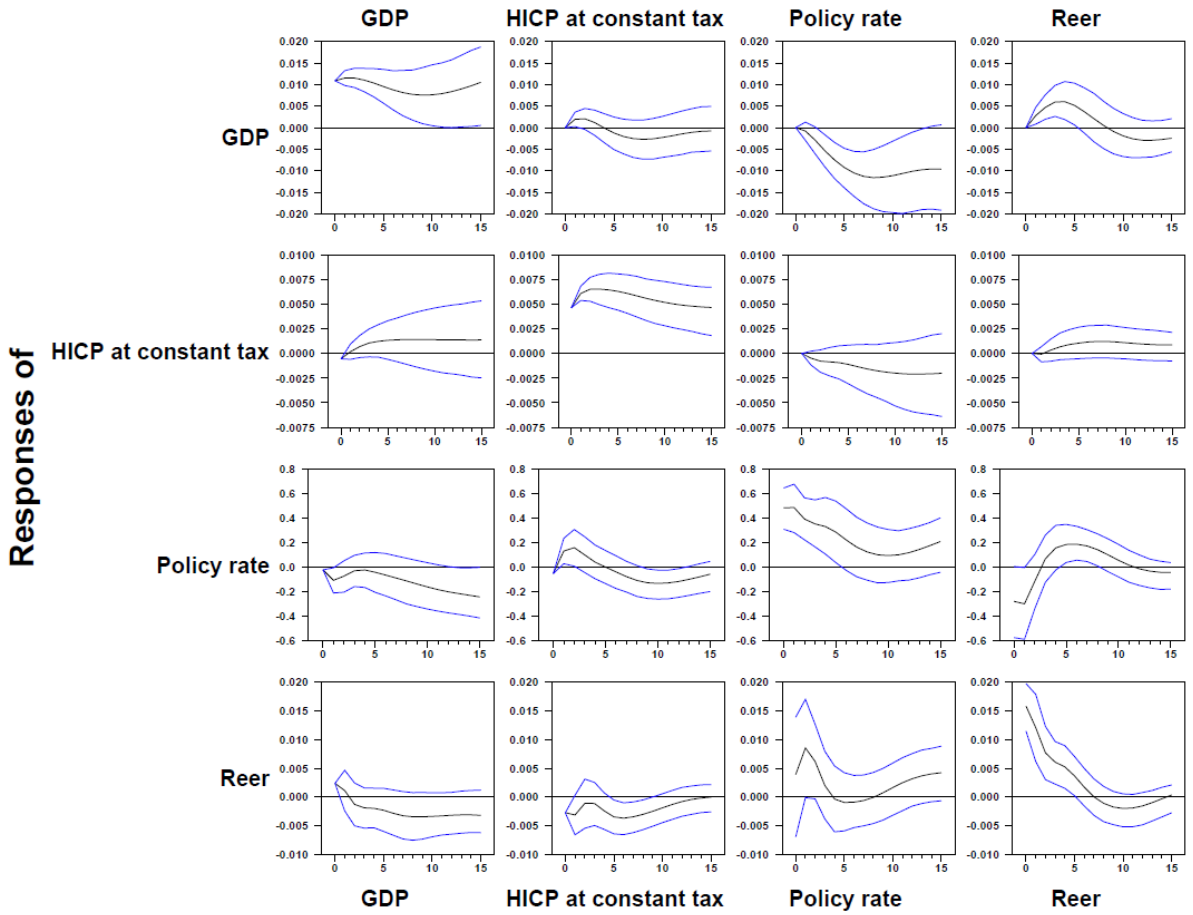


Figure 5. Structural VAR (Real GDP, HICP at constant tax, policy rate and reer)



Annex I. Data Descriptions and Source

	Description	Source
Real GDP	Gross Domestic Product (Seasonally and work day adjusted, 2010 chained volume)	Eurostat and Haver
CPI	Seasonally adjusted; 2010=100	Romania NIS and Haver
HICP at constant tax	Seasonally adjusted; 2015=100	Eurostat and Haver
Policy rate	Monetary policy rate (eop) for Romania; reference rate (avg per annual) for Poland; two-week repo rate (eop) for Czech Republic; base rate (avg) for Hungary	Central banks and Haver
REER	JPMorgan Real Broad Effective Exchange Rate Index, CPI based; 2010=100	Haver
New credit	New business lending	NBR
Gross credit	Non-government domestic credit	NBR and Haver
Excess liquidity	Total monthly deposit in central bank's facility[5]; seasonally adjusted	NBR monthly bulletin

[5] The NBR published monthly total deposits until January 2014, after which daily average value was published. We estimate the month total value by multiplying the daily average amount by a factor of 21.

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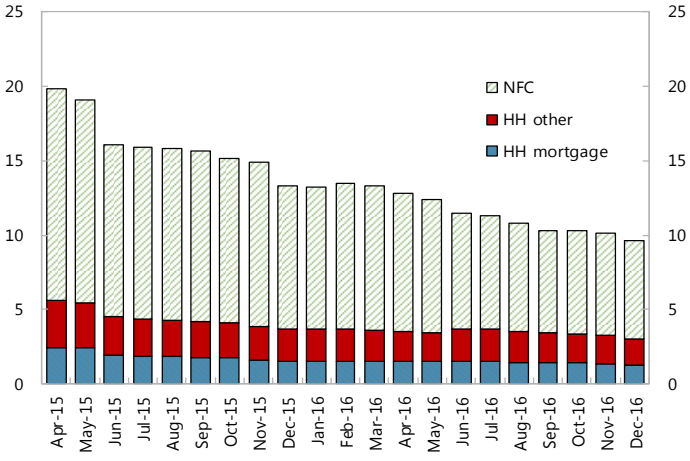
ENHANCING THE IMPACT OF RECENT REFORMS TO THE INSOLVENCY LAWS IN ROMANIA[1]

A. Background

1. Romania overhauled its business insolvency framework in 2014 and adopted a new personal insolvency law in 2015.[2] These reforms aim to modernize business insolvency procedures to better enable the rescue of viable businesses, speed up the liquidation of unviable businesses and recognize the need for a fresh start for over-indebted individuals. The effective implementation of the procedures for resolution of both business and personal insolvency depends on a strong institutional framework, which in the case of the personal insolvency reform is yet to be established.

2. Although nonperforming loans (NPLs) have declined significantly, a strong insolvency framework is important to facilitate efficacious private debt resolution. NPLs have declined to under 10 percent of loans, with about a third of the NPLs in the household segment (Figure 1). Data on the business insolvency law indicates that the pre-insolvency procedures have seen limited use or success, and the judicial reorganization procedure could be strengthened. Further, the insolvency procedure is lengthy and there are often delays which may be attributed in part to overburdened courts and misalignment of the incentives for insolvency professionals. The involvement of public creditors is limited and often not conducive to the reorganization process. Due to delays in setting up the necessary institutional framework, the entry into force of the personal insolvency law has been delayed twice. It is now scheduled to become effective on August 1, 2017, although further delays are likely. Monitoring the impact of reforms through data is difficult as the collection of insolvency data is limited: for instance, no data on size and types of claims is available; and the data available is not regularly published and analyzed.

Figure 1. NPL
(Percent of total loans)



Sources: Romanian authorities; and IMF staff calculations.

[1] Prepared by Anjum Rosha (LEG)

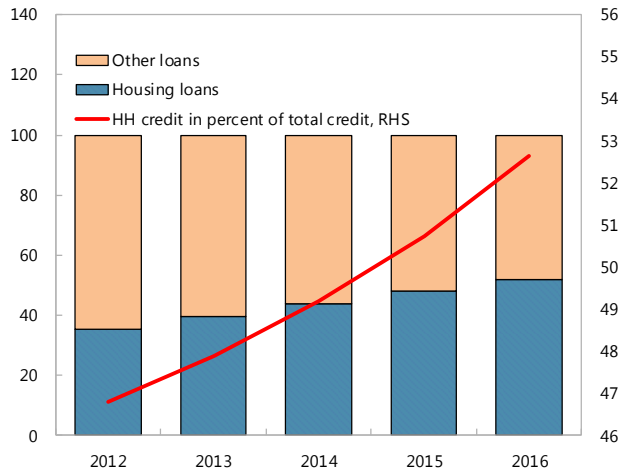
[2] Law No. 85/2014 and Law No. 151/2015

3. This paper takes stock of the status of the insolvency framework in Romania and outlines considerations for the way forward. The first section of this paper analyses the key features of the personal insolvency law, the second section assesses the experience with the business insolvency law, and the third section discusses the adequacy of the methodology for collection of insolvency case data. The final section presents reform recommendations.

B. Personal Insolvency Law

4. Household lending comprises about half of the banks' credit stock. Mortgage lending as a share of credit has been steadily increasing (Figure 2) and more recently, consumer lending has started to accelerate. Given the cyclical position of the economy, interest rates are expected to rise and increase pressure on the payment capacity of debtors. A personal insolvency law may prove useful to both debtors and creditors in addressing individual over-indebtedness.

Figure 2. Household Credit
(Percent of total)



Sources: Romanian authorities; and IMF staff calculations.

5. A well-functioning personal insolvency framework is an important element of a modern debt resolution toolkit. Personal insolvency law should aim to preserve an appropriate balance between maintaining credit discipline and affording good faith debtors a fresh start. It would be a more appropriate tool than ad-hoc solutions that were recently introduced in Romania, such as the mandatory conversion of foreign exchange denominated loans or the retroactive application of the giving in payment law. It would also be timely given the expansion in credit to households and the potential impact of increasing interest rates on the affordability of mortgages.

6. The Law No. 151/2015 on Insolvency of Individuals ("LII") was adopted in mid-2015, but has not yet become effective. Romania's adoption of a personal insolvency law providing over-indebted consumers with a second chance is in keeping with the trend in several Eastern European countries that have adopted personal insolvency laws following the global financial crisis (see Table 1). The LII was adopted without any impact assessment being conducted, an omission that should be remedied. Its implementation has been twice delayed due to the challenges in establishing the new institutional framework required under the law. The authorities expect to start implementation on August 1, 2017.

Table 1. Personal Insolvency Law Reform in Selected Eastern European Countries						
	Latvia	**Lithuania**	**Poland**	**Slovenia**	**Bulgaria**	**Romania**
Year of reform	2010	2012	2014	2016	N/A Draft Bill introduced in 2015 for protection of over-indebted individuals	2015
Coverage	Consumers only	All natural persons	Consumers only	All natural persons		Consumers only
Procedures available	Debt settlement through a court approved repayment plan follows a liquidation of the debtor's nonexempt assets.	Debt settlement through a court approved repayment plan which could include liquidation of the debtor's nonexempt assets. Fast track" option where a plan and the bankruptcy petition are filed together and the court decides which one to proceed with.	Procedures for debt settlement and liquidation of the nonexempt assets followed by a repayment plan adopted by the court. If the personal situation of the debtor demonstrates that s/he is unable to satisfy any claims under a payment plan, the court may grant an immediate discharge without adopting a payment plan	Liquidation of the debtor's nonexempt assets followed by a court approved payment plan		Debt settlement through a court approved repayment plan and liquidation of the nonexempt assets. Fast track process for debtors with no income and no assets.

Table 1. Personal Insolvency Law Reform in Selected Eastern European Countries (concluded)						
Eligibility	Debtors who are unable to pay overdue debt in an amount exceeding 5,000 euros or debt exceeding 10,000 euro falling due within one year may file.	Debtors with obligations exceeding 25 minimum monthly wages which they cannot meet may file.	Debtor may file along with prima facie evidence of insolvency. Insolvency is presumed if the delay in performing his or her obligation exceeds three months	Debtors obliged to file if the debt exceeds 1000 euro and the debtor is unemployed; or if the debt exceeds three times salary plus income over two months.		Debtor may file if the debt exceeds 15 times the minimum wage.
Primary residence	Sale may be delayed for up to 1 year in certain circumstances	Currently none but special provisions are under consideration	Not excluded from enforcement, however, debtor is awarded an amount from the proceeds of liquidation to pay rent for 12-24 months	Not excluded from enforcement		Not excluded from enforcement, although insolvency professional may suggest how to deal with the residence in the repayment plan
Discharge period	1 to 3.5 years	5 years	3 years (plus 18 months in some cases at court's discretion)	2-5 years (depending on age, family status, health, cause of insolvency, etc)		1-5 years
Source: EC, 2016, Study on a new approach to business failure and insolvency Comparative legal analysis of the Member States' relevant provisions and practices.						

7. The LII establishes two new entities: (i) the Central Insolvency Committee (CIC) which will perform monitoring and coordinating functions and (ii) the Territorial Insolvency Committees (TICs), which will perform quasi-judicial functions and supervise individual cases, in each of Romania's forty-two counties. The design of the LII relies heavily on trained insolvency professionals and the TICs. Districts courts perform only a limited dispute resolution and oversight function, effectively shifting most of the burden away from the judiciary to the TICs

8. The LII provides three procedures for individuals whose debts do not arise from the operation of a business: (i) repayment plan procedure; (ii) judicial liquidation of assets; and (iii) fast track insolvency. Each procedure is time-bound, uses standardized forms, and relies significantly on the use of an insolvency professional. The commencement of any one of the procedures triggers a limited, time-bound stay on individual enforcement action by creditors. The repayment plan procedure is the most flexible and enables the debtor to continue to maintain possession of assets during the procedure and continued ownership over assets at the end of the procedure, to the extent permitted under the repayment plan. The judicial liquidation procedure envisages a liquidation of the debtor's pursuable assets (non-pursuable assets that are exempted from sale include goods for the debtor's personal use, tools of trade, etc.) and continued payments by the debtor for a period thereafter. Each of the three procedures, if successful, affords the debtor with the opportunity for a court ordered release from any residual debts ("discharge"). A court may revoke the debtor's discharge within 3 years if the debtor is found to have committed fraud. (See Box 1 for details).

Box 1. Procedures available under the Insolvency of Individuals ("LII")

The repayment plan procedure under the LII envisages the debtor and a super majority of its creditors agreeing on a repayment plan and confirmation of the plan to bind any holdout creditors. The TIC and the administrator play a key role in the process. The TIC receives applications from debtors, appoints an administrator, issues decisions on whether to accept the plan and monitors the implementation of the plan based on bi-annual reports of the administrator. The administrator assists the debtor with preparation of a plan, notifies all creditors, prepares a table of claims, and facilitates conciliation between the debtor and the creditors. The repayment plan is approved if it is supported by creditors holding 55% of total value of claims and secured creditors holding 30% of the total value of secured claims. If a plan is not approved by the creditors as detailed above, but certain conditions are met (e.g. the administrator finds that the plan is fair and achievable, claims coverage ratio is at least 50% and higher than it would be in liquidation, creditors holding a majority of claims support the plan), the court may confirm the plan over the objections of the holdout creditors. If a plan is not confirmed by the court or the debtor fails to perform under the plan, judicial liquidation proceedings may be commenced (see below). If the repayment plan is successfully completed, the administrator issues a report, the TIC closes the proceedings and the debtor may petition the court for a discharge.

The judicial liquidation procedure under the LII requires settlement of debts through a liquidation of the debtor's pursuable assets, followed by a repayment period. The judicial liquidation process may commence at the debtor's request, or it may follow an unsuccessful repayment

Box 1. Procedures available under the Insolvency of Individuals ("LII") (concluded)

plan procedure. A court appointed a liquidator takes stock of the debtor's assets, prepares the table of claims (if not prepared in the course of the repayment plan procedure) and liquidates the debtors' pursuable assets. Once the debtor's pursuable assets are sold, the court issues an order closing the proceedings and the TIC takes over the supervision of the case. The TIC assesses the debtor's capacity to pay and reasonable living expenses with the help of the liquidator, and sets the payments to be made by the debtor going forward. The TIC monitors changes in the debtors' finances on a semi-annual basis, and if the debtor acts in good faith (including continuing to share information) and (i) pays at least 50% of the remaining debts in 1 year, or (ii) 40% of the remaining debts in 3 years, or (iii) after 5 years of payments, the court may discharge the debtor.

The fast track insolvency procedure under the LII applies in cases where the debtor has small debts, no income and no assets. The debtor petitions the TIC which conducts due diligence and notifies the court as to its findings. A three-year observation period follows during which the debtor may not run into new arrears, may not take a new loan, and is required to report her financial standing to the TIC on an annual basis before the debtor is discharged. If the debtor's financial situation improves during the observation period (e.g. through new employment, inheritance, etc.), the debtor is required to report the changed circumstances to the TIC and is no longer eligible for a discharge on the basis of the fast track procedure.

9. The LII provides for the collection and dissemination of data on personal insolvency cases by the CIC. It is currently envisaged that the Insolvency Bulletin, which was established in 2006 to serve a summoning and notification function in business insolvency cases and operates under the Ministry of Justice, will have the primary responsibility of collecting personal insolvency data.

10. The schedule for implementing the LII by August 2017 is optimistic. The CIC has been established, and its members have been appointed. However, two critical sets of actions are still pending: (i) actions that the authorities need to take to provide resources to enable the staffing and functioning of the CIC and TICs; and (ii) adoption of secondary legislation and adoption of guidance and rules by the CICs and TICs in their area of competence. Limited progress has been made in both these areas. With regards to the first, a Government Decision to hire personnel for both the CIC and the TICs has been drafted and is under inter-ministerial consideration. In addition, TIC members will be drawn from various Ministries and the Consumer Protection Agencies whose resources may need to be supplemented to allow the hiring of additional personnel to discharge these new functions. Additional logistics such as premises, information technology systems would need to be worked out. Regarding the latter, a Government Decision outlining rules and standards on matters such as reasonable living expenses of the debtor, and treatment of the primary residence has been drafted and is being discussed at the Ministerial level but has yet to be adopted. The LII also envisages a new professional body of qualified and registered administrators and liquidators for personal insolvency cases which will be distinct from the existing body of insolvency administrators dealing

with business insolvency (together, "insolvency professionals"). The CIC is responsible for setting the standards for the insolvency professionals to be appointed under the LII, which is yet to be done. Additional rules, regulations and guidelines would need to be prepared by the CIC for the smooth functioning of the new system. Debtor awareness materials also need to be developed and disseminated.

11. The LII appears well-designed but its effectiveness in practice will depend largely on its proper implementation. The LII appears to balance the need for credit discipline with affording good faith debtors a fresh start. The relatively streamlined and largely administrative procedures seem well-suited to personal insolvency cases as they provide for less formal and conciliatory processes that take the burden off the court system. The TIC is responsible for debtor counseling (e.g. financial education), legal awareness programs and outreach which if well-implemented will aid individual debtors who lack awareness about their options in case of financial distress. The LII appears to adequately safeguard against moral hazard including through (i) decisions based on full and accurate disclosure of information and the debtor's ability to pay; (ii) limited and clear exemptions of the debtor's assets and income from the insolvency process (see Box 2 for treatment of primary residences); and (iii) an earned discharge from residual debts that follows a period of monitoring and repayment (except in the fast track procedure, where no repayment is expected).

12. Effective implementation of LII requires a sound institutional framework. The secondary regulations (which are yet to be adopted) will be key to the effective implementation of the law. Moreover, an adequate level of supervision and monitoring including by the court would be required to avoid abuse by strategic debtors and for the smooth functioning of the LII. Reliable information systems (e.g. for verification of the debtor's assets based on tax filings) underpin a sound process. The design of the LII envisages an important role for insolvency professionals as both the courts and the TIC rely on the insolvency professional's due diligence, mediation skills and professional opinion. Therefore, a strong cadre of insolvency professionals is crucial to the effective implementation of the LII.

13. Although, there is no international best practice for personal insolvency law against which the LII may be assessed, the LII includes some singular features which bear monitoring. For instance, unlike many countries, the LII provides for different periods before discharge based on the extent to which the debtor has been able to repay its debts and the procedure used (i.e. the period before a discharge could vary from 1 year to 5 years depending on whether the debtor has repaid 50 percent or 40 percent or a lower percentage of its debts). Although not binding, the European Commission Recommendation on a New Approach to Business Failure and Insolvency considers a discharge period of no more than 3 years for entrepreneurs to be reasonable, and this is echoed in the European Commission's Proposal for a Directive on Insolvency, Restructuring, and Second Chance (see Box 3). Some actions by the TIC appear to be mere formalities and could be further streamlined. Once secondary legislation is adopted and following some experience with the functioning of the LII in practice, a comprehensive assessment of the personal insolvency framework could be conducted.

Box 2. The Debtor's Primary Residence under the LII

Most personal insolvency laws do not provide for any special treatment of an insolvent debtor's primary residence. If there is a mortgage on the home, the secured creditors are normally outside of the scope of the personal insolvency process and accordingly the creditor may enforce and liquidate the collateral in an event of default (Germany, France, Netherlands). Exceptionally, where there is no mortgage on the home, some jurisdictions provide for a limited homestead exemption (e.g. some states in the United States). Table 3 provides a brief snapshot of the treatment of primary residences in Eastern Europe.

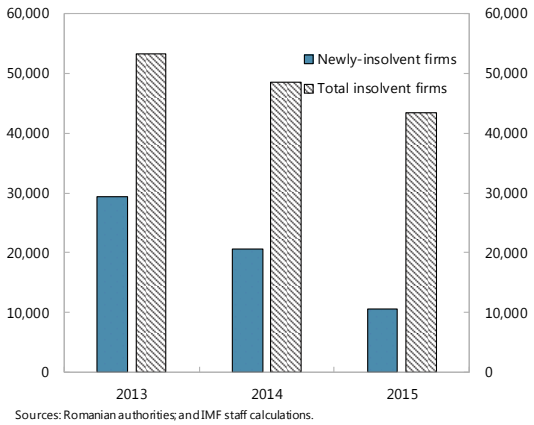
Under the LII, there is no bright line rule for the treatment of the primary residence when the debtor is insolvent. Instead the LII provides that the insolvency professional will work with the debtor to analyze the options with regard to the family residence which could include sale of the family residence, transfer of the property to the banks, or retention of the home by the debtor. The factors that influence the decision include the costs of maintaining the home, the amount of property tax, the amount of rent the debtor would need to pay if the home was sold, installment payments under the mortgage, etc. Unless additional guidance is provided to insolvency professionals, this set of provisions could yield unpredictable results and potentially have a negative impact on both payment culture and banking system.

Additional guidance to insolvency professionals could take the form of a "liquidation test". The personal insolvency laws in some countries enable debtors to keep their primary residences if that alternative is not economically less favorable to the creditors than selling the home (Cyprus, Ireland). In these countries, the debtor may keep its primary residence provided s/he can pay at least as much under a repayment plan as the creditor would have recovered in liquidation. It appears that such guidance is being considered through a Government Decree to be issued shortly.

C. Business Insolvency Law

14. The number of new insolvency petitions has decreased, however the overall amount of debt under insolvency resolution remains high (Figure 3). The improved capacity of firms to service debt due to the economic recovery, as well as write-offs and loan portfolio sales by banks, have resulted in a decline in NPLs. At present, NPLs are highly concentrated in the SME segment (Figure 4). As of September 2016, the firms undergoing insolvency proceedings accounted for 45 percent of banks' NPLs. [3]

Figure 3. Number of Insolvent Firms



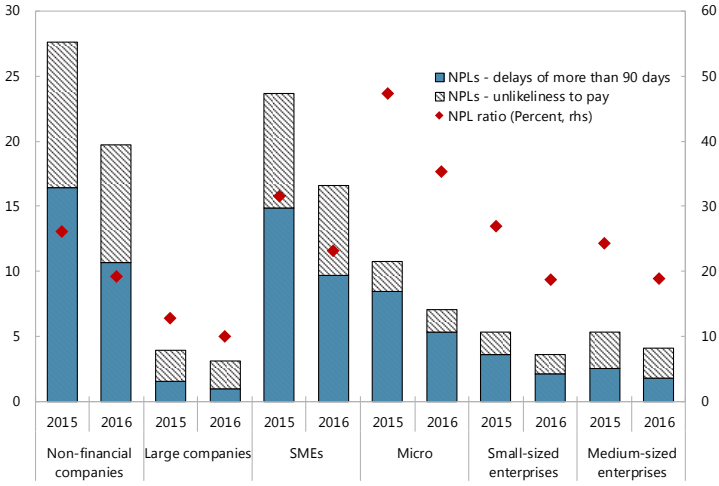
Sources: Romanian authorities; and IMF staff calculations.

[3] National Bank of Romania, Financial Stability Report, December 2016.

15. Law 85/2016 on Pre-Insolvency and Insolvency Proceedings (the "Code") entered into force in mid-2014. It covers corporates, entrepreneurs and most professionals whose debts exceed a threshold value.[4] Table 2 provides a brief overview of the key features of the Code as compared to other eastern European countries that have pursued reform in recent years. Prior to its adoption, staff conducted a desk review of the draft Code in light of international best practices and cross-country experience, and made recommendations on certain key elements. These included strengthening pre-insolvency procedures, incentivizing post-petition financing, establishing a clear ranking of claims, and improving notice requirements. The authorities accepted several of these suggestions, bringing the Code into closer alignment with international best practices. At the time, staff also emphasized that successful implementation of the Code would require adequate institutional capacity (judges, courts and insolvency professionals), as well as support from other laws and regulations (e.g. tax laws, provisioning rules for banks). Staff recommended that the authorities review the experience with the Code periodically with a view to making changes that could enhance its effectiveness.

16. The Code includes two pre-insolvency procedures, the Ad Hoc Mandate and the Preventative Concordat, both of which have not been much used. The Ad Hoc Mandate is a 90-day confidential procedure whereby the debtor requests the court to appoint an insolvency practitioner to help facilitate discussions between the debtor and its creditors. The Preventative Concordat aims to offer a speedy and cost effective alternative to judicial reorganization. It enables court confirmation of a restructuring plan that is accepted by creditors holding 75 percent of the value of claims, which then binds all holdout creditors. The use and success of both these procedures has been limited possibly due to the high supermajority required for plan approval.[5] The Code also limits the flexibility of the Preventative Concordat procedure by requiring that the recovery plan may only span over a period of 2 years (with a possible extension of 1 year), that 20 percent of the total amount of claims must be repaid in the first year, and that debtors may use the procedure only once every three years.

Figure 4. NPL Ratio by the Size of Companies
(Billions of Romania lei)



Source: Romanian authorities.

[4]Liberal professionals (such as lawyers, doctors, etc.) are excluded from the ambit of the Code. It applies in cases where the cumulative debt exceeds 40,000 Lei (about USD 10,000).

[5]According to data provided by the Insolvency Bulletin, by mid-2016, there were a total of 66 preventive concordat procedures and 3 ad hoc mandate procedures of which agreement was reached in 21 preventive concordants and one ad hoc mandate.

17. The formal insolvency process commences with a judicial reorganization proceeding, which could be further strengthened. The judicial reorganization proceeding sets out the process by which the debtor and its creditors may agree on a reorganization plan of up to 3 years, facilitated by the judicial administrator and supervised by the court. Once confirmed by the court, a reorganization plan binds all creditors including any hold out creditors. The provisions for voting on a reorganization plan are detailed in the Code.[6] The judicial reorganization procedure is also not frequently used.[7] This is likely because the procedure is too complex, expensive, and lengthy for small businesses (and certain types of small businesses such as individual entrepreneurs and family businesses are not permitted to file for judicial reorganization). Moreover, when it does take place, judicial reorganization is also often unsuccessful.

18. The judicial reorganization procedure has several weaknesses:

- **Creditors do not have sufficiently early input on the appointment of the judicial administrator.** In a voluntary filing, the debtor appoints the interim judicial administrator. The appointment of the interim judicial administrator lasts until the meeting of the creditors committee is called, which could take several months. In the meantime, the interim judicial administrator is in charge of several important tasks (e.g. valuation of assets, preparation of the table of claims), and creditors do not have an adequate level of input. Changing the administrator at a later stage and unwinding past actions causes delay and increases costs.

- **Securing the cooperation of public creditors in debt restructuring is a challenge.** Arrears to public creditors are often a significant percentage of the overall claims against a debtor. Although the participation of budgetary creditors is envisaged in both in the preventative concordat procedure and in the judicial reorganization process, they do not often meaningfully participate. The Code provides that debt restructuring by budgetary creditors is not considered state aid if the private creditors test is met (i.e., it can be shown that such creditors receive more under the plan than they would in liquidation).[8] However, public creditors do not vote in favor of a plan unless they are paid in full. This is for a number of reasons including: (i) an interpretation of the Tax Procedure Code that suggests debts may only be written off if the debtor is dissolved and therefore no debt reduction can be accepted either under the preventative concordat or the

[6]The Code provides for 5 classes of creditors and the plan may be confirmed by the court if it receives the support of (i) the majority of classes (or if there are 2 or 4 classes, then at least half the classes); (ii) at least one class that is impaired; and (iii) a global majority of creditors holding 30% of the value of all claims. Further a plan may not be approved unless dissenting creditors who are impaired receive "fair and equitable treatment", which provides *inter alia* that an impaired creditor should not receive less under the reorganization plan than it would in a liquidation procedure.

[7]Data from the Insolvency Bulletin indicates that since the Code became effective, less than 1000 judicial reorganizations have been filed (out of a total of over 26,000 insolvency cases filed in the same period). As the reorganization procedure itself takes time and the reorganization plans typically span up to three years in Romania, at present there is limited data on the success or failure rate of reorganization plans.

[8]Public creditors in Romania have limited priority in liquidation, i.e. they are paid before all other unsecured creditors but after the expenses and costs of the procedure, the secured creditors, and settling the labor dues. As per the distribution provided under the Code, bondholders are subordinated not just to the tax authorities but also unsecured bank creditors which may negatively impact the development of a corporate bond market in Romania.

judicial reorganization procedures; (ii) tax authorities have limited capacity or expertise to assess whether the private creditor test is met and state aid is not triggered; (iii) officials are concerned regarding their own personal liability under laws safeguarding against the dissipation of state assets; and (iv) there is a strong perception among the authorities that insolvency filings are often a tactic used by the debtor to delay enforcement of collateral by tax authorities and that such strategic debtor behavior needs to be curtailed. It appears that there is additional confusion caused by conflicting jurisprudence on whether the standstill period under the Code is required to be honored by public creditors in enforcing penalties under tax laws, as well as the interaction between criminal laws and the Code.

- **There are excessive delays.** The design of the law requires that unless the debtor requests immediate liquidation, judicial reorganization is attempted in all cases. As there is no independent assessment of the debtor's viability early in the process, going through the full judicial reorganization procedure can create delays. Additionally, while the Code provides for deadlines for the various steps in a procedure, there are frequently delays due to the overburdened court system. The number of specialized judges working exclusively on insolvency matters is quite limited. Reportedly, judicial administrators often do not have the right incentives to efficiently guide cases through the system (e.g. they often are paid on a monthly fee basis, rather than on a success fee basis).

19. Reorganization of small businesses is not adequately supported under the Code. The vast majority of insolvency petitions filed under the Code have been by small and micro businesses.[9] However, the Code does not appear to facilitate the rescue of such businesses. In particular:

- Unincorporated small businesses (e.g. individual entrepreneurs and family business) are not permitted to use the judicial reorganization proceeding. They are required to request a "simplified liquidation proceeding" which is essentially a quick liquidation procedure. Therefore, unincorporated small businesses have no restructuring options under the insolvency procedures (although they may use the pre-insolvency procedures).

- Where the debtor is an incorporated business and may access the judicial reorganization procedure, the procedure is lengthy, complex and expensive for small businesses. It appears better suited for use by debtors with large debts who have access to interim financing as well as expertise. Moreover, the debt of small business is often backed by personal guarantees and business insolvency may trigger personal insolvency, for which an entirely distinct procedure must be followed.

20. The Code also envisages a liquidation procedure, followed by a discharge for individual entrepreneurs. Liquidation proceedings may be commenced at the debtor's request or

[9]Data from the Insolvency Bulletin indicates that for 2016, of 8392 petitions filed, over 6045 were small and micro enterprises.

in case the judicial reorganization process fails. In addition, as mentioned above, the Code provides for a simplified liquidation proceeding which is the only alternative for certain categories of debtors (e.g. unincorporated businesses, defunct companies, etc.). Data indicates that over half of all debtors use the simplified liquidation proceeding.[10]

21. Stakeholders have expressed concerns regarding strategic debtor behavior. To afford the debtor an opportunity to restructure and to enable collective action by creditors, the Romanian insolvency law provides for a stay on individual enforcement actions by creditors once the insolvency petition is filed. The stay is temporary and is designed in a manner which is consistent with international best practice. However, reportedly, many debtors file for insolvency solely to delay creditor enforcement actions (including for example, delay the collection actions by tax creditors). This is despite safeguards such as (i) notification of the tax authorities by the debtor before filing for insolvency; (ii) all claims that fall due during the pendency of the stay must be paid in full, failing which the creditors can take action against the debtor.

22. In summary, the business insolvency framework has been strengthened but some challenges remain. The Code has benefitted from the feedback from Fund staff and other IFIs at the early stages of drafting, however, some important shortcomings remain to be addressed. In addition to the weaknesses of the reorganization procedure identified above, the Code does not facilitate the effective restructuring of small businesses as it does not offer a streamlined restructuring procedure. Moreover, the objectives of the Code are not fully supported by regulatory and tax rules. Capacity building and training initiatives aimed at the judiciary could also be strengthened.

[10] Data from the Insolvency Bulletin shows that for 2016, of 8392 cases filed, 5588 filings requested simplified liquidation.

Table 2. Key Features of Business Insolvency in Selected Eastern European Countries					
	Latvia	**Poland**	**Slovenia**	**Bulgaria**	**Romania**
"Pre-packs"[11]	Yes	Yes	Yes	Not contemplated	Not contemplated
In court rehabilitation procedure	Yes, in-court procedure for development of a rehabilitation plan after filing a petition	Yes, 4 types of reorganization procedures with varying levels of court involvement: Arrangement Approval Proceedings; Accelerated Arrangement Proceedings; Arrangement Proceedings; and Remedial Proceedings	Yes, separate reorganization (compulsory settlement) procedures for medium and large businesses, and small and micro enterprises. In addition, there is a pre-insolvency restructuring proceeding available to medium and large businesses.		Yes, three procedures: ad hoc mandate procedure, preventative concordat, and judicial reorganization which entail varying degrees of court involvement.
Voting majority required	Two-thirds of secured creditors and a simple majority of unsecured creditors. Length of plan is 2 years (plus 2 years extension with consent of creditors)	Class voting, plan should be accepted by each class by a 2/3rds majority of the claims. If not, the plan may still be approved if accepted by 2/3rds of total claims, or the plan ensures that the dissenting classes are no worse off than in liquidation.	No class voting and intricate rules to calculate the voting power of creditors.	Class voting, plan approved by a simple majority of claims. If a creditor holding more than half of claims votes against the plan, it may not be approved, regardless of the outcome of class voting	Court confirmation of the preventative concordat requires – (i) disputed claims do not exceed 25% and (ii) creditors representing 75% of undisputed claims agree. Length of plan may be up to 2 years (plus 1 year extension with consent of creditors).

[11] Expedited procedure for court approval of a rehabilitation plan negotiated between parties before filing of an insolvency petition.

Table 2. Key Features of Business Insolvency in Selected Eastern European Countries (concluded)					
		Most restructuring procedures require that the value of disputed claims does not exceed 15%.			The judicial reorganization procedure follows a system of class voting with a support from a minimum number of classes, and at least 30% a global majority of all claims. Length of plan may not exceed 3 years.
Insolvency practitioner in rehabilitation proceeding	Yes, creditors or court appoint	Yes, creditors or court appoints	Not necessary	Yes, court appoints initially but creditors can replace	Yes, court appoints initially but creditors can replace
Simplified SME procedure	No	No	Yes, simplified compulsory settlement procedure	No	Yes, mandatory liquidation procedure for individual entrepreneurs
Conversion of failed rescue proceeding into bankruptcy	Yes	Yes	Yes	Yes	Yes
Discharge of residual debts of entrepreneurs	Yes	Yes	Yes	No	Yes
Source: EC, 2016, Study on a new approach to business failure and insolvency Comparative legal analysis of the Member States' relevant provisions and practices.					

D. Data Collection and Analysis

23. Reliable data is a key element in assessing the efficiency and effectiveness of the insolvency laws. Findings backed by accurate data offer additional objectivity, credibility and bring accountability to the system. Periodic data measuring the duration and cost of insolvency proceedings and the recovery rates to creditors could assist the authorities in assessing the efficacy of the business insolvency law, and if changes are made to the law, measuring the impact of those changes against a baseline. Additionally, the recent European Commission's Proposal for a Directive on Insolvency, Restructuring, and Second Chance includes a requirement for member states to collect comprehensive statistical data on insolvency cases, focusing on the frequency, length, cost and recovery rates for secured and unsecured creditors, among other relevant data.

24. The purposes for which information is collected determines the type of data collected, the methodology used and the agencies entrusted with the task. Data collection for insolvency cases could focus on (i) general statistics on the number and type of insolvency proceedings with the aim of monitoring economic trends; (ii) NPL resolution and the rate of credit recovery by banks; (iii) measuring the effectiveness and efficiency of the insolvency system (including measuring the impact of reforms against a baseline); and (iv) other purposes (e.g. for budgetary resource allocation for infrastructure and institutional improvements, key performance indicators for courts, etc).

25. In light of the recent reforms to the insolvency system, this paper focuses on data collection that could assist the authorities in measuring the effectiveness and efficiency of the new insolvency system. Such an assessment would consider data collected after a debt resolution process is initiated although the beneficial effects of the system could be far wider (e.g. strengthening credit culture, early action by debtors and creditors to enter into out-of-court workouts, etc.). The analysis of the effectiveness of the insolvency framework thus revolves around the concepts of time taken to complete the proceeding, cost of the proceeding, and the recovery rate. Although outside the scope of this paper, it should be noted that this analysis is impacted not just by the insolvency framework but also the procedures for debt enforcement (e.g. the Civil Procedure Code which sets out the procedures for seizure and sale of assets).

Box 3. European Commission's Proposal for a *Directive on Insolvency, Restructuring, and Second Chance*

The objective of the EC Proposal is to establish certain minimum standards for debt restructuring and insolvency across the European Union, including also special rules for discharge of debt without attempting a full harmonization of insolvency law. The Proposal will follow the usual co-decision procedure, with parallel work at the Council and at the European Parliament. Once a Directive is adopted, member states will have two years to implement it under their national regimes.

The proposal foresees that member states would be required to collect data annually based on a standard methodology, and transmit it to the EC. This data would cover, at minimum, the number of filings for each type of procedure (restructuring, insolvency, second chance), length, outcome of procedures, administrative costs of procedures, recovery rates, and success of such procedures. Member states would also be required to break down this data by size and type of debtors so that the effectiveness of procedures can be objectively assessed. It reads:

Box 3. European Commission's Proposal for a *Directive on Insolvency, Restructuring, and Second Chance* (concluded)

"1. With a view to arriving at reliable annual statistics, Member States shall collect and aggregate at Member State level data on:

(a) the number of procedures which were initiated, pending and resolved, broken down by:

(i) preventive restructuring procedures,

(ii) insolvency procedures such as liquidation procedures,

(iii) procedures leading to a full discharge of debt for natural persons;

(b) the length of the procedure from initiation to payout, separate by types of procedures (preventive restructuring procedure, insolvency procedure, discharge procedure);

(c) the share of each type of outcome within each restructuring or insolvency procedure, including the number of procedures applied for but not commenced for lack of available funds in the debtor's estate.

(d) the average costs of each procedures awarded by the judicial or administrative authority, in euro;

(e) the recovery rates for secured and unsecured creditors separately, as well as the number of procedures with zero or no more than two percent total recovery rate in respect of each type of procedure referred to in point (a);

(f) the number of debtors subject to procedures referred to in point (a)(i) who within three years from the conclusion of such procedures are subject to either of the procedures referred to in points (a)(i) and (a)(ii);

(g) the number of debtors who, after having undergone a procedure referred to in point (a)(iii) of this paragraph, are subject to another such procedure or another procedure referred to in point (a) of this paragraph.

For the purposes of point (e) of the first subparagraph, recovery rates shall be after costs and anonymised data fields shall show both recovery rate and recovery rate lined to time until recovery.

2. Member States shall break down the statistics referred to in paragraph 1 by:

(a) the size of the debtors involved, by number of workers;

(b) whether debtors are natural or legal persons;

(c) in respect of discharge and where such distinction is made under national law, whether the procedures concern only entrepreneurs or all natural persons.

3. Member States shall compile statistics from the aggregate data referred to in paragraphs 1 and 2 for full calendar years ending on 31 December of each year, starting with data collected for the first full calendar year following [the date of start of application of implementing measures]. These statistics shall be communicated to the Commission on the basis of a standard data communication form annually, by 31 March of the calendar year following the year for which data is collected.

4. The Commission shall establish the communication form referred to in paragraph 3 by way of implementing acts. Those implementing acts shall be adopted in accordance with the advisory procedure referred to in Article 30(2)."

26. Data on business insolvency cases is collected by various agencies for their own distinct purposes. The various sources of data are as follows:

- The Superior Council of Magistracy collects data from courts across the country for measuring the efficiency of the court system. The data collected is predominantly for case management purposes, is not very granular (for instance, it does not provide information on the time taken for the different stages of a procedure, or the recovery rate in case of liquidation), and is not published.

- The Insolvency Bulletin published by the National Trade Register is a fully computerized system that serves as a tool for notification and summons. It maintains detailed records when an insolvency procedure has been commenced and information captured regarding the duration of procedures is quite comprehensive and granular (e.g. it captures data at virtually every stage in a proceeding and can aggregate it to yield average time taken for each element). However, it has two major limitations. First, although data related to amount and types of claims is embedded in the underlying documents, it is not extracted and therefore the Insolvency Bulletin is not a useful tool for providing information on recovery rates. Second, while the data is public and available free of charge, it must be specifically requested and only very limited data is periodically published and analyzed.[12]

- The National Association of Insolvency Administrators also collects information based on the reports of insolvency practitioners which are largely standardized (e.g. standard form of the table of claims), and this includes information such as rate of recovery and success of the reorganization. However, this information is not published.

27. The authorities intend to enhance their data collection capacity using EU funds. A new component is sought to be added to the Insolvency Bulletin which will enable data related to claims to be captured in a detailed and granular fashion. The module is proposed to be developed with EU funds over the next two years and will be based on the experience in insolvency data collection and analysis in other European countries. Although envisaged predominantly for business insolvency, the module could also usefully be adapted to cover personal insolvency cases.

28. Certain points in the business insolvency procedures could anchor the data collection efforts. The collection of data could take place at various points in the insolvency process (such as petitions, judicial rulings, appeals) which could help gauge the speed of the process (milestones) and identify bottlenecks. Substantive information is generated at a few important points in the process such as through the table of claims, and the reorganization plan (data points). The milestones and the data points could together anchor the data collection framework and provide useful information about the time taken for each element of the process as well as identify the causes of insolvency, the amounts and types of claims, value and types of the debtor's assets, etc. As discussed above, the data collected by the Insolvency Bulletin provides information on milestones, but not data points. Therefore, detailed data is only available regarding the speed of the process. Ideally, data points should supplement the milestones, and the matrix could include the following:[13]

[12] It should be noted that the Insolvency Bulletin routinely publishes limited data on the number of insolvency petitions filed on a monthly basis and offers a comparison with the past year noting the increase or decline in filings. This information, while useful, does not shed light on the effectiveness of the various elements of the insolvency system.

[13] As there are still cases in the courts under the old business insolvency law (Law 85/2006), there could be legacy issues with regard to the data. However, data collected could focus on cases filed after the Code became effective, eliminating this concern.

Table 3. Possible Milestones and Data Points		
Parties	**Court**	**Administrator**
Petition (Art. 65 of the Code)	Opening of the Procedure (Art. 71 of the Code)	Appointment of the Interim Insolvency Professional (Art. 73 of the Code)
	Automatic Stay (Art. 75 of the Code) and other interim orders	
	Appointment of Special Administrator (Art. 85 of the Code)	
Submission of Claims		
		Report recommending liquidation or continue with reorganization (Art. 92 of the Code)
		Registration of preliminary table of claims (Art. 92 of the Code)
First creditors meeting (Art. 47-50 of the Code)		Confirmation of Insolvency Professional
Challenge of claims (Art. 111-114 of the Code)	Decisions on challenges	Registration of final table of claims (Art. 112-114 of the Code)
Draft Reorganization Plan (Art. 132 of the Code)		
Vote on Reorganization Plan (Art. 138-139 of the Code)	Confirmation of the reorganization plan (Art. 138-139 of the Code)	
Payments under the reorganization plan	Monitoring	Periodic reports
	Opening of Liquidation	Liquidation of assets and distribution to creditors
		Final report to court (Art. 167 of the Code)
	Closing of Proceeding (Art. 174-184 of the Code)	

E. Recommendations

29. The recent reforms to the insolvency framework should be implemented in full, and their impact could be enhanced and more effectively monitored. Changes to the legal framework for business insolvency have brought Romania closer in line with international best practice. The challenges ahead relate to implementing the personal insolvency law and improving

the business insolvency law further based on the practical experience with its functioning. Additionally, strengthening the systems for data collection and analysis could prove an important monitoring tool for the authorities in their efforts to enhance the impact of the changes. In each of these areas, some specific recommendations are as follows:

Personal Insolvency: With regard to implementing the LII, consideration could be given to:

- Conducting an impact assessment prior to its implementation. The impact assessment should include a review of the adequacy of the existing infrastructure, the costs of implementation, and the impact on the financial sector (which could be pursued in the context of the upcoming Financial Sector Assessment Program).

- Improving inter-ministerial cooperation between the Ministries of Justice, Economy and Public Finance, by establishing a project team with a project manager. The existing action plan should be updated with a strategy for implementation that should be agreed among the Ministries as the appropriate way forward, and based on the strategy, a revised list and sequence of actions along with timelines and the persons responsible and shared across Ministries. Periodic progress reports should be provided to the Ministries and, if practicable, published.

- Providing adequate resources to the CIC to commence work on the secondary legislation, rules and guidance including materials for debtor counseling. The CIC should finalize the standards for insolvency professionals, and qualification examinations could be organized by the professional bodies following which registration of insolvency professionals under the LII could commence.

- Phasing the roll-out of the TICs over a period of 2 years. Establishing 42 TICs, one in each county, could be done in a phased manner with 5-10 TICs being rolled out in the first phase (e.g. by December 31, 2017). After these are successfully functioning, the next phase of 10-15 TICs could be rolled out (e.g. by mid- 2018), drawing from the lessons learned from the first phase of implementation to increase the efficiency of the process. The final phase could establish the remainder of the TICs (e.g. by mid- 2018). Gradual implementation would have the added benefit of reducing the logistics and lowering the budgetary outlay at the outset.

- Monitoring closely the inter-play between the business and personal insolvency laws (e.g. where an individual petitions for both business and personal insolvency, there would be two distinct procedures which could prove onerous and unnecessary, and the discharge under the business insolvency law would be immediate upon liquidation but under the personal insolvency law could take up to five years).

Business Insolvency: With regard to the Code, consideration could be given to:

- Undertaking an evaluation of the functioning of the Code in practice, and consider necessary changes. These could include changes enabling creditors to have an early say in the appointment of the interim judicial administrator including requesting an independent opinion

on the viability of the debtor; and for small businesses to have access to a simplified and streamlined reorganization procedure.

- Safeguarding against strategic behavior by debtors by ensuring that the insolvency procedures are quick, and adequately supervised through a robust institutional framework including capable insolvency administrators and courts. Where the insolvency process is quick and oversight is robust, strategic debtors can be quickly weeded out. In such cases, the stay would be brief and would not provide debtors with a safe haven for any significant length of time. Delays usually stem from: (i) the design features of the law; and/or (ii) capacity/resource constraints of the institutional framework. Further work could be done to better identify the specific areas where streamlining and strengthening is possible.

- Tax authorities to monitor closely, and as a matter of priority, the cases where (i) the ratio of tax debt to private debt is high, and/or (ii) the amount of the tax debt involved is high. The tax authorities could also monitor the ratio of public debt to private debt in insolvency filings and the recovery rates of private and public creditors. Based on the findings which should be presented to all stakeholders, additional safeguards could be considered if needed.

- Encouraging the use of the pre-insolvency procedures, which are largely out-of-court and could provide a speedy, low cost alternative to the judicial reorganization procedure. The National Bank of Romania and the National Bankers' Association could promote the use of these tools among banks and measures raising awareness among the insolvency practitioners could help.

- Adopting guidance for officials of public creditors that (i) clarifies that public creditors may participate in reorganization plans that do not provide for the payment of public creditor dues in full; and (ii) enables the formulation of a decision on whether or not they could support a debtor's restructuring plan based on the debtor's viability and the private creditors test. Where such guidance is followed in good faith, officials should be protected from personal liability.

- Harmonizing the provisions of the tax and criminal laws with the Code, and provide clear guidance to tax authorities. Consideration could also be given to creating a special group within the tax authority that specializes in insolvency cases and providing them with the requisite training and expertise to handle insolvency cases.

- Strengthening the institutional framework through increasing the number of insolvency judges; providing training opportunities for insolvency judges including inter-disciplinary training and information on international best practice and cross-country experience; and reconsidering the incentive structure for insolvency professionals (in particular fee structure).

Monitoring impact of reforms through data collection and analysis: With regard to data collection and analysis, consideration could be given to:

- Pursuing the enhancements to the Insolvency Bulletin that would enable the data related to claims to be captured for both business and personal insolvency cases.

- Improving the system of data collection for monitoring the efficiency and effectiveness of the business insolvency framework by designating one agency (possibly, the Romania Insolvency Bulletin) to collect, analyze and periodically publish insolvency case data.
- Standardizing the method of data input at the source producing more granular data that captures the key data points.
- Using periodic reports to identify bottlenecks and propose solutions on an ongoing basis.

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