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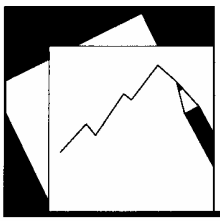

IMF Working Paper

Interest Rate Pass-Through in Romania and Other Central European Economies

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Interest Rate Pass-Through in Romania and Other Central European Economies

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Abstract

Interest rate pass-through from policy interest rates to market rates and inflation has been hypothesized to play a lesser role in Romania than in other Central European transition economies. This paper tests this hypothesis and concludes that it cannot be supported by the data. Hence pass-through in Romania is concluded to be in line with that in comparable economies in the region. Moreover, the interest rate pass-through has become more pronounced over time.

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Keywords: Monetary policy transmission, Interest rate, Romania, Central European Economies

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I. INTRODUCTION

This paper aims to test the hypothesis that the interest rate pass-through from policy to market rates plays a lesser role in Romania than in other transition economies in the region. The policy interest rate pass-through is claimed to be more slow and limited as a consequence of specific features of the Romanian monetary policy framework . The transmission from the policy interest rate to the lending and deposit rates studied here is part of the broader issue of the effectiveness of interest rate policy in controlling inflation by affecting aggregate demand, which goes beyond the scope of this paper.

Several factors are usually considered in explaining the ineffectiveness of interest rate policies. Those that Romania shares, to a larger or smaller extent, with other countries in the region are a low degree of monetization, underdeveloped financial markets, and capital controls. In addition, the lending policies of banks are often found to be price inelastic with respect to interest rates in the short run, because other, non-interest rate factors, like adjustment costs and, sometimes, directed lending, play a substantial role (see e.g. Cottarelli and Kourelis (1994), Schaechter, Stone, and Zelmer (2000), or Carare et. al. (2002)). The balance sheet problems in the banking and corporate sectors are also frequently mentioned, but in the case of Romania they do not seem to be of critical importance.

The Romanian monetary system has, however, some specific characteristics that could potentially further weaken the interest rate instrument. Starting with 1997, the Romanian economy exhibited a strong and consistent increase in structural excess liquidity (Anthoni, Udea, and Braun, 2003). As the National Bank of Romania (NBR) has been increasing its reserves sharply, it had to control high-powered money by accepting deposits from the commercial banks. Hence, instead of borrowing from the central bank, commercial banks typically have substantial deposits over and above their reserve requirements at the NBR. Therefore, instead of reflecting the marginal costs of funding for the commercial banks, the policy interest rate merely reflects an opportunity cost. Since empirical evidence suggests that commercial banks react differently to cost increases than to revenue decreases, the question arises whether the Romanian situation of excess liquidity could cause such asymmetric behavior of banks, rendering policy interest rate less effective.

After estimating interest rate pass-through coefficients for several Central European economies (CEEs), the paper concludes that the pass-through in Romania is in line with that in other countries in the region. Further research would be needed to analyze the contribution of various factors to the effectiveness of the policy interest rate and to estimate the transmission from policy rates to inflation.

The remainder of the paper is organized as follows. Sections II and III present the structural model and the data used in the estimations. Section IV describes the basic results on the outstanding loans, while Section V discusses the results on deposit rates and rates on newly issued loans. Section VI looks at the time consistency of the estimation results for Romania. Finally, Section VII concludes.

II. THE MODEL

The paper measures the interest rate pass-through from the policy rate to market rates by employing an error-correction framework. Assuming perfect competition in the loan market, the relation between market and policy rates can be described by

$$i^m = \alpha + \beta \cdot i^p, \quad (1)$$

where i^m is the market loan rate, i^p is the policy rate, α is a mark up, and β reflects the demand elasticity of market rates with respect to policy rates. Relatively inelastic demand (an elasticity β lower than 1) is likely to be found when banks have substantial market power, either because no close substitutes for bank loans exists, i.e., when capital markets are underdeveloped, or because of the structure of the market for bank loans (De Bondt, 2002). A wide range of factors influence the structure of the market, such as the degree of state-ownership of the banking sector, and the degree and form of regulation, including market entry restrictions and menu costs. Relatively elastic demand would signal that bank credit is not rationed. In such a setting, banks would want to lend money to both low- and high-risk borrowers, equalizing returns on both types of lending by charging risk-adjusted rates to the high-risk borrowers. Hence, the risk adjustment in the rate might on average cause market rates to react more than one-to-one to changes in the policy rate.

Relationship (1) does not touch upon the issue of timing. Market interest rates will not react instantly to changes in the policy rate. Even though banks will quickly adapt their short-term lending rates, medium- and long-term rates will react more slowly, or not at all, as they are primarily guided by expectations of future short-term rates. Moreover, average lending rates will adapt only gradually, as new loans replace old ones. These considerations point to a gradual adjustment of market rates to the new policy rates. Therefore, equation (1) should be interpreted as valid only in the long run.

The long-run nature of equation (1) suggests a model in which equation (1) can be seen as a long-run equilibrium relationship, around which short-term dynamics abound. Such an approach is well-established in the literature. Engle and Granger (1987) suggest a two-step approach in which the long-run relationship is fitted in levels, while the second step involves regressing the first differences of the dependent variables on their lagged values and lagged deviations from the long-run equilibrium relationship. This approach, labeled error-correction, is warranted as long as the dependent and explanatory variables are cointegrated, i.e., both are non-stationary, but there exists a linear combination of these series which is stationary. In general, interest rates series would not be expected to be non-stationary, as they normally do not exhibit a long-term trend. In transition economies, however, one might expect interest rate series to exhibit a declining trend as the transition takes hold and the problem of inflation is reined in. This would imply these series to be integrated of order 1 (I(1)). To establish this hypothesis, the paper performs unit root tests on the series by applying the augmented Dickey-Fuller (1981) test on the individual series. In case both the policy rates and the market rates are I(1), the series might be cointegrated, which is subsequently tested using standard Johansen (1988, 1991) statistical tests . When a cointegrating relationship is found, the suggested interpretation of equation (1) as a long-run

equilibrium relationship, around which short-term dynamics abound, is justified from a statistical point of view.

An error-correction model (ECM) of interest rate pass-through can be specified as

$$\Delta i_t^m = \gamma_1 + \gamma_2 \Delta i_{t-1}^m + \gamma_3 \left(i_{t-1}^m - \beta \cdot i_{t-1}^p - \alpha \right) + \eta_t . \quad (2)$$

Here, Δ is the difference operator, and the equation states that the first difference of market interest rates, Δi^m_t, depends on its own one-period lag, Δi^m_{t-1}, the deviation from the long-run relationship in the last period, $i^m_{t-1} - \beta \cdot i^p_{t-1} - \alpha$, and a constant, γ_1. In such an ECM, the coefficient γ_3 indicates the speed of adjustment of the short-run dynamics to the long-run equilibrium relationship. This coefficient hence can be interpreted to signal the effectiveness of the interest rate instrument of monetary policy: a higher value of the coefficient signals a faster market response and hence a more effective first step in the interest rate channel of monetary transmission.

This paper employs ECM (2) to test the whether the interest rate pass-through in Romania is low compared to other transition economies in the region, as claimed previously due to the nature of the monetary policy regime. This is done by a simple comparison and statistical testing of estimation results from different transition economies in the region.

III. THE DATA

For the purpose of estimation, data from a wide range of transition economies in Central and Eastern Europe are collected. The countries included are Romania, the Czech Republic, Hungary, Poland, the Slovak Republic, and Slovenia. The period under consideration is January 1995 - February 2004, and the frequency of data is monthly. (Because of transition, data problems abound: The Baltic states were not included owing to the lack of data, while Bulgaria was not included owing to its currency board arrangement.) The sample for the Slovak Republic has been limited to 2001-04 period, owing to the switch in the monetary regime from an exchange rate peg to a disinflationary regime with a floating exchange rate in 1998.[2] The remaining countries each have broadly comparable monetary policy regimes, with inflation as the primary, or in some cases the sole target of monetary policy.

For these countries, the monthly data consist of average short- and long-term loan rates, deposit rates, and the central bank policy rates. The period for which all data are available vary by country, but even the shortest series still has at least three years of monthly

[2] The years 1999 and 2000 are left out of the Slovak time series, as the interest rate series took roughly two years to adapt to the new monetary policy framework.

data available. In addition, short series of monthly interest rates on new loans (as opposed to all loans) are available for the Czech and Slovak Republics and Romania.

IV. Results on Outstanding Loan Rates: Equilibrium Equation and Basic ECM

Estimations results for the series on outstanding loan rates are in Table 1. The table contains results on, first, equation (1), which is estimated for all short- and long-term lending rates on the outstanding stock of loans. Second, unit roots test are performed on all data series, using the standard augmented Dickey-Fuller test at the 5 percent uncertainty level. All policy rates and long- and short-term lending rates are found to be integrated of order 1, with the exception of the short-term rate for Romania (which is found to be I(2)) and the short-term and policy rates for Slovenia (which are found to be I(0)). Third, to test for cointegration between the market and policy rates, standard Johansen cointegration tests are performed on the pairs of series.

In all countries in the sample, the policy rate is a highly significant explanatory variable for both the short- and the long-term market rates. Significance is lowest (but still high) in Hungary and Slovenia, presumably because of the small length of the time series in the case of Hungary (data from January 2000 onwards only), while the Slovenian policy rate is characterized by only a few movements since 1995. The magnitude of the estimated coefficients varies between 0.67 and 2.07, with most estimates being close to 1. Coefficient estimates below 0.8 are found for the Czech Republic (short- and long-term rates), Hungary (long-term rate), Romania (short- and long-term rates), and the Slovak Republic (long-term rate). This points to the substantial market power of commercial banks, either because no close substitutes for bank lending exist, or because of the limited competition in the banking market. In contrast, the banking markets in Poland and especially Slovenia exhibit relatively elastic demand, which hints at a market where credit is not rationed and banking competition is amply present.

Cointegration tests confirm that the market rates can to a large degree be explained by the policy rates. For the series which are I(1), this indicates that there is a high degree of co-movement between policy and market rates. The one pair of series that fails the cointegration test consists of the Hungarian short-term market rate and the Hungarian policy rate. This is presumably due to the short series being tested. From the above, the general conclusion is that the policy rate is a highly relevant explanatory variable for the market lending rate in the long run, as can be expected in a market economy. This allows the estimation of the ECM specifications.

The estimation results for the basic ECM for each country, as specified in equation (2), are in Table 2. The fit of the estimated equations, as indicated by the R^2, is low for all of the equations. At the same time, the Durbin-Watson (1950, 1951) test statistic indicates little serial autocorrelation in the residuals. Both effects are the normal consequences of estimating a model in first differences. The main parameter of interest in the ECM is the estimate c(3) of the coefficient γ_3, which indicates the speed of adaptation of the short-term dynamics to the long-run equilibrium equation. This coefficient estimate thus is a measure of the speed of the pass-through of the policy interest rate to the market rates, and hence of the effectiveness of

the interest rate channel. Since the coefficient indicates adaptation to the long-run equilibrium, it is expected to be negative.

For the series on rates on outstanding loans, the hypothesis that the interest rate pass-through is low in Romania compared to other transition countries is contradicted. For most countries in the sample, the estimated adaptation coefficient c(3) is negative and significantly different from 0 at the 5 percent uncertainty level. However, in the case of Slovenia, the coefficient estimates are significantly different from 0 only at the 8 percent (long-term rates) or 11 percent (short-term rates) uncertainty levels. In the sample, the coefficient estimates range from -0.08 to -0.39, with almost all estimates being in the range -0.09 to -0.18. The coefficient estimates for Romania, at -0.14 and -0.15 for the short- and long-term rates respectively, are not substantially different from the estimates for the other transition countries in the sample. Statistical testing indicates that the adaptation coefficient for the short-term rate is significantly larger than -0.08 (the lower bound of the estimates for the other countries) at the 5 percent uncertainty level, while the same holds for the long-term coefficient estimates, but only at a 12 percent uncertainty level.

V. Results on Deposit, Newly Issued Loan Rates, and Panel Estimations

Estimation results for deposit rate data also reject the hypothesis that the pass-through in Romania is weaker than in other countries. The estimation results for the long-run equilibrium equation for the deposit rates are in Table 3. Most series are cointegrated, indicating that estimation through ECM methodology is warranted. The results for the ECMs for deposit rates in the individual countries are in Table 4. All the estimates of the adaptation coefficients are negative and in most cases they are significantly different from 0, the exceptions being the estimates in the long-term rate equation for the Slovak Republic, and in the short-term rate equation for Poland. The other estimates are in the range -0.13 to -0.60, with the estimate for the long-term rate equation for Romania being -0.24. Thus these coefficient estimates are generally somewhat larger than the estimates for rates on outstanding loans above, and exhibit larger t-values. In other words, deposit rate generally react more expeditiously to policy rates than do loan rates. This might be due to several factors, like, for instance, more competition on the market for deposits, or the fact that, contrary to loan rates, the deposit rates do not contain a possibly volatile risk premium. Statistical testing of the estimated adaptation coefficients once again shows that Romania does not stand out among its peers by exhibiting an exceptionally slow speed of adaptation.

Data on newly issued loans are only available for three countries in the sample and for limited time spans. Therefore, some caveats apply to the estimation results. First, time series comprising more than two years are only available for the Czech and Slovak Republics, while for Romania, time series spanning just 16 months are available.[3] Second, the series for

[3] The time series for the Czech and Slovak Republics range from 1995 to December 2003, after which the series are either no longer updated or became somewhat unreliable. The Romanian authorities have started the systematic collection of these data only in May 2003, which yields time series that range from May 2003 to August 2004.

Romania are too short to perform unit root tests and hence cannot be verified to be suited for analysis in an ECM framework. In the event, for reasons of comparability, the ECM analysis is performed for all three countries anyway. The estimation results are shown in Tables 5 and 6.

Even so, estimation results on series for newly issued loans suggest that the pass-through from policy rates to market rates is fast, almost one-to-one, and confirms again that transmission in Romania is similar to that in its peers. In the long-term equilibrium equation, the estimates of the policy rate coefficients are highly significant for the Czech and Slovak Republics, with estimated values between 0.83 and 1.21, i.e., close to 1. While the Czech long-rate coefficient estimate at 0.83 is still significantly different from 1 at the 5 percent uncertainty level, the Czech short-rate coefficient and both the long- and short-rate Slovak coefficients are not statistically different from 1. For Romania, reliability of the estimation result is lower for the reasons described above. However, although policy rate coefficient for the short rate differs significantly from 1 at 0.24, the policy rate coefficient for long rate at 0.62 is not statistically different from 1 at the 5 percent uncertainty level. Hence, I conclude that the long-run equilibrium rate on newly issued loans closely follows the policy interest rate. Moreover, as expected in the case of newly issued loans, the pass-through coefficient γ_3 is much larger than the estimate of this coefficient for the total loans portfolio. Hence, the rate on newly issued loans moves towards its long-run equilibrium in a short amount of time.

Pooling the data series in a panel regression yields inconclusive results. The results of a fixed effects panel estimation with a common coefficient on the policy rate confirm the policy rate as a highly significant variable for the market rates, with values of the t-statistic of 29.0 and 36.5 for the short- and long-term equation, respectively. Further estimation in an ECM framework, using the residuals from the panel regression for the long-run equilibrium equation, does not yield any conclusive results. The cause presumably lies in the fact that significant changes in monetary policies in the different countries in the sample occurred at very different points in time. Hence, the residuals of the long-run equilibrium relation look very different when this relationship is estimated in a panel than when estimated for the countries individually.

VI. Results: Time Consistency

Estimation results for Romania clearly differ when different time periods are taken into account (Table 7). To see if the above results are constant over time or whether the market evolved over time, the data series for Romania are split in two, taking as the break point the first month in which the policy interest rate was below 40 percent. The two samples are October 1999-June 2001 and June 2001-January 2004. Estimation results for the different samples clearly differ, as seen in Table 7.

In the earlier period the policy rate does not significantly influence the market interest rates. In addition, no cointegration between market and policy rates is found, which also prevents a well-founded interpretation of the estimation results of the ECMs.

In sharp contrast, in the later period, the policy rate is highly significant for the market rates and the series are cointegrated. In addition, the coefficients for the policy rates are considerably higher than the estimates for the full sample, a difference which is statistically significant at the 5 and 10 percent level for the short- and long term rate series, respectively. These higher estimates indicate that the Romanian banking market has developed towards a more complete market while banking competition increased.

Moreover, the interest rate pass-through in Romania has increased over time. The estimates of the adaptation coefficients in the ECMs indicate a significantly swifter adaptation of short-term dynamics to the long-run equilibrium than in the regressions for the full sample. Hence, at least this first part of the interest rate channel of monetary policy has become more effective, indicating that the NBR could rely on its interest rate policy to a larger extent than in the past. This result is surely at least in part due to the successful macroeconomic stabilization which has taken hold in Romania over the last few years. In general, in a more stable macroeconomic environment, inflationary expectations and hence interest rate expectations of different market participants converge, yielding interest rate policy more effective. As the functioning of the interest rate instrument is an essential precondition for a move towards an inflation targeting regime, this finding lends further support to the feasibility of the gradual shift towards inflation targeting that the Romanian authorities are undertaking.

The analysis for different time periods also suggests that the Romanian banking market was in general further developed in the later years, and became more competitive, with less market power for individual banks. The policy rate coefficients in the long-run equations are much higher in the later time period, which indicates more elastic demand. In turn, more elastic demand points to a limitation of the market power of the commercial banks, i.e., a more competitive environment. In addition, the coefficient estimates signal that credit is in general rationed to a much less extent in the later period. This finding is consistent with the financial deepening and credit boom observed in Romania during the last few years.

VII. CONCLUSIONS

Claims that the particular features of Romania's monetary policy regime result in a lower effectiveness of its interest rate instrument are contradicted by the results of this study, which can be summarized as follows:

The estimates of interest rate pass-through from policy interest rates to rates on the outstanding volume of loans and deposits in Romania are in line with coefficient estimates for other transition economies in the region. Hence, although the execution of monetary policy by NBR leads commercial banks in Romania to face an opportunity cost of funding rather than the marginal cost of funding, the results for the transmission process are similar. This leads to the conclusion that the commercial banks react to these opportunity costs in much the same way as they would to 'real' marginal costs. Moreover, as the transmission from policy rates to market rates is similar to that in most other economies in the region, Romania could potentially follow some of its peers by introducing an inflation

targeting regime, provided that the monetary authorities build up the necessary forecasting and communications capacity.

Results for data series on newly issued loans suggest that market rates for new loans react to policy rate changes quite fast and in most cases almost one-to-one, and confirm again that transmission in Romania is similar to that in its peers. The results for Romania, however, should be treated with caution, as the time series span too short a period for firm conclusions. Still, the result for Romanian loans with maturity of more than a year is consistent with the thesis that the transmission mechanism in Romania is similar to that in its peers. However, the rate on newly issued short-term loans in Romania seems to be lower than one, which is in contrast to the results for the Czech and Slovak Republics that were obtained from longer time series.

Analysis of the Romanian loans market for different time periods strongly suggests that the interest rate pass-through from policy to market rates has become more pronounced over time. Hence, the NBR's interest rate instrument has become more effective. As the functioning of the interest rate instrument is an essential precondition for a move towards an inflation targeting regime, this finding lends further support to the feasibility of the gradual shift towards inflation targeting that the Romanian authorities are undertaking. The analysis for different time periods also indicates that the Romanian banking market became more competitive over time, a fact consistent with the financial deepening observed in Romania during the last few years.

A natural extension of this paper lies in analyzing the complete interest rate channel of monetary policy, from the policy rate to the consumer price index. Such an analysis could follow a VAR methodology, as employed in, e.g., Belaisch (2003), Gueorguiev (2003), or Leigh and Rossi (2002) for exchange rates or Kuijs (2002) for monetary policy transmission mechanisms, but goes beyond the scope of this paper.

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APPENDIX: ESTIMATION TABLES

Table 1. Country Long-Term Equations - Loan Rates
Country_Rate,t = c(1) + c(2) * Country_Policy_Rate,t

Country	Maturity	Coef	Estimate	t-statistic	R-squared	Coint 1/
Czech Republic	Short Rate				0.951	yes
		c(1)	2.8729	18.03		
		c(2)	0.7579	43.03		
	Long Rate				0.959	yes
		c(1)	4.1903	33.43		
		c(2)	0.6506	46.96		
Hungary	Short Rate				0.382	no
		c(1)	7.6227	3.7		
		c(2)	1.0973	5.46		
	Long Rate				0.338	yes
		c(1)	13.5277	9.75		
		c(2)	0.6707	4.95		
Poland	Short Rate				0.912	yes
		c(1)	7.2796	15.64		
		c(2)	0.8507	29.42		
	Long Rate				0.898	yes
		c(1)	1.8865	3.33		
		c(2)	0.9571	32.28		
Romania	Short Rate				0.749	yes
		c(1)	14.6490	6.25		
		c(2)	0.7998	12.23		
	Long Rate				0.747	yes
		c(1)	15.3746	7.12		
		c(2)	0.7324	12.14		
Slovak Republic	Short Rate				0.624	yes
		c(1)	-2.1216	-1.47		
		c(2)	1.6222	8.92		
	Long Rate				0.728	yes
		c(1)	3.0948	5.57		
		c(2)	0.7915	11.32		
Slovenia	Short Rate				0.369	yes
		c(1)	-3.8601	-1.38		
		c(2)	2.0788	7.41		
	Long Rate				0.356	yes
		c(1)	-0.2881	-0.11		
		c(2)	1.8546	7.2		

1/ Using the standard Johansen Cointegration Test.

Note: all series are I(1) at the 5 percent uncertainty level, except Rom_St_Out, which is I(2) and SVN_St_Out and SVN_Pol, which are I(0).

Table 2. Country ECM Estimation Results - Loan Rates
D(Country_Rate),t = c(1) + c(2) * D(Country_Rate),t-1 + c(3) * L-T-Eq_Resid

Country	Maturity	Coef	Estimate	t-statistic	R-squared	D-W
Czech Republic	Short Rate				0.157	2.02
		c(1)	-0.0761	-1.14		
		c(2)	0.0748	0.63		
		c(3)	-0.3880	-3.68		
	Long Rate				0.060	1.96
		c(1)	-0.6180	-1.35		
		c(2)	0.1923	1.75		
		c(3)	-0.1821	-2.27		
Hungary	Short Rate				0.139	1.92
		c(1)	-0.1354	-1.83		
		c(2)	-0.1451	-1.03		
		c(3)	-0.0822	-2.62		
	Long Rate				0.234	1.85
		c(1)	-0.1020	-2.24		
		c(2)	0.0097	0.07		
		c(3)	-0.1029	-3.41		
Poland	Short Rate				0.165	1.99
		c(1)	-0.1414	-2.26		
		c(2)	0.1846	1.80		
		c(3)	-0.1266	-3.33		
	Long Rate				0.080	1.99
		c(1)	-0.2091	-2.88		
		c(2)	0.0967	1.08		
		c(3)	-0.0908	-2.90		
Romania	Short Rate				0.408	2.15
		c(1)	-1.0089	-4.64		
		c(2)	-0.4558	-4.05		
		c(3)	-0.1541	-4.27		
	Long Rate				0.370	2.05
		c(1)	-0.9474	-4.35		
		c(2)	-0.4372	-3.76		
		c(3)	-0.1417	-3.58		
Slovak Republic	Short Rate				0.115	1.92
		c(1)	-0.1704	-2.68		
		c(2)	-0.0242	-0.22		
		c(3)	-0.1061	-2.39		
	Long Rate				0.276	2.01
		c(1)	-0.0743	-3.14		
		c(2)	0.0693	0.54		
		c(3)	-0.1607	-3.92		
Slovenia	Short Rate				0.044	1.81
		c(1)	-0.1942	-1.10		
		c(2)	0.1602	1.55		
		c(3)	-0.0751	-1.61		
	Long Rate				0.046	1.82
		c(1)	-0.1756	-1.00		
		c(2)	0.1524	1.47		
		c(3)	-0.0895	-1.78		

Table 3. Country Long-Term Equations - Deposit Rates
Country_Rate,t = c(1) + c(2) * Country_Policy_Rate,t

Country	Maturity	Coef	Estimate	t-statistic	R-squared	Coint 1/
Czech Republic	Short Rate				0.947	yes
		c(1)	0.0705	0.40		
		c(2)	0.7975	41.02		
	Long Rate				0.788	no
		c(1)	1.7917	7.57		
		c(2)	0.4918	18.79		
Hungary	Short Rate				0.990	yes
		c(1)	-0.4599	-3.22		
		c(2)	0.8237	102.97		
	Long Rate				0.980	yes
		c(1)	-1.2950	-5.89		
		c(2)	0.9039	73.30		
Poland	Short Rate				0.956	yes
		c(1)	-3.0961	-8.39		
		c(2)	0.9824	50.88		
	Long Rate				0.974	yes
		c(1)	-0.8408	-3.22		
		c(2)	0.9054	55.89		
Romania	Short Rate				...	...
		c(1)	...	...		
		c(2)	...	...		
	Long Rate				0.762	yes
		c(1)	1.3739	0.62		
		c(2)	0.7826	12.64		
Slovak Republic	Short Rate				0.536	yes
		c(1)	-4.1156	-3.05		
		c(2)	1.2650	7.44		
	Long Rate				0.441	yes
		c(1)	-0.2667	-0.21		
		c(2)	1.0048	6.16		
Slovenia	Short Rate				0.440	yes
		c(1)	-5.1917	-3.17		
		c(2)	1.4155	8.60		
	Long Rate				0.363	yes
		c(1)	-0.9470	-0.44		
		c(2)	1.5705	7.32		

1/ Using the standard Johansen Cointegration Test.

Note: all series are I(1) at the 5 percent uncertainty level, except SVN_Dep_St_Out and SVN_Pol, which are I(0).

Table 4. Country ECM Estimation Results - Deposit Rates
D(Country_Rate),t = c(1) + c(2) * D(Country_Rate),t-1 + c(3) * L-T-Eq_Resid

Country	Maturity	Coef	Estimate	t-statistic	R-squared	D-W
Czech Republic	Short Rate				0.254	2.09
		c(1)	-0.0776	-0.92		
		c(2)	0.0872	0.75		
		c(3)	-0.6008	-4.76		
	Long Rate				0.073	1.99
		c(1)	-0.0802	-1.44		
		c(2)	-0.0191	-0.19		
		c(3)	-0.1261	-2.61		
Hungary	Short Rate				0.417	1.74
		c(1)	-0.0831	-2.34		
		c(2)	0.2174	2.91		
		c(3)	-0.4812	-7.83		
	Long Rate				0.302	1.69
		c(1)	-0.1336	-3.04		
		c(2)	0.0653	0.89		
		c(3)	-0.3337	-6.71		
Poland	Short Rate				0.083	2.07
		c(1)	-0.1371	-2.64		
		c(2)	0.2906	3.24		
		c(3)	-0.0193	-0.57		
	Long Rate				0.505	1.65
		c(1)	-0.1470	-3.21		
		c(2)	0.2320	2.82		
		c(3)	-0.3741	-7.35		
Romania	Short Rate				...	...
		c(1)	...	...		
		c(2)	...	...		
		c(3)	...	...		
	Long Rate				0.561	1.97
		c(1)	-0.9378	-5.61		
		c(2)	-0.2986	-2.85		
		c(3)	-0.2415	-7.75		
Slovak Republic	Short Rate				0.534	1.95
		c(1)	-0.1590	-4.34		
		c(2)	0.0434	0.30		
		c(3)	-0.1390	-4.47		
	Long Rate				0.073	1.80
		c(1)	-0.0752	-1.62		
		c(2)	0.2341	1.66		
		c(3)	-0.0339	-0.95		
Slovenia	Short Rate				0.073	1.77
		c(1)	-0.1429	-1.02		
		c(2)	0.1585	1.54		
		c(3)	-0.1598	-2.51		
	Long Rate				0.053	1.84
		c(1)	-0.1682	-0.93		
		c(2)	0.1065	1.01		
		c(3)	-0.1426	-2.25		

Table 5. Country Long-Term Equations - Rates on Newly Issued Loan
Country_Rate,t = c(1) + c(2) * Country_Policy_Rate,t

Country	Maturity	Coef	Estimate	t-statistic	R-squared	Coint 1/
Czech Republic	Short Rate				0.949	yes
		c(1)	1.1038	4.94		
		c(2)	1.0366	41.92		
	Long Rate				0.968	yes
		c(1)	3.6515	25.78		
		c(2)	0.8333	53.21		
Romania	Short Rate				0.131	yes 2/
		c(1)	20.8332	6.07		
		c(2)	0.2473	1.45		
	Long Rate				0.287	yes 2/
		c(1)	14.1306	2.68		
		c(2)	0.6240	2.38		
Slovak Republic	Short Rate				0.533	yes
		c(1)	-0.2350	-0.18		
		c(2)	1.2137	7.400		
	Long Rate				0.733	yes
		c(1)	2.1810	3.39		
		c(2)	0.9299	11.47		

1/ Using the standard Johansen Cointegration Test.

2/ These test results should be treated with caution, as no unit root tests could be performed on the series.

Note: All series for the Czech Republic and the Slovak Republic are I(1) at the 5 percent uncertainty level, while the series for Romania are too short to perform unit root tests.

Table 6. Country ECM Estimation Results - Rates on Newly Issued Loans
D(Country_Rate),t = c(1) + c(2) * D(Country_Rate),t-1 + c(3) * L-T-Eq_Resid

Country	Maturity	Coef	Estimate	t-statistic	R-squared	D-W
Czech Republic	Short Rate				0.179	2.02
		c(1)	-0.0594	-0.51		
		c(2)	0.4003	2.80		
		c(3)	-0.7125	-4.43		
	Long Rate				0.161	2.00
		c(1)	-0.1056	-1.41		
		c(2)	-0.1671	-1.59		
		c(3)	-0.3357	-2.82		
Romania 1/	Short Rate				0.752	1.66
		c(1)	-0.0123	-0.08		
		c(2)	0.1183	0.42		
		c(3)	-1.5332	-2.82		
	Long Rate				0.322	2.05
		c(1)	0.0488	0.24		
		c(2)	0.1605	0.68		
		c(3)	-0.4123	-2.28		
Slovak Republic	Short Rate				0.109	1.33
		c(1)	-0.1317	-1.62		
		c(2)	-0.1589	-1.55		
		c(3)	-0.1205	-1.89		
	Long Rate				0.616	2.22
		c(1)	-0.1324	-2.45		
		c(2)	-0.2259	-2.42		
		c(3)	-0.6499	-7.12		

1/ These test results should be treated with caution, as no unit root tests could be performed on the series.

Table 7. Romania: Estimation Results for Different Samples - Loan Rates

	Maturity	Coef	Estimate	t-statistic	R-squared	Coint 1/	D-W
			1999:10-2001:06				
Long-Run Equations	Short Rate				0.0188	no	
		c(1)	49.0471	6.35			
		c(2)	0.0827	0.14			
	Long Rate				0.0211	no	
		c(1)	46.9781	7.69			
		c(2)	0.0844	0.64			
ECMs	Short Rate				0.2810		1.92
		c(1)	-0.9717	-1.78			
		c(2)	-0.4101	-1.88			
		c(3)	-0.1541	-1.42			
	Long Rate				0.293		1.92
		c(1)	-1.0227	-1.86			
		c(2)	-0.4078	-1.91			
		c(3)	-0.1719	-1.47			
			2001:07-2004:01				
Long-Run Equations	Short Rate				0.925	yes	
		c(1)	6.7495	4.53			
		c(2)	1.0622	18.85			
	Long Rate				0.900	yes	
		c(1)	11.7058	8.68			
		c(2)	0.8197	16.06			
ECMs	Short Rate				0.623		2.29
		c(1)	-0.9738	-5.90			
		c(2)	-0.5252	-4.36			
		c(3)	-0.4151	-5.74			
	Long Rate				0.596		2.19
		c(1)	-0.8705	-5.86			
		c(2)	-0.5000	-3.95			
		c(3)	-0.3494	-5.13			

1/ Using the standard Johansen Cointegration Test.