

Monetary autonomy under different exchange rate regimes in the long-run: the case of seven new EU countries

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Abstract. *This paper finds that except for Poland, the other six countries possess moderate or significant monetary autonomy in the long run as their interest rates make partial or small adjustments to a change in the Euro area interest rate. Except for the Czech Republic and Poland, the findings support the hypothesis that countries under more flexible exchange rate regimes possess more monetary autonomy than countries under less flexible exchange rate regimes because local interest rates under more flexible exchange rate regimes are less sensitive to a change in the euro area interest rate.*

Keywords: exchange rate regimes; monetary autonomy; global transformation of interest rates; Fisher hypothesis.

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1. Introduction

Monetary autonomy, exchange rate stability, and free capital mobility are ideal goals for many countries to consider in order to conduct effective monetary policy, maintain price stability, promote economic growth, and increase exports and foreign investments. However, the impossible trinity suggests that only two of the three above policies can be achieved simultaneously (Mundell, 1963). Therefore, if a country has chosen free capital mobility, the country needs to determine whether monetary autonomy or exchange rate stability would be selected.

This paper examines the sensitivity of interest rates in Bulgaria, the Czech Republic, Hungary, Latvia, Lithuania, Poland and Romania outside the Euro zone to a change in the Euro area interest rate under four different exchange rate regimes (International Monetary Fund, 2009). Theoretically, we expect that countries with more (less) flexible exchange rates would be less (more) sensitive to a change in the Euro interest rate and possess greater (lesser) monetary autonomy. A country pursuing a flexible exchange rate allows exchange rates to fluctuate freely based on market forces, does not have to change the domestic interest rate in response to a change in the world interest rate, and maintains significant monetary autonomy. On the other hand, a country pursuing a fixed exchange rate would like to make a full adjustment to a change in the world interest rate so that the demand for and the supply of the own currency would not change much due to any interest rate differential between the domestic interest rate and the world interest rate. Hence, there is little monetary autonomy under a fixed exchange rate regime.

Several seminal articles have examined the subject. Frankel, Schmukler and Servén (2004) show that several large advanced countries can select their own rates in the long run whereas most other countries with flexible exchange rates react fully to international interest rates in the long-run. In the short-run, countries with flexible exchange rates respond to international interest rates with slower speed, suggesting that they possess some degree of monetary autonomy. Shambaugh (2004) examines whether different exchange rate arrangements would affect the degree of monetary autonomy. He finds that domestic interest rates in countries with pegged exchange rates are more sensitive to international interest rates than countries with non-pegged exchange rates. Obstfeld, Shambaugh and Taylor (2005) indicate that without capital controls, countries not pegging exchange rates are expected to retain sufficient monetary autonomy whereas countries pegging exchange rates would lose significant monetary autonomy. Cheung, Tam and Yiu (2008) find that countries with fixed or hard peg exchange rates and controls on free capital mobility such as China do not react much to a change in the US interest rate and have greater monetary autonomy.

A number of recent studies have investigated the sensitivity of domestic interest rates to the international interest rate and the degree of monetary autonomy for selected Central and Eastern European (CEE) or new EU

countries. Scheicher (2000) reveals that short-term interest rates in the Czech Republic, Hungary and Poland under different exchange rate systems were correlated with the German interest rate during 1997-1998. Habib (2002) examines the response of interest rates in the Czech Republic, Hungary and Poland under different exchange rate regimes and shows that interest rates in these three countries are not affected by the short-term interest rate in Germany.

Crespo Cuaresma and Wojcik (2006) find that the behavior of the interest rate in the Czech Republic supports the monetary independence hypothesis whereas the behaviors of the interest rates in Hungary and Poland do not validate the monetary independence hypothesis. Examining the relationship between exchange rate regimes and monetary autonomy for eight new EU countries, Căpraru and Ilnatov (2011) show that interest rates in countries with fixed or intermediate exchange rate arrangements are less sensitive to ECB's interest rate than countries with floating exchange rate arrangements and that intermediate exchange rate arrangements can better preserve monetary autonomy. In view of these different or conflicting empirical results, a further study of the subject for these countries is appropriate.

2. The model

Extending Scheicher (2000), Habib (2002), Frankel, Schmukler and Servén (2004), Shambaugh (2004), Obstfeld, Shambaugh and Taylor (2005), Crespo Cuaresma and Wojcik (2006), Cheung, Tam and Yiu (2008), Căpraru and Ilnatov (2011), and other previous studies, we can express the local interest rate as a function of the international interest rate and the inflation rate:

$$R_t = \alpha_1 + \alpha_2 IR_t + \alpha_3 \pi_t + \varepsilon_t, \quad (1)$$

where

- R = the local interest rate,
- IR = the international interest rate,
- π = the inflation rate, and
- ε = the error term.

We expect that the impact of an increase in the international interest rate on the local interest rate is positive and that the effect of a higher inflation rate on the local interest rate is also positive. The Fisher hypothesis suggests that the local interest rate and the inflation rate have a one-for-one relationship. If the Fisher hypothesis holds, the coefficient of the inflation rate will be equal to one. Note that α_2 or α_3 measures the long-run effect of a change in IR or π on the local interest rate.

Another methodology which may be considered is the autoregressive distributed lag model (ARDL). Initial empirical work based on the ARDL model shows that the sign of the current international interest rate is negative for three of the seven countries due to a high degree of multicollinearity between the current and lagged international interest rates. Hence, the ARDL model is not used.

The GARCH (Nelson, 1991, Engle, 2001) or ARCH (Engle, 1982, 2001) model will be applied in empirical work. The GARCH model specifies that conditional variance is a function of the past variances and past squared error terms:

$$\sigma_t^2 = \phi + \sum_{i=1}^p \alpha_i \sigma_{t-i}^2 + \sum_{j=1}^q \beta_j \varepsilon_{t-j}^2 \quad (2)$$

where

σ^2 is the conditional variance and ε is the error term. The ARCH model stipulates that conditional variance is a function of the past squared error terms:

$$\sigma_t^2 = \delta + \sum_{i=1}^n \beta_i \varepsilon_{t-i}^2 \quad (3)$$

3. Data and empirical results

The data came from the *International Financial Statistics* published by the International Monetary Fund. The local interest rate is represented by the money market rate except that the discount rate is used for Hungary due to lack of data. The international interest rate is represented by the money market rate in the Euro area. The sample begins in 1999.M1 and ends in 2011.M12. The ADF test on the residuals shows that time series variables in equation (1) for each of the countries are cointegrated and have a long-term stable relationship.

Table 1

Estimated regressions of global transmission of interest rates

	IR_t	π_t	INT	\bar{R}^2	$H_0: \alpha_2 = 1$
Currency board					
Bulgaria	0.889a (56.229)	0.076a (15.162)	-0.224a (-6.016)	0.485	Rejected
Lithuania	0.819a (60.426)	0.118a (14.113)	-0.178a (-4.903)	0.414	Rejected
Other conventional fixed peg					
Latvia	0.574a (14.810)	0.088a (8.776)	0.914a (8.075)	0.128	Rejected
Managed floating					
Romania	0.465a (2.949)	1.037a (71.576)	1.801a (3.599)	0.607	Rejected
Independently floating					
Czech Republic	0.721a (31.376)	0.082a (7.498)	0.591a (12.348)	0.375	Rejected
Hungary	0.145b (2.096)	0.644a (13.010)	3.488a (17.611)	0.279	Rejected
Poland	2.467a (31.606)	0.635a (26.449)	-0.844a (-5.345)	0.641	Rejected

Notes: Letter a or b indicates that the coefficient is significant at the 1% or 5% level. INT is the intercept.

Table 1 presents empirical results. Figures in the parenthesis are z-statistics. The GARCH or ARCH model is employed in empirical work if both autocorrelation and heteroskedasticity are detected based on the LM test. The effect of a change in the Euro area interest rate on the local interest rate ranges from a low of 0.145 for Hungary to a high of 2.467 for Poland. According to the Wald test, the null hypothesis that the long-run effect is equal to one can be rejected at the 5% level for all the countries. In the long-run, Latvia, Romania and Hungary make relatively small adjustments whereas Bulgaria, Lithuania, and the Czech Republic make moderate adjustments and Poland makes more than full adjustments, suggesting that except for Poland, the other six countries possess some degrees of monetary autonomy in the long run.

The coefficient of the inflation rate is significant for all the seven countries at the 1% level and ranges from a low of 0.076 for Bulgaria to a high of 1.037 for Romania. Local interest rates in Bulgaria, Lithuania, Latvia and the Czech Republic are less responsive to a change in the inflation rate whereas local interest rates in Romania, Hungary and Poland are more responsive to a change in the inflation rate. According to the Wald test, the null hypothesis that the coefficient of the inflation rate equals to one cannot be rejected for Hungary and can be rejected for the rest of the countries. These results suggest that the Fisher hypothesis holds only for Romania and does not apply to the other six countries.

Except for the Czech Republic and Poland, coefficients of the Euro area interest rate continue to decline as exchange rate regimes become more flexible. Hence, except for the Czech Republic and Poland, countries adopting less flexible exchange rate regimes have greater monetary autonomy than the countries adopting more flexible exchange rate regimes in the long run.

4. Summary and conclusions

This paper has examined monetary autonomy under different exchange rate regimes for seven new EU countries outside the Euro zone in order to determine whether interest rates in countries with more flexible exchange rate regimes may be less sensitive to a change in the Euro area interest rate in the long-run. The local interest rate is specified as a function of the Euro area interest rate and the inflation rate. The GARCH or ARCH model is applied in empirical work.

Major findings are summarized as follows. The positive coefficients of the Euro area interest rate and the inflation rate are significant at the 1% or 5% level for all the countries. Latvia, Romania, and Hungary are less sensitive to a change in the Euro area interest rate whereas Bulgaria, Lithuania, and the Czech Republic are more sensitive to a change in the Euro area interest rate. Poland makes more than full adjustments. The Fisher hypothesis applies to Hungary and does not hold for the remaining six countries. Except for the Czech Republic and Poland, empirical

results confirm the hypothesis that countries with more flexible exchange rate arrangements have greater monetary autonomy than countries with less flexible exchange rate arrangements in the long-run.

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