




Monetary independence and liberalisation of capital flows: an unattainable duo in the context of financial globalisation and eurozone accession?

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Aim: Financial globalisation is a process that involves the liberalisation of capital flows and the deregulation of financial markets. Under these conditions, however, financial crises are more easily transmitted between countries, and the issue of financial stability is once again gaining topicality, with independent monetary policy playing an important role. The aim is to define the concept and meaning of monetary policy independence and to examine whether it is possible to achieve a certain degree of independence.

Methods: Through a critical analysis of the theoretical concepts of “trilemma”, “quadrilemma” and “dilemma” and an insight into the “original sin hypothesis” in previous research, the interrelationship between monetary policy, capital flows and exchange rate regimes was explained to form an empirical research model. The study was conducted for a group of six Central and Eastern European (CEE) countries. A dynamic panel model was used in which monetary policy independence is estimated by the β_1 coefficient. The higher the coefficient with the Euro Interbank Offered Rate (EURIBOR), i.e. the closer its value is to 1, the greater the influence of foreign interest rate movements on the domestic interest rate and the lower the country’s degree of monetary policy independence.

Results: The coefficient β_1 with the EURIBOR variable was 0.72 and was statistically significant at all significance levels, which means that there was a significant transmission of the foreign interest rate to the domestic interest rate in the observed countries and the degree of monetary policy independence is low.

Conclusions: Financial openness affected the reduction and accumulation of reserves, the growth of the degree of monetary policy independence, while the choice of exchange rate regime was not statistically significant. The study thus confirms that monetary policy independence in the era of capital account liberalisation is limited regardless of the type of exchange rate regime.

Keywords: monetary independence; trilemma; quadrilemma; dilemma; capital account freedom; panel model

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Introduction

The process of globalisation means a deepening of interdependence in the political, cultural and economic sense. The economic aspect leads to greater freedom of capital movements, i.e. the opening of capital accounts and the deregulation of financial markets. Although this has many positive effects (access to external financing and achieving a higher growth rate through foreign savings and technology, rising standards, etc.), financial globalisation also has increasingly negative consequences, reflected in macroeconomic imbalances due to rising foreign debt, overvalued exchange rates, loss of competitiveness or increasingly frequent crises due to financial tensions, such as the great financial crisis of 2008–2009, which spread from the US to the rest of the world and had long-term negative consequences for a large number of countries. The more financially integrated a country is, i.e. the higher the degree of financial openness and capital flows, the greater the likelihood of capital outflows in times of financial crisis, leading to a sharp decline in employment, a volatile growth rate and an increase in public debt (1).

One of the most important factors in financial globalisation is the issue of monetary independence. The term most frequently used in the literature, monetary policy independence, refers to the freedom to set domestic or local interest rates independently of foreign interest rates (2). For example, if a country suffers from an inflation shock, it will raise interest rates and lower them in a recession to stimulate the economy, regardless of the international interest rates levels (3).

The issue of monetary policy independence is addressed in the Mundell-Fleming model, which analyses the effectiveness of monetary policy in a small open economy (4). Mundell's most important contribution is the concept of the "trilemma" or "impossible trinity", which links three macroeconomic policies: independent monetary policy, exchange rate stability and capital openness. According to this concept, a country cannot simultaneously pursue an independent monetary policy and a stable exchange rate policy with an open capital account (4). This follows from the so-called uncovered interest rate parity, which states that if domestic and foreign bonds are perfect substitutes, in a fixed exchange rate situation and free movement of capital, the central bank must keep the domestic interest rate at the level of the foreign interest rate so that it is determined by the country to whose currency the exchange rate is pegged (4, 5). To maintain financial stability and achieve a degree of monetary autonomy in the short term under conditions of financial globalisation, countries began to accumulate international reserves. This theoretical concept is called "quadrilemma" and adds a fourth corner to the existing triangle of the trilemma, namely international reserves (4, 6). One of the main factors that have influenced the extension of the trilemma concept to the quadrilemma is the so-called "fear of floating", i.e. the need for a country to keep its exchange rate stable. Financial integration has exacerbated this problem in some countries due to possible sudden capital outflows or inflows, and countries see the solution precisely in the accumulation of international reserves (7, 8). A concept that also challenges the basic assumptions of the trilemma in the world of open capital accounts is Rey's "dilemma" (9), which states that in a globalised financial world with various forms of capital flows and imperfections in the financial markets, the monetary policy of major countries influences the monetary conditions and financial stability of other countries. The concept of the dilem-

ma is based on the existence of the so-called global financial circuit and the correlation of capital flows between countries. Monetary factors are transmitted from the financial centre to the rest of the world, and the country's monetary policy becomes dependent on global conditions. In this dilemma, the choice is between an independent monetary policy or a free flow of capital, which leads to the conclusion that the choice of exchange rate is irrelevant.

For small countries on the periphery, monetary policy independence can only be achieved with capital controls, as these isolate their monetary policy even if the core countries lower the interest rates (9, 10). The issue and importance of maintaining financial stability is coming back to the forefront of discussions as financial crises increasingly spread to countries that are more open and dependent on foreign capital, and small open economies are the hardest hit. The inability of monetary policy to achieve domestic policy objectives makes it difficult for some countries to recover from the crisis (11), which is the main criticism of the eurozone. Henriksen et al. (12) believe that the reason for this is the assumption that countries with independent monetary policies would make different policy choices when output and employment shocks are asymmetric. By fixing the exchange rate (e.g., through euro integration and acceptance of the single currency) and thus losing monetary policy independence, these countries have only limited options for combating the crisis. The question is therefore: How decisive can monetary policy independence be in the fight against external shocks in the small open economies of Central and Eastern Europe in the process of euro integration?

The aim of this study is to assess which factors (under the conditions of capital liberalisation and globalisation) are important for the monetary policy independence of small open countries in Central and Eastern Europe that are strongly intertwined with the eurozone, and to what extent these countries can pursue an independent monetary policy.

Methods

We analysed how the openness of financial and capital markets, the choice of exchange rates and the level of international reserves influenced the monetary independence of six countries from Central and Eastern Europe (CEE) between 2001 and 2019 (19 years). The selected countries (Bulgaria, Czech Republic, Croatia, Hungary, Poland and Romania) are post-transition European Union (EU) countries that were not members of the eurozone during the period analysed.

Variables for assessment of monetary independence and financial openness

To assess the significance of the degree of capital openness, the choice of exchange rate regime and the level of international reserves for the degree of monetary policy independence, an empirical model based on Klein and Shambaugh (10), Gosh (11) and Frankel et al. (13) was created. The definitions and data sources for all variables used in the model and the expected effects of the independent variables are as follows:

IR – interest rate (14). The dependent variable in the model was the average annual rate of the three-month money market interest rate for a given country.

EURIBOR – Euro Interbank Offered Rate (14). The average annual rate of three-month EURIBOR was used as the base interest rate. The expected impact on the IR is positive, meaning that the change and increase of the EURIBOR rate also changes and increases the domestic IR.

FO – Financial openness (15, 16), measured as the sum of foreign assets and liabilities in GDP and shows capital mobility, that is, an openness of accounts to foreign capital. Expected impact is negative as greater financial integration and free movement of capital limit monetary policy independence.

FXRdum – *De facto* exchange rate regime. The exchange rate regimes were classified according to Ilzetzki, Reinhart and Rogoff (17) and simplified into three “main” groups: fixed, intermediate and floating exchange rate regimes. Since the exchange rate regime is a qualitative variable, it was included in the model as a binary dummy variable, where 0 stands for a fixed exchange rate and 1 for an intermediate or fluctuating exchange rate. The impact of this variable is not expected to be statistically significant since it cannot reduce the transmission of the effects of the global financial cycle.

rGDP – Share of international reserves in GDP (18). By including the level of international reserves in the model, we have also tested the quadrilemma concept to assess whether the appropriate level of international reserves provides central banks with more room for manoeuvre in the conduct of monetary policy. Expected impact of this variable is positive, meaning that a higher level of reserves allows for greater monetary independence.

FD – Financial development (18) is shown as the share of loans to the private sector in GDP (11, 19) and it is expected to have a positive impact as higher values of this indicator are considered to allow for more independent monetary policy

realGDPG – Real GDP growth rate (16). This variable was included in the model as a control variable that either directly or indirectly influences the dependent variable.

INFDIF – Inflation differential was also used as a control variable, as in Gosh (11) and Frankel et al. (13). The difference between domestic and foreign interest rates may include the exchange rate risk premium and the sovereign risk premium. The exchange rate risk premium reflects the fear of devaluation, which may be reflected in the inflation differential, and the sovereign risk premium may indicate economic instability, which is strongly correlated with the inflation rate. It is therefore advisable to use the inflation differential. The ability to pursue an independent monetary policy by setting interest rates independently can also be expressed in the long term as the ability to determine one's own inflation rate (13). A larger difference between the inflation rates of the observed countries and those of the euro area also means greater monetary independence (14).

Statistical modelling

The sample contains a spatial component (i.e. cross-sectional data) and a temporal component (i.e. time series data), which is why panel models were used for the analysis (20). A dynamic panel model was chosen for this study, as economic relationships are generally dynamic in nature, meaning that the values of the variables from the previous period influence the current values of the variables. Specifically, the corrected fixed effects estima-

tor or the least squares dummy variable corrected (LSDVc) estimator was chosen for the analysis because in this specific observed model the number of observation units is small and the number of periods is larger than the number of observation units (6 countries, 19 years) (21).

The general equation of the chosen model can be written analytically as follows:

$$IR_{it} = \mu + \gamma IR_{i,t-1} + \beta_1 EURIBOR_{i,t1} + \beta_2 FO_{i,t2} + \beta_3 FXRdum_{i,t3} + \beta_4 rGDP_{i,t4} + \beta_5 FD_{i,t5} + \beta_6 realGDPG_{i,t6} + \beta_7 INFDIF_{i,t7} + \alpha_i + \varepsilon_{it}$$

Where $i=1, \dots, N$; $t=1, \dots, T$; IR_{it} – the interest rate of the selected country as dependent variable; $IR_{i,t-1}$ – dependent variable in the previous period (lagged variable); $EURIBOR_{i,t1}$, $FO_{i,t2}$, $FXRdum_{i,t3}$, $rGDP_{i,t4}$, $FD_{i,t5}$, $realGDPG_{i,t6}$, $INFDIF_{i,t7}$ – independent and control variables were previously defined, γ , β_1 , β_2 , β_3 , β_4 , β_5 – parameters to be evaluated, α_i – constant member, ε_{it} – country relationship error i in period t , i – units of observation, t – observation period, μ – common constant term for all units of observation.

The key variable in our model, monetary policy independence, is estimated by the β_1 coefficient. The higher the coefficient with EURIBOR, i.e., the closer its value is to 1, the greater the impact of foreign interest rate movements on the domestic interest rate and the lower the country's degree of monetary policy independence. The programme STATA (StataCorp, College Station, TX, USA) was used to test the model, at level of significance of 0.05.

Results

Descriptive statistics shows the general characteristics (mean, standard deviation, minimum and maximum) of the observed variables in the selected CEE countries of EU: Bulgaria, Czech Republic, Croatia, Hungary, Poland and Romania (Table 1).

Table 1. General characteristics of the observed variables in CEE countries of EU*

Variable*	Mean	Standard deviation	Min	Max	No. observations
IR	3.986801	3.209960	-0.008333	16.089170	106
EURIBOR	1.544161	1.672985	-0.356333	4.634233	114
FO	210.14560	127.65170	80.08376	634.10850	114
FXRdum	0.2192982	0.4155979	0.0000000	1.0000000	114
rGDP	24.815280	9.861577	9.710438	68.352790	114
FD	43.909000	15.333700	8.653377	70.853420	114
realGDPG	3.122807	2.986223	-7.400000	10.400000	114
INFDIF	1.940128	4.707144	-3.694797	33.285350	114

*Abbreviations: IR – the average annual interest rate of the three-month market rate of the selected country, EURIBOR – average annual rate of three-month EURIBOR, FO – financial openness, FXRdum – dummy variable, exchange rate regime de facto, rGDP – international reserves of the country, FD – financial development, realGDPG – real GDP growth rate, INFDIF – inflation differential, Std. Dev. – standard deviation, Min – minimum, Max – maximum, Obs. – observations.

Pearson's correlation coefficients are presented in **Table 2**. The correlations between the observed independent variables are weak and it can be concluded that there is no problem of multicollinearity in the selected model. The correlation coefficient between the variables EURIBOR and INFDIF is the only one with a value slightly above 0.5, but this can be ignored because it is still a weak correlation and it can be assumed that there is no problem of multicollinearity here either. It later emerged that the addition of these variables to the model does not change the sign and significance of the others therefore these two variables can be used in the same model.

Table 2. Correlation matrix of the independent variables*

Variable*	EURIBOR	FO	FXRdum	rGDP	FD	realGDPG	INFDIF
EURIBOR	1.0000						
FO	-0.2462	1.0000					
FXRdum	0.4391	-0.1851	1.0000				
rGDP	-0.4172	0.3326	-0.4731	1.0000			
FD	-0.2952	0.3219	-0.4046	0.4292	1.0000		
realGDPG	0.2616	-0.2996	0.2070	-0.1507	-0.4479	1.0000	
INFDIF	0.5440	-0.1847	0.4626	-0.2803	-0.4141	0.2419	1.0000

*Abbreviations: EURIBOR – average annual rate of three-month EURIBOR, FO – financial openness, FXRdum – dummy variable, exchange rate regime de facto, rGDP – international reserves of the country, FD – financial development, realGDPG – real GDP growth rate, INFDIF – inflation differential.

Figure 1 shows the evolution of IR and EURIBOR separately for each country over the observed period, i.e., from 2001 to 2019. It can be seen from the graph that the domestic interest rates of the selected countries generally followed the evolution of the base rate,

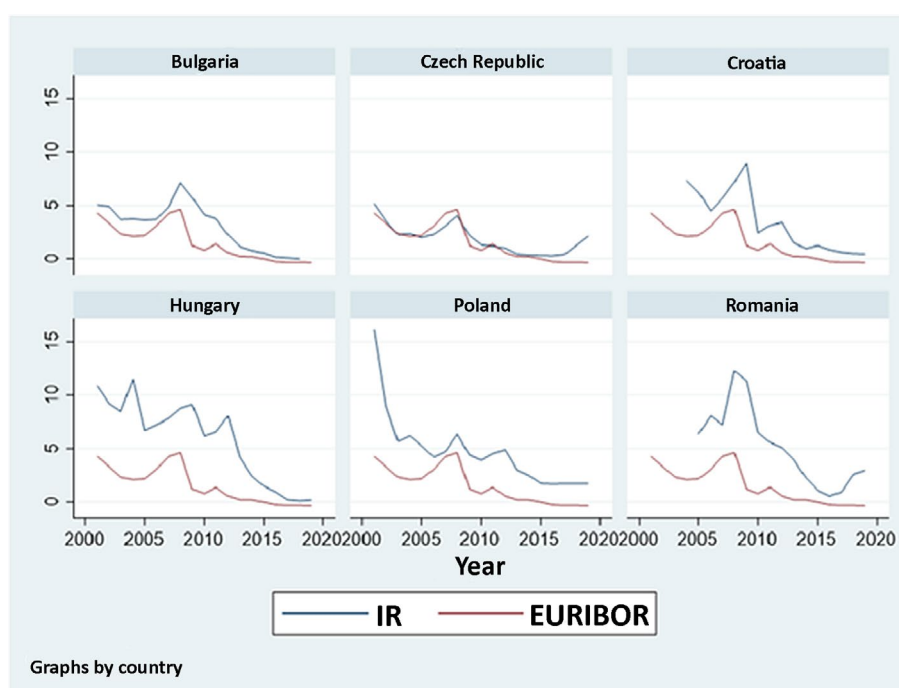


Figure 1. Development of domestic interest rate (IR) and EURIBOR by country. The x-axis shows the observed period of time (2001–2019) and the y-axis shows the height of the mentioned interest rates.

albeit with a certain difference, namely the difference to EURIBOR. During the period under review, the difference was greatest in Hungary and Romania, while it was extremely small in the Czech Republic until 2015. In addition, it is noticeable that the interest rate differential has decreased in Bulgaria, Croatia and Hungary in recent years, while it has increased in the Czech Republic and Poland and especially in Romania at the same time. The observed movements and differences between domestic and base rates, i.e., the interest rate differential, can be explained both by the degree of independence in the conduct of monetary policy and by the country's risk level and differences in inflation rates, which later proved to be statistically significant in the model at level of significance of 0.05.

Figure 2 is the graphical representation of the evolution of other independent variables over the years by country. The only variable that is not shown graphically is the dummy variable for the de facto exchange rate regime, whose evolution over time shows no significant fluctuations and is therefore omitted from the graphical representation. All

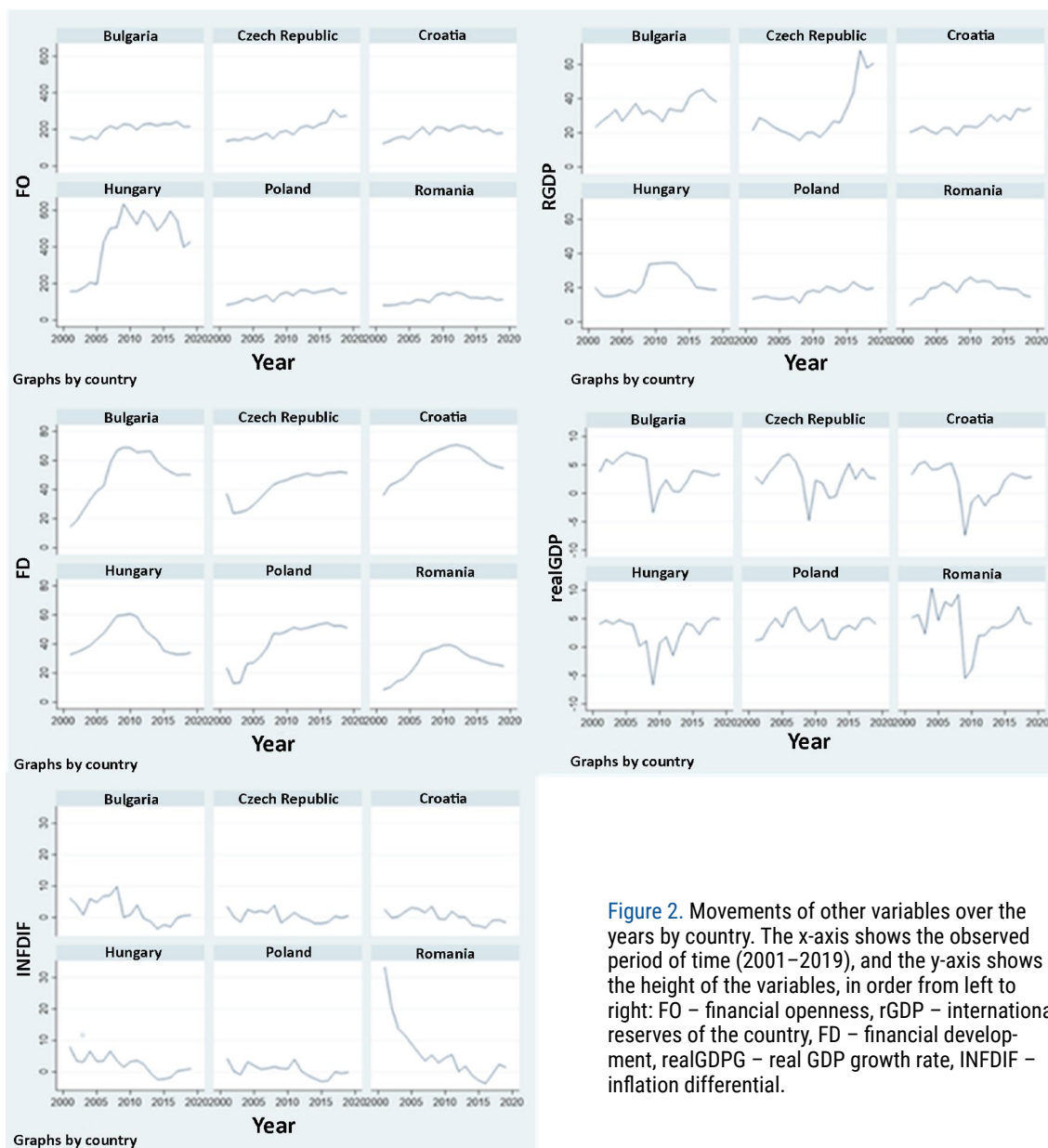


Figure 2. Movements of other variables over the years by country. The x-axis shows the observed period of time (2001–2019), and the y-axis shows the height of the variables, in order from left to right: FO – financial openness, rGDP – international reserves of the country, FD – financial development, realGDPG – real GDP growth rate, INFDIF – inflation differential.

countries had a trend of increasing FO and FD with some periods of small oscillations. As for rGDP, it is clear that the values were very different between countries. RealGDPG was rising with some oscillation in all countries before the global financial crisis, only to fall in all countries afterwards. The inflation differential has been declining in recent years and has a roughly similar value in all countries.

The results of the Wooldridge test for autocorrelation of the residuals showed that there was autocorrelation ($P=0.011$). We used a dynamic panel model to include the lagged value of the IR variable in the model to solve this problem.

From the results obtained by including the estimated coefficients, the equation of the specific model can be written as follows:

$$IR_{it} = \mu + 0.3883IR_{it1} + 0.7232EURIBOR_{it1} + \beta_2 0.0052FO_{it2} + \beta_3 1.1746FXRdum_{it3} + \beta_4 0.0521rGDP_{it4} + \beta_5 0.0172D_{it5} + \beta_6 0.1719realGDPG_{it6} + \beta_7 0.2396INFDIF_{it7} + \alpha_i + \varepsilon_{it}$$

where $i=1, \dots, 5$; $t=1, \dots, 19$.

As shown in **Table 3**, the value of the interest rate of the previous period turned out to be statistically significant at the 1% level, which confirmed the justification of using the dynamic panel model. As for the key variable in our model, the results show that the coefficient β_1 with the EURIBOR variable was 0.72 and was statistically significant at all significance levels. It can be concluded that the influence of EURIBOR on the movement of domestic interest rates was significant, which means that the implementation of independent monetary policy in the observed countries is quite limited.

Table 3. Corrected fixed effects estimator with associated statistical significance levels

Variable	(1) IR
L. IR	0.388 (0.0711)†
EURIBOR	0.723(0.167)†
FO	-0.00516 (0.00284)§
FXRdum	-0.175 (0.534)
rGDP	0.0521 (0.0204)‡
FD	0.0172 (0.0135)
realGDPG	-0.172(0.0642)†
INFDIF	0.240 (0.0714)†

*Abbreviations: L.IR – the average annual interest rate of the three-month market rate of the selected country, EURIBOR – average annual rate of three-month EURIBOR, FO – financial openness, FXRdum – dummy variable, exchange rate regime de facto, rGDP – international reserves of the country, FD – financial development, realGDPG – real GDP growth rate, INFDIF – inflation differential

† $P < 0.01$.

‡ $P < 0.05$.

§ $P < 0.10$.

For the other independent variables, FO was significant at a statistical significance level of 10%, The negative sign confirmed the theoretical expectations about the negative impact of the degree of financial openness on monetary independence. Thus, a higher degree of capital account openness can reduce a country's monetary freedom, i.e. openness reduces the potential positive effects of domestic monetary policy on the domestic economy. The

variable FXRdum was not statistically significant, which means that the choice of exchange rate regime was not important for an independent monetary policy. rGDP was found to be statistically significant at the 5% significance level. This means that the accumulation of reserves created some room for manoeuvre for the implementation of an independent monetary policy. The FD variable proved not to be statistically significant for the selected countries. Therefore, the level of financial development was completely irrelevant for the degree of monetary policy independence. This result therefore contradicts the expectation that greater financial openness with a high level of financial development gives a country a certain degree of monetary policy independence. As for the control variables, realGDPG was statistically significant at the 1% significance level and had a negative sign, which means that real GDP growth reduced monetary independence. Finally, it was found that INFDIF was statistically significant also at a statistical significance level of 1% and had positive effects. Long-term monetary policy independence can indeed be expressed by the extent to which it is possible to determine the inflation rate independently, i.e., with high capital openness, domestic and foreign interest rates are equalised in the long run, and the ability to determine the nominal interest rate is determined by the ability to determine one's own inflation rates.

Discussion

Given the recurring appeals in favour of maintaining monetary policy independence in parts of the professional community and the public, the aim of the paper was to assess the possibility and determinants of independent monetary policy based on modern theoretical concepts and to examine the above arguments using the example of the post-transition EU countries that were not yet part of the Eurozone at the time the study was conducted in 2020.

This study has limitations that do not jeopardise the objectivity and coherence of the analysis. For example, the limitation of the analysis period to 2019 is welcome, as the COVID crisis falls at a time when monetary policy is characterised by low and even negative interest rates and unusual liquidity creation (22, 23). Taking these years into account would only call the analysis itself into question due to the structural break.

Based on the concepts of the dilemma, the trilemma and the quadrilemma, which refer to monetary policy independence and its relationship to financial openness, foreign exchange regimes and international reserves, as well as on the studies of other authors on the possibilities of an independent monetary policy, hypotheses were formed.

The results of the estimated model show that monetary policy in the observed EU countries outside the euro area was quite limited and that the degree of monetary policy independence is low. It can be said that there was a significant transmission of monetary conditions and foreign interest rate movements to domestic ones in the selected countries in the observed period. Accession to the European Union brought with it the complete opening of capital accounts and financial integration with other members, which made it difficult to conduct monetary policy completely independently of other countries.

Financial openness has a negative and statistically significant effect at a 10% significance level, while the effect of reserve accumulation is positive and statistically significant at a 5% level, and exchange rates were also found to be statistically insignificant. Our results are in line with theoretical assumptions and previous studies. For example, Crespo Cuaresma and Wójcik (24) analysed the possibility of implementing an independent monetary policy in selected CEE countries, which are also small open economies. The results show that no country in Central and Eastern Europe has a fully independent monetary policy and that only large, industrialised countries can achieve monetary policy independence. The research confirmed that the Czech Republic and Poland have greater monetary policy independence than Hungary, but they also have a more flexible exchange rate, and these countries would suffer more losses than benefits from adopting the euro. The conclusion is that the liberalisation of capital movements, the development of financial markets and the investment strategies of global financial investors have influenced monetary policy independence during the observed period.

Căpraru and Ihnatov (25) analysed the effects of interest rate changes in the Eurozone on the interest rates of selected sixteen CEE countries outside the Eurozone and under different exchange rate regimes. They also analysed whether the choice of exchange rate regime affects the sensitivity of the domestic interest rate to the foreign interest rate, i.e. the euro area interest rate. They used the same model as Frankel et al. (13) and analysed the period of the global financial crisis. Their results show that the observed countries did not pursue an independent monetary policy vis-à-vis the European Central Bank in the long run during the crisis. There was also an influence of the Eurozone interest rate on the domestic interest rate, and in case of financial shocks, these would be transmitted to other countries. The interest rates of countries that are not members of the European Union are more sensitive to interest rate movements in the Eurozone than the interest rates of EU member states (25).

Even in the hypothetical situation in which the processes of eurointegration are neglected, financial globalisation itself implies the loss of a large part of monetary policy independence for small open economies in a situation of free movement of capital. The question is therefore not so much the choice of exchange rate, but rather what protection mechanisms (e.g. reserves) and other measures to limit certain capital movements or the introduction of macroprudential measures the country can take to maintain financial stability. Higher international reserves create opportunities for the country to “relax the trilemma” so that it can choose to continue to pursue a policy of greater monetary independence and financial openness while maintaining exchange rate stability to try to reduce output volatility through monetary policy (6).

The process of financial globalisation and the opening of capital accounts, which has intensified in post-socialist countries since the 1990s, gives rise to discussions about the importance of achieving and maintaining financial stability in a world where financial conditions spill over from one country to another, which can have a significant negative impact on the economy and complicate the implementation of macroeconomic policies (26). Large financial frictions must be responded to with effective national macroeconomic policies. The term independent monetary policy usually means the free determi-

nation of the domestic or local interest rate in relation to the foreign interest rate, i.e. the interest rate of a base country. Its importance lies precisely in the possibility of counter-cyclical action under conditions of crises and external shocks, where countries can stimulate domestic aggregate demand and prevent or mitigate a recession in the country through monetary expansion and devaluation of the domestic currency (13).

Our study showed that in a situation of global financial circulation and free movement of capital, small open economies adjusted their interest rate to the international interest rate, i.e. they lost their monetary policy independence regardless of the choice of exchange rate regime, which is in line with previous research (11, 13, 26). This confirms the concept of the dilemma, i.e. that monetary policy depends on global financial conditions, which are influenced by the monetary policy of central banks in the major economies (26). Irrespective of the choice of exchange rate regime, monetary policy cannot therefore be independent in the case of free capital movements, but can only decide independently on the degree of liberalisation of capital movements. On the other hand, the process of eurointegration itself implies the process of fixing the exchange rate and ultimately the introduction of a common currency and a common monetary policy. In conceptual terms, financial globalisation and the process of euro integration abolish the classical independence of monetary policy and restrict fiscal policy through rules.

In conclusion, we can say that the significant influence of EURIBOR on the movement of domestic interest rates that the selected countries did not have a high degree of monetary policy independence, i.e., they cannot use monetary expansion and the depreciation of their currency to stimulate demand for domestic products and growth in output and employment in the event of a recession. The result should not come as a surprise as the sample includes countries that have strong economic ties with the eurozone and a fully open capital account. The selected countries have thus effectively pegged their monetary policy to the European Central Bank (ECB) monetary policy, i.e., they effectively “import” the eurozone’s monetary policy, which confirms that there is a transmission of the movement of the foreign interest rate to the domestic interest rate. Thus, the decisions of the Governing Council of the ECB practically have a decisive influence on domestic economic conditions, which confirms the low degree of monetary policy independence of these countries.

The discussion of the above policies is beyond the scope of this paper and serves as a guide for further research. The conditions of macroeconomic adjustment in a situation without exchange rate flexibility, i.e. the social implications and disadvantages of internal devaluation, are also a valuable area for further research on the above topic.

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