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ANALISIS OF THE DETEREMINANTS OF EXCHANGE RATE VARIABILITY[26]

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Abstract: *The objective of this paper is to analyze the determinants of nominal exchange rate variability for the acceding countries. The literature recognizes various determinants of bilateral exchange rate variability. For example, countries with strong trade links tend to be characterized by stable bilateral exchange rates. The implication is that the costs of adoption of a common currency decreases when exchange rates are stable. In this case, the countries may reap the benefits of common currency without risking that by irrevocably fixing their currency large adjustments in the real sector would occur. After presenting the main results of several authors who previously studied the determinants of exchange rate variability, this paper will estimate the importance of the factors to which OCA theory points for the exchange rates variation in Central and Eastern European countries, hereafter the CEE countries.*

Keywords: *Exchange Rate Variability, Common currency, Optimum Currency Area (OCA)*
JEL Codes: *F31, O24*

INTRODUCTION

The withdrawal from a variable exchange rate of a country is associated with giving up the ability to conduct autonomous monetary policy. This is a major concern for countries maintaining a floating exchange rate in order to absorb internal and external macroeconomic shocks. The ability to influence productivity at the cost of high inflation, i.e., rejection of the Balassa-Samuelson effect (Zlatinov, 2022) poses also a problem. The adoption of a common currency is associated with different costs for those countries with fixed and for the ones with floating exchange rates. Greece, which have introduced the euro in 2002 has experienced an unprecedented drop of its GDP[27].

EXPOSITION

Early research on determinants of exchange rate variability

This analysis is pioneered by Bayoumi and Eichengreen (Bayoumi, 1996) and developed by Devereux and Lane (Devereux, 2003). Bayoumi and Eichengreen develop a procedure for applying the core implications of the theory of optimum currency areas to cross-country data. Their analysis relies on data from industrialized countries from 1960's to 1980's and they find that the relationship between the characteristics of countries to which OCA theory points and the observed behaviour of exchange rates is sufficiently stable to be used for forecasting purposes. The authors extrapolate the independent variables and substitute them into the exchange rate equation,

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[27] Greece was the country hit the hardest by the Eurozone debt crisis. Between 2009 and 2014, the country saw its GDP drop by more than 25%, a figure that exceeds even those found during the Great Depression (Stiglitz, 2016)

obtaining an "OCA index" for European countries. This index is further used to predict which countries from Western Europe were at that time best suited to be among the founding members of EMU.

Devereux and Lane (Devereux, 2003) widen their sample also to developing countries. They examine whether the countries with high level of debt issued in foreign currency will tend to stabilize the value of their currency in relation to the currencies in which the debt is issued.

The analysis of exchange rate regimes employed in these papers differs by earlier work on choice of exchange rate regime because it does not rely on judgmental categorizations of exchange rate arrangements. The variability of real and nominal exchange rates is of course influenced to a high extent by the choice of exchange rate regime and consequently should contain information about what arrangement to adopt. Moreover, actual exchange rate behaviour may convey more information about the economic determinants than the putative exchange rate regime. Thus, the limited-dependent variable on which most earlier investigations focus does not make use of all the information available in the variability of exchange rate.

The OCA theory focuses on characteristics which make stable exchange rates and monetary unification more or less desirable. The most important of these are asymmetric disturbances to output, trade linkages, similarity of exports, labour mobility and the extent of automatic stabilizers.

Description of variables, estimation and results

Following the procedure of Bayoumi and Eichengreen, this section will analyse the influence of several factors on the variability of bilateral exchange rates between the acceding countries and the Euro zone.

The variables used to explain the variability in bilateral exchange rate are *output disturbances, dissimilarity of the commodity composition of the exports* and the *importance of bilateral trade linkages.* The *output disturbances* are measured by the standard deviation of the change in the log of relative output in the two countries. Thus, for countries in which business cycles move together, the value of this measure will be small, so a positive coefficient is expected. It is important to note that it would be preferable to decompose relative output movements into relative supply and demand shocks, and the respective economies' response to each. However, this is difficult to implement with the short time series utilized here.

The *dissimilarity of commodity composition* of the exports of the two countries is added as a second proxy for the asymmetry of shocks because it is assumed that industry-specific shocks will be more symmetric when two countries exhibit the same main export sectors. Consequently, the less dissimilarity in the composition of exports, the less variability is expected in the bilateral exchange rate, so a positive coefficient is expected.

The *importance of bilateral trade* linkages is measured by the average value of the ratio of exports to the partner country to GDP. It is expected that for a higher level of bilateral trade, the two countries will show more concern for a stable exchange rate. Consequently, according to OCA theory, a negative coefficient is expected for this variable.

The determinants of exchange rate variability are analysed for 4 EU members: Czech Republic, Hungary, Poland and Romania. Bulgaria is not included in the analysis due to the currency board arrangements which makes such analysis inappropriate in this case. The data sample consists of yearly data covering 5 years, from 2018 till 2022.

The results of the OLS estimation are presented in Table 1

Table 1: Variability of exchange rate

	Coefficient	t-statistic
Variability of output	0.852***	3.75
Dissimilarity of exports	0.075	0.78
Trade linkages	0.0004	0.43
n = 28 R-squared: 0.39	denotes significance at one percent confidence level	

The variability of output seems to be highly significant in explaining the variability in bilateral nominal exchange rate. Thus, the different evolution of business cycles seems to have been an important factor of variability in nominal exchange rates. This can be seen also from Table 1, in which the bilateral standard deviations of exchange rates (SDER) is plotted against the standard deviation of the difference of rates of growth of GDP (SDGDP), for each pair of countries considered. From Table 2 it can be seen clearly the positive relationship between discrepancies of business cycles and variability of exchange rates).

Table 2: Variability of exchange rate (with std. dev. of inflation differential included)

	Coefficient	t-statistic
Variability of output	0.749***	3.91
Dissimilarity of exports	0.254*	1.95
Std. dev. of inflation differential	2.125**	2.12
*** = denote significance at 10, 5 and respectively 1% level of confidence		
R-squared =0.69		
n=21		

This finding shows that during the last 5 years the analysed countries have used the nominal exchange rate adjustments to stabilize for cyclical disturbances. In the light of the cost-benefit analysis of joining EMU, it can be interpreted that future asymmetric evolutions of business cycles between CEE countries and current EMU members might bring about additional costs in case of irrevocably fixing the currencies against the Euro.

In the Bayoumi and Eichengreen paper, the coefficients of dissimilarity of exports and trade linkages are significant and have the expected sign. This suggests that for the 21 industrialized countries analysed by the authors, these factors have also played a role in influencing the variability of bilateral exchange rates. The authors interpreted this as a "strong support of the empirical implications of the theory of optimum currency areas". For the sample of CEE countries, it seems that these factors did not have a clear influence on the variability of exchange rates.

One reason may be the shorter sample employed in this paper. Moreover, a closer look at these the independent variables can shed more light about this issue. Thus, except for Czech Republic and Slovakia, which exhibit an average ratio of bilateral exports to GDP of 7 percent, all the other CEE countries trade very little between themselves, while their most important trade relationship is by far the one with Eurozone. Nonetheless, it seems that for the CEE countries, the variability of their

currencies relative to Euro is not influenced in a clear pattern by the importance of economic cooperation with the members of EMU.

As the purpose of this paper is to look into the determinants of variability of bilateral nominal exchange rates between CEE countries, it is useful to note that the inflation differential is, according to Purchasing Power Parity theory, a main determinant of nominal exchange rates movement, especially in the long run. Although the data sample covers a relative short period of time, it is likely that inflation differentials have played an important role in the movements of nominal exchange rates for CEE countries. This relationship is especially appealing to test considering that the countries from the sample have experienced rather high and volatile inflation in a period of economic restructuring. According to PPP theory, changes in nominal exchange rates should be proportional to changes in relative prices given by inflation differential. Subsequently, the variance of inflation differential between each pair of countries should explain part of the variation in changes in nominal exchange rates.

When the OCA equation was estimated for the available sample, due to much higher inflation in Romania[28] compared to all other CEE countries, the independent variables were not statistically significant. However, when excluding Romania from the sample the standard deviation of inflation differential is significant at 5% level, and the dissimilarity of export composition becomes also significant at 10% level. Due to the small remaining sample, the results might not be fully reliable.

CONCLUSION

Purchasing Power Parity theory, in its relative version, states that changes in price levels, expressed in the same currency, are equal between two countries. As the tables show, the inflation differentials prove to have played an important role in the evolution of nominal exchange rates for CEE countries. After controlling for this variable, now all variables are statistically significant and have the expected sign (except the importance of trade linkages, which we excluded from estimation, due to their insignificance). Consequently, it can be stated that unless the CEE countries will exhibit more correlated business cycles, more similar export structure and closer evolution of inflation rates, the costs of relinquishing their national currencies might be high.

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[28] Romania pursues an active monetary policy and manages to maintain a floating exchange rate that meets its goal of managing the rate of inflation. As a result, its exchange rate moves at a predictable rate of depreciation of the lei against the euro, thus ensuring both export competitiveness and predictability for investors, while at the same time discouraging speculation that could trigger a currency crisis.