

# EXCHANGE MARKET PRESSURE BEFORE ENTERING THE ERM II: THE CASE OF CENTRAL EUROPEAN COUNTRIES

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## Abstract

This paper estimates the exchange market pressure in four Central European countries which are also new member of the European Union - Czech Republic, Hungary, Poland and Slovenia. As all new EU-member countries are supposed to join the European Economic and Monetary Union soon, they must pay attention on fulfilling of all convergence criteria. One of the criterions deals with exchange rate stability and is associated with membership in the Exchange Rate Mechanism II. Estimation and analysis of exchange market pressure are extremely important since almost all new EU-members will be forced to switch their relatively flexible exchange rate regime to the ERM II which is considered as quasi-fixed. This paper reveals a significance of exchange market pressure in all types of exchange regime arrangement in all countries analyzed. The paper concludes that exchange market pressure achieved the highest level in fixed pegs regimes and the volatility of exchange market pressure was lowest in the floating regimes.

## Keywords

- Exchange market pressure;
- ERM II;
- Convergence criteria;
- New EU-members.

## Rezumat

Prezentăm în această lucrare presiunea pieței de schimb în 4 țări central europene, care sunt noi membre ale Uniunii Europene - Republica Cehă, Ungaria, Polonia și Slovenia. Pentru că toate țările nou intrate în U.E. trebuie să adere la Uniunea Europeană Economică și Monetară în curând ele trebuie să acorde o atenție deosebită îndeplinirii tuturor criteriilor de convergență. Unul dintre criterii se referă la stabilitatea ratei de schimb și este asociat cu calitatea de membru al Mecanismului Ratei de Schimb II. Estimarea și analiza presiunii pieței de schimb sunt extrem de importante, de vreme ce majoritatea noilor state membre U.E. vor fi obligate să-și schimbe regimul ratei de schimb relativ flexibil conform ERM II care este considerat ca fiind cvasifix. Prezentăm semnificația presiunii pieței de schimb în toate tipurile regimului de schimb în țările analizate. Concluzia este că presiunea pieței de schimb a atins cel mai înalt nivel în țările cu regim stabil și un caracter inconstant al presiunii pieței de schimb a fost mai scăzut în țările cu regim fluctuant.

## Cuvinte cheie

- Presiunea pieței de schimb;
- ERM II;
- Criterii de convergență;
- Noi state membre U.E.

## 1. Background

Eight countries from Central and Eastern Europe (CEEC) joined the European Union (EU) in the spring of 2004 and completed, in fact, transformation from centrally planned economies to market economies. Moreover, it is expected that they will also join the Economic and Monetary Union (EMU) and implement the euro as a legal tender. However, membership in the EMU is conditioned by fulfilling of the Maastricht criteria. One of them is the criterion of the national currency's stability in the period preceding entry into the EMU. This criterion is associated with specific exchange rate regime, ERM II, which must be adapted by all countries with regimes whose principles do not correspond with the ERM II's spirit (the group of incompatible regimes includes crawling pegs, free floats or managed floats without a mutually agreed central rate and pegs to anchors other than the euro.) It means that all CEEC except Estonia and Lithuania will have to modify their exchange rate arrangement when joining ERM II. (As of 1<sup>st</sup> December 2005, five of the CEEC (Estonia, Latvia, Lithuania, Slovakia and Slovenia) joined the ERM II. Nevertheless, the exchange rate regime in Latvia is very similar with the ERM II, thus the "costs" of the regime's rearrangement are rather marginal). The Czech Republic, Hungary, Poland and Slovakia currently use flexible exchange rate arrangements. Slovenia also maintained flexible regime before entry into the ERM II. Such a change towards less flexible exchange rate system increases susceptibility of the countries to currency crises and pressures on the foreign exchange markets.

The aim of the paper is to estimate exchange market pressure in the Czech Republic, Hungary, Poland and Slovenia during the period 1993-2004. Since all

countries used both fixed and flexible exchange rate regime, the time span chosen allow us to compare magnitude of tensions on the foreign exchange market in different exchange rate environment. This kind of analysis has important policy implications as the switch to less flexible regime is unavoidable in the near future. The paper is structured as follows: the second section deals with the theoretical concept of exchange market pressure, the third section describes the data used and the fourth section presents the empirical results. The paper ends with a summary of the main findings and some conclusions.

## 2. Theoretical Concept of Exchange Market Pressure

The notion of exchange market pressure was introduced by Girton and Roper (1977). They started from the insight that excess demand or supply on the foreign exchange market can result in a change in the price of foreign exchange as well as in a change in the level of foreign reserves. The interesting feature of the concept is that is applicable to all exchange rate systems and to different degrees of exchange rate management.

In contrast to Girton and Roper (1977) or Weymark (1995) we assume that exchange market pressure is also associated with interest rate differential, particularly in transition countries like the CEEC in the 1990s. As Vanneste *et al.* (2004) pointed out, interest rates have been frequently changed in CEEC to alleviate exchange market pressure. Therefore, we extended the original approach and included the change in interest rate differential into the model. The similar approach was previously followed by Pentecost *et al.* (2001) or Vanneste *et al.* (2004), among others. Exchange market pressure is thus defined as:

$$emp = e - \frac{\sigma_e}{\sigma_{\hat{r}}} \cdot \hat{r} + \frac{\sigma_e}{\sigma_{(i_s - i_s^*)}} \cdot (i_s - i_s^*)$$

where *emp* is exchange market pressure, *e* denotes rate of depreciation of domestic currency,  $\hat{r}$  is proportional increase in domestic international reserves,  $(i_s - i_s^*)$  defines change in interest rate differential, and  $\sigma_{\hat{r}}$ ,  $\sigma_e$ ,  $\sigma_{(i_s - i_s^*)}$  are standard errors of the respective variables.

We also take into account the different volatility of the components by using variance smoothing weights. The weights on the intervention and interest rate terms are the ratio of the standard error of the percentage change of the exchange rate over the standard error of the percentage change of reserves and the interest rate differential respectively.

### 3. Variables and Data Used

The samples cover the period from 1992:4 to 2004:4 yielding 48 quarterly observations for all countries. All data were extracted from the International Financial Statistics (IFS) provided by the International Monetary Fund. Changes in domestic exchange rate were computed relative to the euro. Exchange rates prior 1999 were obtained using the irrevocable conversion rate of German Mark to the euro. Employing of euro as the reference currency seems to be logical since the Maastricht criterion of exchange rate stability is based on the rate of domestic currency to the euro. Similarly, the EMU (Germany prior 1999) was used as anchor to compute changes in the short-term interest rate differential.

Rates of depreciation of domestic currency were calculated as change of the nominal bilateral exchange rate of the domestic currency vis-à-vis the euro, measured as the domestic currency price of one unit of foreign currency. We

calculated cross rates implied by bilateral USD rates available in the IFS in line AE. The proportional change in domestic international reserves was yielded by ratio of change in the level of reserves (IFS line 79DAD) and money base of previous period (IFS line 14). To calculate change in interest rate differential with the EMU (Germany) we used money market rates (IFS line 60B) or treasury bills rate in the case of Hungary (IFS line 60C).

### 4. Empirical Results

Exchange market pressure in all countries analyzed was estimated according to (1) and the results of calculation are depicted in Figures 1-4. Along with the exchange market pressure line, the lines representing 1.5 multiple of standard deviation above and below the mean value are portrayed. Backgrounds of figures showing *emp* in the Czech Republic, Hungary and Poland are divided into several parts allowing to distinguish different exchange rate arrangements occurred in the countries during the period analyzed. Elementary descriptive statistics of the *emp*-measure are reported in Table no 1.

Results suggest that the Czech Republic and Slovenia have gone through considerably less volatile development of the exchange market pressure than Hungary and Poland. This is evident in the standard deviation's values which are in the latter countries approximately twice as high as in the former ones. Consequently, the corridor depicted in the figures is narrower in the Czech Republic and Slovenia.

It is interesting that lower volatility has been achieved in the environment of floating exchange rate regime which has been operated by central banks during the entire period in Slovenia and two thirds of the time span in the Czech Republic.

Table no. 1

## Descriptive Statistics of Exchange Market Pressure

Source: Author's calculations

|                           | Czech Republic | Hungary   | Poland    | Slovenia  |
|---------------------------|----------------|-----------|-----------|-----------|
| <i>mean</i>               | -0.008086      | 0.049493  | 0.007103  | 0.013818  |
| <i>median</i>             | -0.005112      | 0.034319  | -0.002229 | 0.012880  |
| <i>min</i>                | -0.103579      | -0.063994 | -0.390981 | -0.053909 |
| <i>max</i>                | 0.099353       | 0.443237  | 0.240733  | 0.187736  |
| <i>standard deviation</i> | 0.044761       | 0.098472  | 0.101864  | 0.041055  |
| <i>upper limit</i>        | 0.059055       | 0.197199  | 0.159933  | 0.075399  |
| <i>lower limit</i>        | -0.075228      | -0.098214 | -0.145726 | -0.047764 |

One can also point out that the most appropriate exchange rate regime is the crawling band with a tight fluctuation corridor since no foreign exchange crisis, defined as quarter when the *emp*-measure exceeds the mean value by 1.5 standard deviation, occurred when this regime was being applied. On the other hand, when the fixed or crawling pegs were in operation, the *emp*-band was escaped in five out of 36 quarters observed. Flexible exchange rate arrangements such as managed floating or crawling band with a wide fluctuation corridor witnessed five crises during the 124 quarters.

Figure no. 1

## Exchange Market Pressure in the Czech Republic

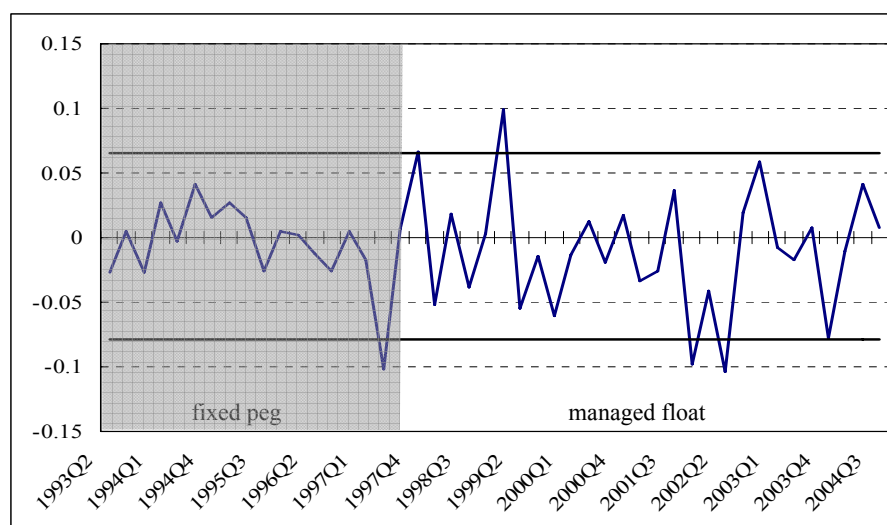


Figure no. 2

## Exchange Market Pressure in Hungary

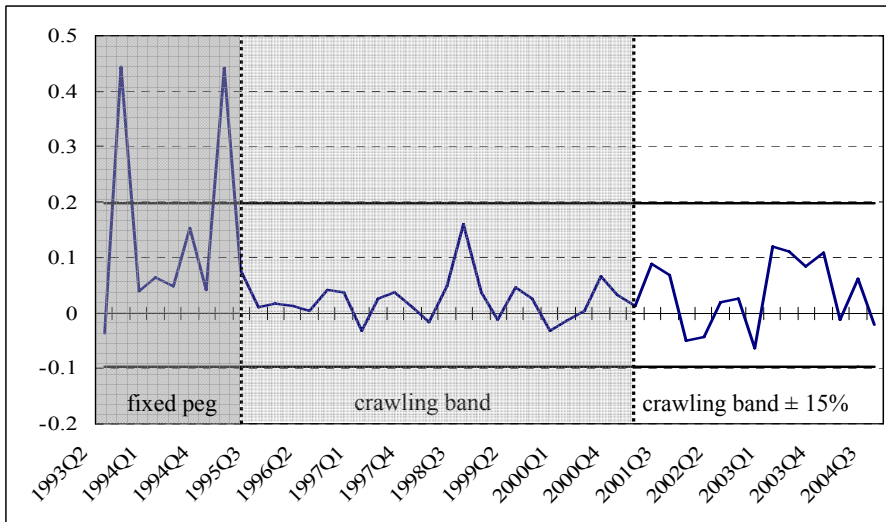


Figure no. 3

Exchange Market Pressure in Poland

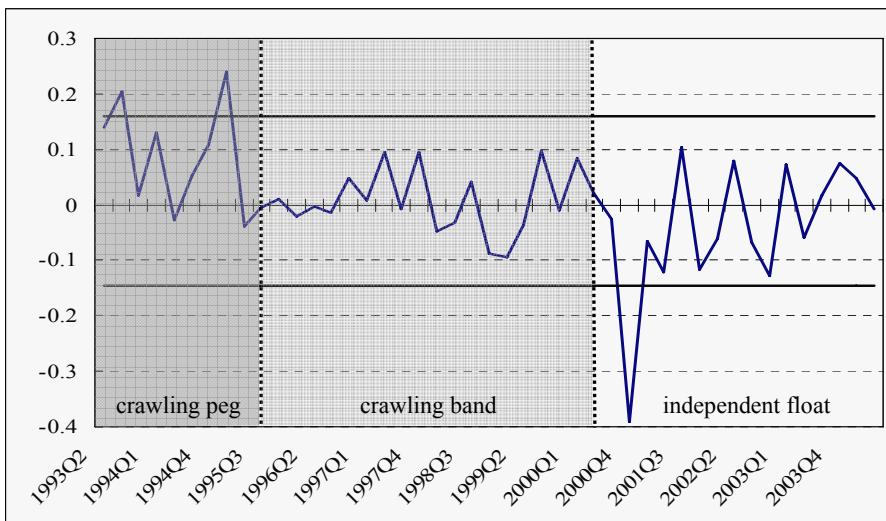
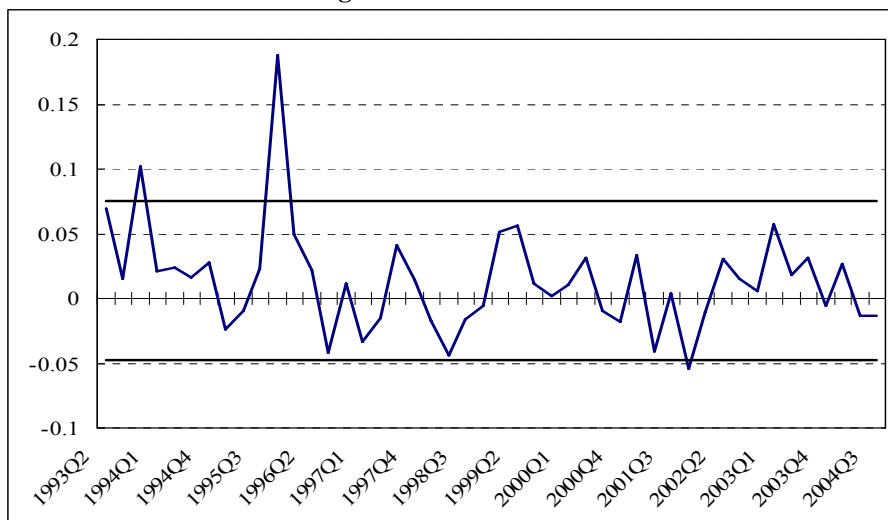


Figure no. 4

Exchange Market Pressure in Slovenia



## 5. Conclusion

In this paper a measure for exchange market pressure for four CEEC was computed. We found that tensions on foreign exchange market were the smallest in periods characterized by a crawling band. Moreover, two important conclusions can be drawn. The proportion of crisis quarters is the largest in fixed pegs and the lowest volatility of exchange market pressure measured by standard deviation was revealed in Slovenia and

Czech Republic – countries whose exchange rate history is entirely or predominantly based on floating regimes. These findings would cast serious doubts on the European Commission's requirement that the CEEC must enter ERM II (a quasi-fixed regime with a fluctuation band) and participate in it without substantial tensions on the exchange rates. The doubts gain importance if the ECB's position to allow fluctuations  $\pm 2.25$  around the central parity is considered as decisive.

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