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The J-Curve in the Emerging Economies of Eastern Europe

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Abstract

Devaluation or depreciation of a currency worsens the trade balance before improving it resulting in a J-curve pattern. A new definition of the hypothesis implies a short-run deterioration combined with the long-run improvement. By using monthly data over the January 1990- June 2005 period from 11 east European emerging economies, most of which are the new European Union (EU) members or the EU candidate countries, this paper uses the bounds testing approach to cointegration and error-correction modeling and finds empirical support for the J-curve hypothesis in three countries of Bulgaria, Croatia and Russia. The results have important implications for policymakers in involved economics in terms of using exchange rate policy as a policy device to achieve real convergence towards EU standards.

JEL Classification: F31

Keywords: Emerging Economies, the J-Curve, Bound Testing Approach to Cointegration.

I. Introduction

The enlargement of the European Union (EU) membership continues at a speedy rate. On May 2004, ten new members joined EU. Eight of them, namely the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia, are the former transition economies. Cyprus and Malta are the other two new members. Bulgaria, Croatia, Romania and Turkey are the candidate countries. The next round of the enlargement is expected to include the Western Balkan countries of Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia and Serbia and Montenegro.

These new emerging markets of Europe are relatively small, open economies, relying on export revenues to promote economic growth. Exports, therefore, play an important role in their catching-up efforts with the EU. After all, real economic convergence towards the EU standards is the ultimate objective of their economic integration decision with the EU. Fluctuations in export revenues due to adverse exchange rate changes may delay the real convergence process. In other words, the link between exchange rates and trade flows is an important issue for the newly emerging European economies. In countries with less flexible exchange rates and incomplete restructuring, adverse real exchange rate developments may put even a stronger pressure on the real sector of the economy, hurting competitiveness and ongoing restructuring efforts. Competitiveness is heavily influenced by real exchange rate developments in these economies.

An important stylized fact regarding the evolution of real exchange rates in transition economies is the initial undervaluation of the real exchange rate, misalignments and appreciation of the real exchange rate due to transition-related structural changes, and other factors such as the Balassa-Samuelson effects. The relative significance of these effects and measurement of equilibrium real exchange rates has been extensively studied in the literature (e.g., Halpern and Wyplosz, 1997; Krajnyák and Zettelmeyer, 1998; Corricelli and Jazbec, 2004; Égert, 2005; Égert and Halpern, 2005). Brada (1998) argues that, although the new EU member states adopted different monetary and exchange rate policies, real exchange rates in these economies have followed similar patterns. In other words, real exchange rates initially appreciated in all transition economies. [1] While dealing, among other challenges, with the adverse effects of the real exchange rate appreciation on the economy, transition economies have adopted trade policies[2] to reorient their trade towards EU, which was mainly with the former Soviet Union prior to the pre-1990s economic reforms. During the initial years of the transition, the key economic goal was to achieve a stable inflation environment, instead of competitiveness, because the elimination of government restrictions in general and trade liberalization measures increased aggregate demand, putting pressure on prices. Over time, competitiveness has played a much more important role as inflation was controlled and price convergence with the EU is achieved.[3] To achieve competitiveness, measured by real exchange rate movements, some countries undertook a series of official devaluations, while others have switched to more flexible exchange rate policies.[4] Over the years, there has been a significant increase in trade flows and in particular to the EU. An important question is whether changes in real exchange rates have affected the trade flows.

A significant challenge to trade flows has been high exchange rate volatility. Brada (2000) argues that significant capital inflows to the transition economies caused problems for

[1] Following studies investigate the reasons for such appreciation: Kemme and Teng, 2000; Dibooglu and Kutan, 2001; Égert, 2002; Égert et al., 2002; Bulíř and Šmídková, 2005; De Broeck and Sløk, 2005. Égert (2003) provides a survey of this literature.

[2] For a review of trade policy in transition economies, see Drabek and Brada (1998) and Hare (2000).

[3] See Kočenda (2001) and Kutan and Yigit (2004, 2005) for evidence of price convergence in transition economies.

[4] For a comprehensive review of the development in exchange rate policies in these economies, see Kočenda and Valachy (2005).

exchange rate policy in many countries. Kočenda and Valachy (2005) support this argument. They provide empirical evidence that nominal exchange rates in four Visegrad economies have exhibited greater fluctuations over time because of exchange rate regime changes. Several countries initially adapted fixed exchange rate regimes to deal with inflation shocks at the beginning of the transition. Over time, countries have switched to more flexible exchange rates to improve competitiveness. Besides regime changes, recent adoption of inflation targeting policies in some transition countries (the Czech Republic, Hungary and Poland) further hurt the exchange rate stability (Orlowski, 2005). However, improved institutions, such as the establishment of independent central banks, at least in some transition economies, have helped reduce exchange rate volatility (Kočenda and Valachy, 2005).

The exchange rate and the regime used to manipulate or to maintain it have been a key element of the stabilization programs of transition countries (Brada, 2000). Despite this and the importance of exchange rates on trade flows in these emerging, open economies of Europe, there are not many empirical studies on the real exchange rate-trade link.[5] To our best knowledge, there have been only two related studies. Kemme and Teng (2000) provide evidence on the impact of the exchange rate policies in Poland on export growth. They use the deviations of the exchange rate from its equilibrium level as a measure of real exchange rate misalignments and examine its impact on exports performance. They find that the misalignments tend to reduce export growth in Poland. Égert and Morales-Zumaquero (2005) investigate the impact of nominal exchange rate volatility on export flows in ten Central and Eastern European transition economies. They find that higher exchange rate volatility hurts export performance and the negative effects of exchange rate volatility vary across countries.

[5] Some related work study pass-through of exchange rates to inflation rates in some selected transition economies (Billmeier and Bonato, 2004; Coricelli et al., 2005; Korhonen and Wachtel, 2005).

In this paper, we fill an important gap in the literature by studying the impact of real exchange rate changes on the trade balance in the newly emerging European economies. A rich body of the literature argues that trade flows respond to currency changes with some delay. Specifically, the short-run effects of currency depreciation is said to be different than its long-run effects. In the short-run, since goods in transit have been priced at old exchange rates, the trade balance could deteriorate even after currency devaluation or depreciation. Once the effects of new exchange rate are realized, we may observe an improvement, hence the J-curve pattern. We study both the short- and the long-run linkages between real exchange rate movements and trade balance in several new EU members, namely, Cyprus, the Czech Republic, Hungary, Poland, and Slovakia, in the candidate countries of Bulgaria, Croatia, Romania and Turkey, as well as two former Soviet Union countries, namely, Russia and Ukraine. A review article by Bahmani-Oskooee and Ratha (2004a) reveals that except Turkey, the J-Curve hypothesis has not been tested for any of the other countries in our sample.

Our study has important policy implications. It is important for involved policymakers to understand that whether real exchange changes can be used as a policy tool to manipulate trade flows in these economies. An insignificant long run link between the real exchange rate and the balance of trade would indicate that real exchange rate changes in these economies do not have real effects on trade flows from a long run perspective. An important implication of this is that exchange rate policy may not be used to catch up with the EU standards in terms of real income growth. However, such real convergence is one of the important conditions for joining the eurozone for the new EU members and applying for the EU memberships for the candidate countries. To this end, in Section II we introduce the model and estimation method. In Section III we report the empirical results. Finally, a summary is provided in Section IV. Data sources and definition of variables are cited in an appendix.

II. The Model and Method

The concept of the J-Curve phenomenon was introduced into the literature by Magee (1973) who observed deterioration in the U.S. trade balance despite devaluation of the dollar by 15% in 1971. Bahmani-Oskooee (1985) then introduced a simple reduced form model of the trade balance in which the trade balance was related to the real exchange rate in addition to other variables. The method of testing the J-Curve was then reduced to imposing lag structure on the real exchange rate and observing the sign and significance of estimated lag coefficients. The finding of negative coefficients for lower lags and positive ones for higher lags was argued to support the J-Curve phenomenon. Sum of these short-run coefficients was interpreted as the long-run effects of the exchange rate on the trade balance. This approach later was adopted by other authors, e.g., Felmingham (1988), Karunaratne (1988), Mead (1988), Himarios(1989), Brissimis and Leventankis (1989), Moffett (1989), Marwah and Klein (1996), and Brada *et al.* (1997). No strong empirical support is found for the J-Curve.

The above mentioned studies were criticized when in 1987 Engle and Granger (1987) introduced the concept of cointegration and error-correction modeling. The main criticism was that since they used non-stationary data, the results could suffer from spurious regression problem. Researchers began applying cointegration to test for the long-run effects of currency depreciation on the trade balance and error-correction modeling to test the short-run effects or the J-Curve. Example of studies in this group includes Rose and Yellen (1989), Bahmani-Oskooee (1991), Shirvani and Wilbratte (1997), Bahmani-Oskooee and Brooks (1999), Bahrumshah (2001), Wilson (2001), Lal and Lowinger (2002), Bahmani-Oskooee and Goswami (2003), and Bahmani-Oskooee and Rather (2004b, 2004c). Note that while some studies have used aggregate trade data, some have employed bilateral trade data. Again, the findings are mixed.

The consensus among all recent studies is that the trade balance should depend on a measure of domestic income, a measure of foreign income and the real exchange rate. Thus, following Rose and Yellen (1989) and many other studies we adopt the following specification:

$$\text{Log TB}_t = \alpha + \beta \text{ Log } Y_{d,t} + \gamma \text{ Log} Y_{W,t} + \lambda \text{ Log REX}_t + \varepsilon_t \quad (1)$$

where TB is a measure of the trade balance. Following Bahmani-Oskooee (1991) and others we define it as the ratio of imports over exports so that the model could be expressed in log-linear form.[6] Y_d (Y_w) is a measure of domestic (foreign) income, REX is a measure of real effective exchange rate[7] and ε is an error term. Note that estimate of β and γ could be negative or positive. Usually an increase in domestic income leads to higher imports yielding a positive estimate for β. However, if the increase in domestic income is due to an increase in production of import substitute goods, imports could actually decline yielding a negative β (Bahmani-Oskooee 1986).

[6] The ratio is used to make the measure of trade balance unit free (Bahmani-Oskooee, 1991). For theoretical derivation of the reduced form see Rose and Yellen (1989, pp. 54-55).

[7] We note that data on real effective exchange rates in transition economies is hard to obtain. In this paper, we use CPI-based real effective exchange rates due to lack of uniform PPI-based real effective exchange rates for our sample countries. In his investigation of the equilibrium exchange rates of Bulgaria, Croatia, Romania, Russia, Ukraine and Turkey, Égert (2005) uses real exchange rates based on CPI and PPI. His results generally hold for both definitions of real exchange rates. In his panel analysis, Égert (2005) also employs CPI-based real exchange rates. Although Égert (2005) uses real bilateral rates against the euro and the U.S. dollar, we use real effective exchange rates based on major trading partners. Use of the latter may reduce the potential bias that may be induced by using CPI rates of a particular transition economy which include the impact of regulated prices, especially during the early stages of the transition. However, the price regulations are gradually relaxed during our sample period, Moreover, the CPIs of major trading partners are not as regulated, and they reflect more the importance of tradables than the CPIs in transition economies.

Finally, if a decrease in REX or depreciation is to lower imports and stimulate exports, an estimate of λ is expected to be positive.

The trade balance model expressed by equation (1) represents the long-run relationships between the trade balance and its determinants. In an effort to test the J-Curve phenomenon which is a short-run concept, we must incorporate the short-run dynamics into the long-run model outlined by (1). The easiest way to do this is to express (1) in an error-correction modeling format. We do this following the bounds testing approach of Pesaran *et. al*.(2001) as in equation (2) below:

$$\Delta \mathrm{LogTB}_t = \alpha + \sum_{k=1}^{K} \omega_k \Delta \mathrm{LogTB}_{t-k} + \sum_{k=1}^{K} \beta_k \Delta \mathrm{LogY}_{d,t-k} + \sum_{k=1}^{K} \gamma_k \Delta \mathrm{LogY}_{w,t-k} + \sum_{k=1}^{K} \lambda_k \Delta \mathrm{LogREX}_{t-k}$$

$$+ \delta_1 \mathrm{LogTB}_{t-1} + \delta_2 \mathrm{LogY}_{d,t-1} + \delta_3 \mathrm{LogY}_{w,t-1} + \delta_4 \mathrm{LogREX}_{t-1} + u_t \qquad [2]$$

Unlike Engle and Granger (1987) specification where the lagged residuals from (1) as a proxy for linear combination of the variables are entered into the error-correction model, here Pesaran et. al. (2001) include the lagged linear combination of the variables directly into the error-correction model. Pesaran *et. al*. (2001) then propose applying the familiar F test to determine joint significance of lagged level variables as a test of cointegration, i.e., if δ_1-δ_4 are jointly significant, variables are said to be cointegrated. However, the F test that they propose has new critical values. By assuming all variables to be integrated of order one or I(1), through Monte Carlo experiment they tabulate an upper bound critical value, and by assuming all variables to be I(0), they tabulate a lower bound critical value. For cointegration, the calculated F statistic should be greater than the upper bound critical value. The advantage of this approach over other cointegration techniques is that there is no need for pre-unit-root testing. Indeed, variables could be I(1), I(0) or combination of the two. Furthermore, by estimating a model like (2) we directly assess and distinguish the short-run effects from the long-run effects. For example, the short-run effects of depreciation are inferred by the estimates of λ_K's. Specifically, negative values for λ at lower lags followed by positive values at higher lags will be consistent with the J-Curve hypothesis. The long-run effects are inferred by the estimate of δ_4 which is normalized on δ_1.

IV. The Results

The error-correction model (2) is to be estimated for 11 emerging market economies of Bulgaria, Croatia, Cyprus, the Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Turkey, and Ukraine using monthly data over the January 1990- June 2005. The exceptions, definition and sources of the data are all provided in an appendix. The selection of sample countries is based on data availability.

As indicated in the previous section, the first task in estimating (2) is to justify the inclusion of the lagged level variables by carrying out the F test. It has been demonstrated that the results could be sensitive to the lag order imposed on each first differenced variable. Thus, as a fixed rule, following Bahmani-Oskooee and Gelan (2006), we impose 10 lags on each first differenced variable and employ Akaike's Information Criterion (AIC) to select the optimum lags. We then carry out the F test at optimum lags. The full information results from the optimum models are reported in Table 1.

Table 1 goes here

There are three panels in Table 1. Panel A reports the short-run coefficient estimates. For brevity, however, we only report the short-run coefficient estimates for the real effective exchange rate so that we can infer the J-Curve phenomenon. Clearly, in eight of the 11 countries there is at least one lagged coefficient that is significant at the 10% level, implying that in most of these emerging market economies currency depreciation has short-run effects. However, these short-run effects follow the path outlined by the J-Curve only in the results for Hungary where a negative coefficient is followed by a positive one.[8]

To determine whether the short-run effects last into the long run, we must first establish the cointegration among the variables by carrying out the F test. The results of the F test at optimum lags are reported in Panel C. As can be seen, only in six cases is the F statistic larger than its upper bound critical value of 3.52 supporting cointegration. The six cases are Bulgaria, Cyprus, Hungary, Romania, Russia, and Ukraine. However, following Bahmani-Oskooee and Ardalani (2006) we use the long-run coefficient estimates from Panel B and form an error-correction term, *ECM*. We then replace the lagged linear combination of variables by ECM_{t-1} and estimate the model again by imposing the optimum number of lags on each variable. A negative and significant coefficient obtained for ECM_{t-1} is an alternative way of supporting cointegration. By this criterion, cointegration is supported in all the cases.

Now that we have established cointegration, we shift back to our original question so that we can determine in how many cases the short-run effects of currency depreciation lasts into the long-run. The long-run coefficient estimates reported in Panel B clearly shows that only in the results for Bulgaria, Croatia and Russia does the exchange rate carry a positive and significant coefficient. Thus, if we subscribe to the new concept of the J-curve by Rose and Yellen (1989, p.

[8] The three countries where there is no significant lag coefficient at all are Czech Republic, Romania, and Ukraine.

67), i.e., short-run deterioration combined with long-run improvement, we find support for the J-curve hypothesis only in three countries of Bulgaria, Croatia and Russia.[9],[10]

Finally, we turn to a few other diagnostic statistics reported in Panel C. The Lagrange Multiplier (LM) statistic is reported for testing serial correlation in the presence of lagged dependent variable. It is distributed as χ^2 with 12 degrees of freedom. Given the critical value of 21.02, the calculated χ^2 statistic is less than the critical value in the results for seven countries implying autocorrelation free residuals in their models. Ramsey's RESET test for testing functional misspecification is also reported. It also has χ^2 distribution but with one degree of freedom. In majority of the cases it is less than the critical value of 3.84 indicating that the optimal error-correction models are not misspecified. Finally, following Bahmani-Oskooee and Goswami (2003) we apply CUSUM test of Brown et al. (1975) to the residuals of equation (2) to determine the stability of the short-run and the long-run coefficients. Clearly, all coefficients are stable in all models except the case of Turkey, which may be driven by a series of financial crises that took place in Turkey during the sample period..

As a last exercise we thought of using a different lag selection criterion to determine whether the results are sensitive to lag length. The optimum models using Schwartz Bayesian Criterion (SBC) are reported in Table 2.

Table 2 goes here

As can be seen, there are now only six countries (as opposed to eight in Table 1) where the short-run effect is significant. However, the long-run effects are the same, i.e., the long-run effects of

[9] Note that in most cases income variables carry significant coefficients signifying the importance of economic activity in influencing the trade balance.

[10] Note that this new definition of the J-curve has also received empirical support by Bahmani-Oskooee and Ratha (2004b, 2004c) who considered the U.S. trade balance with her 18 developed and 13 developing trading partners. They provided support for this new definition in a total of 18 cases.

real depreciation are positive and significant in the same three countries of Bulgaria, Croatia and Russia.

V. Summary and Conclusion

The J-Curve is a term used to describe the short-run movement of the trade balance subsequent to currency depreciation or devaluation, i.e., an initial deterioration followed by an improvement. Since its introduction in 1973 researches have tried to verify the phenomenon by employing data from different countries. While some have concentrated on the experience of developed countries, some have investigated the phenomenon for less developed countries. To the best of our knowledge, the emerging economies of Eastern Europe have not received any attention. This could be due to unavailability of the relevant data, mostly before they decided to taste some flavors of the free market economy. Since their liberalization and change in their economic systems, a new set of monthly data have become available that warrants testing some of the old theories.

The purpose of this paper was to test the J-Curve hypothesis for 11 East European emerging economies of Bulgaria, Croatia, Cyprus, Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Turkey, and Ukraine using monthly data over the January 1990- June 2005 period. The methodology was based on the bounds testing approach to cointegration and error correction modeling which does not require pre-unit root testing. Moreover, this method has an advantage over the other methods in that it simultaneously tests the short-run and the long-run effects of currency depreciation on the trade balance, providing a method of testing the new concept of the J-Curve, i.e., short-run deterioration combined with long-run improvement. Subscribing to this new definition, we found support for the J-Curve hypothesis in three of the 11 countries, i.e., Bulgaria, Croatia and Russia. While in many of the countries real depreciation had short-run effect, the short-run effects did not last into the long run.

These results indicate that policymakers in these countries may not use exchange rate policy to promote large balance of trade surpluses and hence economic growth, especially in the long run. This finding suggests that other policy channels, such as monetary and fiscal policy, become more important than ever to establish effective means of real convergence towards the EU standards. Therefore, policymakers may need to pay closer attention to the importance of fiscal discipline and the close coordination of monetary and fiscal policy in these economies to achieve economic growth. Furthermore, since real depreciation is not effective in the long-run, reducing exchange rate fluctuations, thus uncertainty by adopting euro as early as possible could benefit these countries. However, this requires that the member and candidate countries must first satisfy the Maastricht criteria and hence join the exchange rate mechanism of the EU in the near future. An early rush to the euro is therefore not advisable for countries with significant lack of monetary and fiscal convergence.

Appendix A
Data Definitions and Sources

The coverage period differed among the countries. Monthly data over the January 1990 – June 2005 were used for Cyprus, Hungary, Poland and Turkey. For Romania the study period was January 1991 – June 2005. For Croatia, the period was January 1992 – June 2005. For Czech Republic and Slovakia the period was January 1993- June 2005. For Russia and Ukraine it was January 1994-June 2005. Finally, for Bulgaria the period of analysis was January 1995 – June 2004.

The data come from the following sources:

a) International financial Statistics of IMF (CD-ROM).

b) OECD monthly economic indicators (supplied by the OECD).

Variables

TB = measure of the trade balance. For each country it is defined the ratio of that country's imports over her exports. Import and export data come from source a.

Y = measure of domestic income. Index of industrial production is used as a proxy for this variable except for Russia. In the absence of industrial production index for Russia, we used index of employment. Both indices come from source a.

YW = measure of world income. Index of industrial production on OECD is used as a proxy for this measure. It comes from source b.

EX = real effective exchange rate such that a decrease reflects a real depreciation of domestic currency. Data come from source a.

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Table 1: Short-Run and Long-Run Estimates using AIC Lag Selection Criterion.							
Panel A: Short-Run Results							
Variable	Bulgaria	Croatia	Cyprus	Czech R.	Hungary	Poland	Romania
$\Delta LnEX_t$	-0.0573 (0.32)	0.4053 (1.70)	1.5195 (1.51)	0.0386 (0.24)	-0.2036 (0.45)	0.9465 (3.28)	0.0461 (0.64)
$\Delta LnEX_{t-1}$	-0.5989 (2.62)		-1.2477 (1.21)		1.9730 (4.45)	0.3442 (1.10)	
$\Delta LnEX_{t-2}$	-0.3180 (1.40)		-0.1905 (0.18)			-0.0076 (0.02)	
$\Delta LnEX_{t-3}$	-0.0118 (0.05)		0.4075 (0.40)			0.9460 (2.99)	
$\Delta LnEX_{t-4}$	-0.5726 (2.39)		2.7131 (2.77)			-0.3532 (1.10)	
$\Delta LnEX_{t-5}$	-0.2339 (1.18)					-0.4653 (1.52)	
$\Delta LnEX_{t-6}$	0.2190 (1.09)					-0.2497 (0.84)	
$\Delta LnEX_{t-7}$	-0.5736 (2.85)					-0.4495 (1.64)	
Panel B: Long-Run Results							
Constant	1.6429 (0.51)	-8.4588 (2.91)	-12.350 (5.45)	3.9130 (1.45)	23.269 (2.51)	-1.8511 (0.21)	-2.6982 (2.24)
$Ln\ Y_t$	-0.4351 (2.90)	0.2672 (0.39)	1.6182 (2.98)	-0.6324 (1.61)	1.3549 (2.11)	-0.1998 (0.28)	0.4112 (2.85)
$Ln\ YW_t$	-0.6833 (0.94)	0.4926 (0.37)	1.5146 (3.78)	-0.3443 (0.39)	-5.9446 (2.56)	0.8655 (0.33)	0.1586 (0.48)
$Ln\ EX_t$	0.8159 (5.10)	1.2200 (1.78)	-0.1308 (0.19)	0.1546 (0.25)	-0.4664 (1.05)	-0.2071 (0.24)	0.0700 (0.64)
Panel C: Diagnostics							
F Stat.	5.45	2.89	9.31	2.15	5.21	2.86	14.2
ECM_{t-1}	-0.8299 (3.98)	-0.3322 (2.76)	-0.5276 (6.18)	-0.2501 (2.27)	-0.2982 (3.13)	-0.1216 (2.31)	-0.6586 (6.94)
LM	22.91	10.88	6.49	45.18	23.69	21.20	4.58
RESET	0.92	1.68	1.91	16.83	1.21	1.02	0.18
CUSUM	Stable	Stable	Stable	Stable	Stable	Stable	Stable
Adj. R^2	0.58	0.54	0.43	0.49	0.46	0.45	0.44

Note: The upper bound critical value of the F-test for cointegration is 3.52 at the 10% level of significance. This comes from Pesaran et al. (2001, Table CI, p. 300).
Numbers inside parentheses are the absolute value of t-ratios
LM = Lagrange multiplier test of residual serial correlation. It is distributed as χ^2 (12).
RESET = Ramsey's test for function form. It is distributed as χ^2 (1).

Table 1 continued.

Variable	Russia	Slovakia	Turkey	Ukraine			
Panel A: Short-Run Results							
$\Delta LnEX_t$	0.9246 (5.27)	-0.0396 (0.08)	0.3182 (1.51)	0.0507 (0.90)			
$\Delta LnEX_{t-1}$	0.3537 (1.73)	-0.6498 (1.24)	0.1058 (0.45)				
$\Delta LnEX_{t-2}$	-0.0634 (0.31)	0.2233 (0.41)	-0.1319 (0.56)				
$\Delta LnEX_{t-3}$	0.2463 (1.24)	-0.0496 (0.10)	0.5228 (2.17)				
$\Delta LnEX_{t-4}$	-0.5236 (2.63)	-0.7471 (1.62)	-0.1053 (0.44)				
$\Delta LnEX_{t-5}$	-0.3778 (2.01)	-1.4659 (2.93)	0.1986 (0.84)				
$\Delta LnEX_{t-6}$	-0.0993 (0.53)	0.9594 (1.86)	0.2188 (0.95)				
$\Delta LnEX_{t-7}$	0.1153 (0.63)		0.4055 (1.80)				
$\Delta LnEX_{t-8}$	-0.2778 (1.53)		0.4754 (2.16)				
$\Delta LnEX_{t-9}$	-0.6563 (3.80)						
Panel B: Long-Run Results							
Constant	-43.02 (1.22)	-2.5061 (0.57)	5.0249 (1.89)	7.8357 (2.94)			
$Ln\ Y_t$	3.1119 (1.50)	-0.0080 (0.01)	0.3517 (0.65)	-0.2238 (0.61)			
$Ln\ YW_t$	4.5172 (0.89)	-0.9551 (0.76)	-1.2640 (1.32)	-1.6139 (1.86)			
$Ln\ EX_t$	1.5599 (2.70)	1.5361 (1.10)	-0.0997 (0.22)	0.1086 (0.93)			
Panel C: Diagnostics							
F Stat.	4.53	1.87	3.36	10.38			
ECM_{t-1}	-0.2074 (2.14)	-0.2328 (2.64)	-0.2217 (3.49)	-0.4673 (6.18)			
LM	14.31	8.25	40.11	14.84			
RESET	10.83	1.89	5.06	2.36			
CUSUM	Stable	Stable	Unstable	Stable			
Adj. R^2	0.53	0.44	0.47	0.26			

Table 2: Short-Run and Long-Run Estimates using SBC Criterion to Select the Optimum Lags.							
Panel A: Short-Run Results							
Variable	Bulgaria	Croatia	Cyprus	Czech R.	Hungry	Poland	Romania
$\Delta LnEX_t$	-0.1032 (0.59)	0.5691 (2.48)	2.8979 (2.77)	0.0208 (0.13)	-0.5359 (1.13)	1.0131 (3.48)	0.0311 (0.43)
$\Delta LnEX_{t-1}$	-0.4634 (2.66)				1.8646 (3.98)		
$\Delta LnEX_{t-2}$							
$\Delta LnEX_{t-3}$							
$\Delta LnEX_{t-4}$							
$\Delta LnEX_{t-5}$							
$\Delta LnEX_{t-6}$							
$\Delta LnEX_{t-7}$							
$\Delta LnEX_{t-8}$							
$\Delta LnEX_{t-9}$							
Panel B: Long-Run Results							
Constant	-6.5353 (3.54)	-8.6737 (3.42)	-12.055 (5.67)	3.4089 (1.40)	16.425 (2.64)	15.6273 (1.52)	-2.4512 (2.06)
$Ln\ Y_t$	-0.0581 (0.67)	1.0703 (2.04)	0.1141 (0.61)	-0.5299 (1.45)	0.9425 (2.07)	1.0437 (1.32)	0.3894 (3.04)
$Ln\ YW_t$	1.0111 (2.21)	-0.5419 (0.44)	2.0315 (5.97)	-0.2599 (0.31)	-4.1242 (2.65)	-4.0293 (1.47)	0.1525 (0.47)
$Ln\ EX_t$	0.5303 (4.63)	1.4829 (2.39)	0.7814 (1.36)	0.0788 (0.13)	-0.3758 (0.99)	-0.3748 (0.37)	0.0443 (0.43)
Panel C: Diagnostics							
F Stat.	19.14	3.36	19.56	2.32	6.09	2.97	27.1
ECM_{t-1}	-0.8338 (8.86)	-0.3838 (3.21)	-0.5933 (8.62)	-0.2638 (2.40)	-0.3177 (4.21)	-0.1118 (2.15)	-0.7017 (9.60)
LM	17.72	19.90	20.87	28.22	29.26	28.89	13.39
RESET	1.29	1.39	0.42	19.64	0.12	0.53	0.16
CUSUM	Stable	Stable	Stable	Stable	Stable	Unstable	Stable
Adj. R^2	0.43	0.52	0.31	0.46	0.37	0.34	0.36

Table 2 continued.							
Panel A: Short-Run Results							
Variable	Russia	Slovakia	Turkey	Ukraine			
$\Delta LnEX_t$	0.8823 (4.92)	0.0747 (0.31)	0.0699 (0.90)	0.0496 (0.88)			
$\Delta LnEX_{t-1}$							
$\Delta LnEX_{t-2}$							
$\Delta LnEX_{t-3}$							
$\Delta LnEX_{t-4}$							
$\Delta LnEX_{t-5}$							
$\Delta LnEX_{t-6}$							
$\Delta LnEX_{t-7}$							
$\Delta LnEX_{t-8}$							
$\Delta LnEX_{t-9}$							
Panel B: Long-Run Results							
Constant	18.902 (3.73)	1.6062 (0.62)	4.4885 (1.66)	7.7863 (2.9283)			
$Ln\ Y_t$	-0.5729 (1.55)	0.2337 (0.84)	0.5797 (1.08)	-0.1193 (0.33)			
$Ln\ YW_t$	-4.3136 (5.78)	-0.7781 (0.96)	-1.8139 (1.95)	-1.6975 (1.96)			
$Ln\ EX_t$	0.6244 (5.06)	0.2119 (0.31)	0.3245 (0.92)	0.1056 (0.91)			
Panel C: Diagnostics							
F Stat.	7.36	6.23	3.43	10.51			
ECM_{t-1}	-0.3908 (5.56)	-0.3525 (4.16)	-0.2156 (3.68)	-0.4702 (6.19)			
LM	26.00	17.07	28.21	13.19			
RESET	1.73	11.98	0.06	0.37			
CUSUM	Stable	Stable	Stable	Unstable			
Adj. R^2	0.30	0.27	0.39	0.26			