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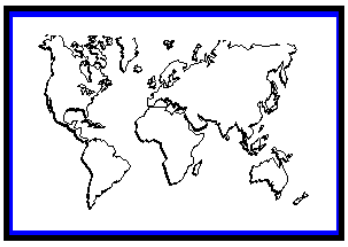

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CHARACTERIZING MACROECONOMIC SHOCKS IN THE CEECs*

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Abstract

In this paper we analyze the nature of the shocks hitting the CEECs over the recent years. To this end, we first evaluate the relative importance of symmetric *vs.* asymmetric shocks, and then extract their temporary component. Our final aim would be assessing the vulnerability of the CEECs to temporary and asymmetric shocks, which would be the most harmful case for the operation of a monetary union. Finally, a comparison with the case of the current EMU members is also presented.

Key words: Monetary union, Central and Eastern European countries, asymmetric shocks, temporary shocks

JEL classification: E65, F33, F41

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1. Introduction

On May 1st 2004, eight Central and Eastern European countries (CEECs hereafter), i.e., the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia, joined (together with Cyprus and Malta) the European Union (EU). Two other countries, Bulgaria and Romania, are expected to join the EU in the next future.

Since these countries (like Sweden, and unlike Denmark and the UK) have not been allowed to opt-out from Stage Three of the Economic and Monetary Union (EMU), they should enter EMU and adopt the euro at a time sooner or later after their integration into the EU. To do this, they must fulfill all the conditions that had to be met by the current EMU members, i.e., a budget deficit of less than 3% of GDP and government debt lower than 60% of GDP, low inflation, and interest rates close to the EU average. Also, in order to be able to adopt the euro, the new members must have observed the normal fluctuation margins provided by the European exchange-rate mechanism (ERM-II) for at least two years without devaluing its currency. In fact, the currencies of Estonia, Lithuania and Slovenia were included in the ERM-II on June 2004; and those of Latvia and Slovakia did it on May and November 2005, respectively. The currencies of the other three countries (the Czech Republic, Hungary and Poland) are also expected to eventually follow.

On the other hand, as is well known from the literature on optimum currency areas initiated in Mundell (1961), the presence of asymmetric shocks (i.e., those requiring a different optimal policy response in different countries) means a potential difficulty for the adequate working of a monetary union. The reason is simple: since forming a monetary union means for each member country surrendering monetary policy independence, a common monetary policy for all the member countries of the union cannot be the proper instrument when facing asymmetric shocks. Accordingly, several empirical studies have appeared in recent years, trying to characterize the kind of shocks that affect the economies of the CEECs.

A widely employed device for assessing the symmetry or asymmetry of shocks is using a measure of the synchronicity of the business cycle. In a study for the Czech Republic, Slovakia, Hungary and Poland, using monthly data on unemployment from 1991 to 1997, Boone and Maurel (1999) found a strong symmetry between the CEECs business cycle and that of Germany, and to a lower extent that of the EU. Later studies, which examine a greater number of countries using more recent data, allow qualifying this result; see, e.g., Süppel (2003), Darvas and Szapáry (2004), Traistaru (2004), and Artis, Marcellino and Proietti (2005). In general, the business cycle of the CEECs seems to be less synchronized with that of the euro area, than that of the EMU countries among them; and the countries showing a greater synchronization with the euro area would be Poland, Slovenia and, especially, Hungary. Finally, other studies using VAR models tend to confirm these results, and conclude that the more advanced CEECs would be hardly different in the correlation of their shocks *vis-à-vis* the euro area than some countries that have already adopted the euro, such as Greece or Portugal; see, e.g., Fidrmuc and Korhonen (2003), Korhonen (2003), Frenkel and Nickel (2005), and Gilson (2005).

In this paper, we address the issue of the shocks that impinge on the CEECs from another perspective. In an influential contribution, Cohen and Wyplosz (1989) have argued that it is not enough to determine whether shocks are symmetric or asymmetric. More specifically, the distinction between permanent and transitory shocks would be also relevant. The basic argument

runs as follows. Faced to a permanent, e.g., adverse output shock, a country would respond optimally through the corresponding fall in demand, so the trade balance would remain in equilibrium. But, if the same shock were transitory, the optimal response would be to maintain spending roughly unchanged, which would be achieved through a trade deficit via a real exchange rate appreciation. However, in the search of a new equilibrium the countries would overreact, on failing to recognize the trade balance externality that appears in a monetary union; and this inefficiency would occur for both symmetric and asymmetric shocks (although to a lesser extent for the former). Therefore, asymmetric *and* temporary shocks would be those more potentially harmful for the operation of a monetary union.

The next section presents our empirical methodology, together with the main results of the paper. Some concluding remarks are offered in the final section.

2. Methodology and empirical results

Cohen and Wyplosz (1989) proposed a simple method for assessing the relative importance of, first, symmetric *versus* asymmetric shocks; and, second, permanent *versus* temporary shocks. Denoting as X_1 and X_2 the levels of a particular variable for two economies:

- First, symmetric shocks are identified with their sum, X_1+X_2, and asymmetric shocks with their difference, X_1-X_2. Next, the relative importance of symmetric *versus* asymmetric shocks would be evaluated by their corresponding standard deviations.
- Second, the temporary component of both symmetric and asymmetric shocks is calculated. Next, the ratio of the standard deviation of these temporary components over the standard deviation of each original series would measure the extent of permanent *versus* temporary shocks, for either symmetric or asymmetric shocks.

In this section we have applied the above method to real GDP data (in million of euros, at 1995 prices and exchange rates, seasonally adjusted[1]), for the eight CEECs already members of the EU (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia), as well as the two next expected-to-be members (Bulgaria and Romania), *vis-à-vis* the whole euro zone. The data are quarterly, and cover the period until 2004.4 (2004.1 for Romania), starting at 1990.1 for Slovakia and Latvia, 1992.1 for Slovenia, 1993.1 for Estonia, 1994.1 for Bulgaria, 1995.1 for the Czech Republic, Hungary, Lithuania and Poland, and 1999.1 for Romania. All the data come from Eurostat.

The results are presented in Table 1. In part A of the table, columns (1) and (2) show, respectively, the size of symmetric and asymmetric shocks, as measured by their standard deviation; and column (3) shows their relative importance, assessed by the ratio of the standard deviation of symmetric shocks to that of asymmetric shocks (so that a ratio above one would mean a greater weight of symmetric shocks). In turn, part B of the table shows the ratio of the standard deviation of the temporary component to the standard deviation of the original series, for both symmetric and symmetric shocks; where the temporary component has been calculated using three alternative methods: a linear trend, a quadratic trend, and the Hodrick-Prescott filter.

[1] All the data have been kindly seasonally adjusted for us by Vicente Esteve, using the US Census Bureau's X11 seasonal adjustment program.

As can be seen, over the period of analysis symmetric shocks would have proved to be quantitatively more important than asymmetric shocks for all countries[2]; the predominance of symmetric shocks would have been higher in the "core" CEECs: Czech Republic, Hungary, Poland, Slovakia and Slovenia. On the other hand, temporary symmetric shocks would have not been particularly important, with the exceptions of Latvia, Bulgaria and Romania. Finally, the temporary component of asymmetric shocks would have been relatively small for Hungary and Slovenia, somewhat higher for Poland, Estonia and Lithuania, and even higher for the Czech Republic, Latvia, Slovakia, Bulgaria and Romania.

Next, these results will be compared with those obtained for the EMU countries in a companion paper; see Bajo-Rubio and Díaz-Roldán (2005). Table 2 shows the results of applying the method of Cohen and Wyplosz to all the countries participating in EMU (except Luxembourg), as well as to the three EU members that chose not to participate in EMU from the start (Denmark, Sweden and the United Kingdom), *vis-à-vis* the whole euro zone (excluding the country concerned, in each case), and using the same data source than in the present paper. In general, the predominance of symmetric shocks would seem to be lower for the CEECs, although not too different as compared to certain EMU countries (such as Ireland, Finland, Greece, or even Germany). Regarding the degree of temporariness of shocks, it would be comparable in the two groups of countries, for both symmetric and asymmetric shocks; the exception would be the high temporary component of symmetric shocks found for Latvia, Bulgaria and Romania.

3. Concluding remarks

In this paper we have analyzed the nature of the shocks hitting the economies of the CEECs over the most recent period. More specifically, macroeconomic shocks to the CEECs *vis-à-vis* the euro zone were characterized as symmetric or asymmetric, and the temporary component of both kinds of shocks was computed. In addition, the results have been compared with those obtained for the EMU member countries using the same methodology. Our final aim would be assessing the vulnerability of the CEECs faced to an eventual EMU membership, provided that the occurrence of temporary and asymmetric shocks would be the most harmful case for the operation of a monetary union.

According to our results, symmetric shocks would have predominated over asymmetric shocks, but in a smaller amount than in the case of the current EMU members; however, at the same time the temporary component of asymmetric shocks would have been higher than that of symmetric shocks. In particular, three groups of countries could be established among the CEECs regarding their vulnerability to an eventual EMU membership:

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[2] Notice that, denoting as *var* and *cov* the variance and covariance, respectively:

$$var\,(X_1+X_2) = var\,(X_1) + var\,(X_2) + 2\,cov\,(X_1, X_2)$$

$$var\,(X_1-X_2) = var\,(X_1) + var\,(X_2) - 2\,cov\,(X_1, X_2)$$

so that the standard deviation of (X_1+X_2) will be higher (lower) than the standard deviation of (X_1-X_2), provided that the covariance between X_1 and X_2 was positive (negative). In other words, the result obtained in Table 1 (i.e., that symmetric shocks would have been quantitatively more important than asymmetric shocks) would imply that the real GDP of each country would have been positively correlated with that of the euro zone.

- Hungary, Slovenia and, to a lower extent, Poland, would be those countries facing a more favourable situation, in terms of a higher predominance of symmetric over asymmetric shocks, and a lower degree of temporariness of both kinds of shocks.
- An intermediate case would be that of the Czech Republic and Slovakia, which, despite a predominance of symmetric over asymmetric shocks comparable to that of the countries in the previous group, would undergo a high degree of temporariness of asymmetric shocks.
- Finally, the least favourable position would be those of the Baltic countries (particularly Latvia), Bulgaria and Romania, since the predominance of symmetric over asymmetric shocks would be lower, and the degree of temporariness of the shocks would be higher (although somewhat lower for Estonia and Lithuania).

Our results would be in line with those obtained in previous studies on the subject, using different methodologies (see the references in the Introduction): in an eventual EMU membership, the "core" CEECs (most notably Hungary, Slovenia and, to a lower extent, Poland) would not perform much worse, according to the nature of the shocks they face, when compared to many current EMU members.

Aside the caution with which these results should be taken, given the relatively short time span of the data available, recall that some other factors should be contemplated when analyzing membership into a monetary union. Among them, the extent of trade with the other members of the union and the degree of credibility of their anti-inflationary policies stand as the most relevant (Alesina and Barro, 2002). Also, if, as argued by Frankel and Rose (1998), a greater economic integration would lead to increased trade, resulting in more highly correlated business cycles among members, a monetary union might be more desirable *ex post* than *ex ante*. This effect, however, might be offset if, instead, a greater industrial specialization by country would follow from higher integration, resulting in more asynchronous business cycles after industry-specific shocks; see, e.g., Krugman (1993). In this sense, and despite the short period of time available for the analysis, the experience of the EMU countries is not too clear, and would even support to some extent an increased specialization in production following the formation of EMU (Bajo-Rubio and Díaz-Roldán, 2005).

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Table 1. Macroeconomic shocks in the CEECs

Table 1A. Symmetric *vs.* asymmetric shocks

	Symmetric (1)	Asymmetric (2)	Ratio (1)/(2)
Czech Republic	0.0543	0.0136	3.99
Estonia	0.1157	0.0465	2.48
Hungary	0.0804	0.0208	3.86
Latvia	0.1137	0.0667	1.70
Lithuania	0.0952	0.0394	2.42
Poland	0.0777	0.0201	3.86
Slovakia	0.1003	0.0286	3.51
Slovenia	0.1006	0.0282	3.57
Bulgaria	0.0662	0.0328	2.02
Romania	0.0432	0.0204	2.12

Table 1B. Temporary component of the shocks

	Symmetric			Asymmetric		
	L	Q	HP	L	Q	HP
Czech Republic	14.72	12.41	11.53	91.08	56.92	51.08
Estonia	11.25	10.40	9.26	29.58	24.68	23.18
Hungary	11.59	10.97	8.95	19.11	15.43	15.59
Latvia	64.82	40.30	28.44	98.54	58.85	45.52
Lithuania	11.73	10.89	10.19	44.80	37.68	30.80
Poland	15.99	9.26	8.72	50.45	44.57	34.30
Slovakia	21.21	18.63	13.34	60.01	53.31	45.72
Slovenia	9.84	9.66	7.61	24.14	19.97	16.93
Bulgaria	48.88	38.14	28.75	97.86	56.26	49.21
Romania	23.03	22.47	22.53	67.75	60.84	64.66

Note: L, Q, and HP denote the method used to smooth the original series, i.e., a linear trend, a quadratic trend, and the Hodrick-Prescott filter, respectively.

Table 2. Macroeconomic shocks in EMU

Table 2A. Symmetric *vs.* asymmetric shocks

	Symmetric (1)	Asymmetric (2)	Ratio (1)/(2)
Belgium	0.0740	0.0042	17.27
Germany	0.0690	0.0213	3.23
Greece	0.0887	0.0220	4.02
Spain	0.0891	0.0168	5.28
France	0.0748	0.0037	20.24
Ireland	0.0924	0.0477	1.93
Italy	0.0678	0.0118	5.71
Netherlands	0.0836	0.0126	6.59
Austria	0.0769	0.0055	13.78
Portugal	0.0616	0.0092	6.64
Finland	0.0959	0.0229	4.18
Denmark	0.0783	0.0083	9.37
Sweden	0.0789	0.0094	8.32
United Kingdom	0.0874	0.0136	6.40

Table 2B. Temporary component of the shocks

	Symmetric			Asymmetric		
	L	Q	HP	L	Q	HP
Belgium	15.74	14.96	9.68	99.32	84.77	76.52
Germany	21.54	20.29	9.70	29.21	16.37	12.12
Greece	22.74	15.65	7.67	55.76	36.42	22.71
Spain	20.96	18.14	7.50	30.40	23.79	17.24
France	21.86	19.43	9.18	92.09	84.49	68.96
Ireland	19.16	8.86	11.33	19.16	11.99	13.69
Italy	21.47	20.48	9.95	38.27	25.00	19.96
Netherlands	22.25	22.23	8.34	72.71	85.16	22.79
Austria	19.60	19.14	7.45	95.22	66.67	53.14
Portugal	25.68	12.87	11.01	99.32	37.30	40.26
Finland	23.41	21.69	9.56	47.49	46.87	30.82
Denmark	20.49	20.44	8.74	94.10	64.75	42.91
Sweden	11.57	10.08	7.73	42.87	38.93	34.74
United Kingdom	17.94	17.29	6.25	45.70	41.67	25.21

Note: See Table 1.