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Industry Specific Real Effective Exchange Rates in Central and Eastern European Countries

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ABSTRACT

This paper investigates the real effective exchange rates (REER) at industry level. We start by calculating REER indices at industry level for seven Central and Eastern European (CEE) countries using industry level trade weights and industry level producer prices. Then we examine the relationships between these industry level indices and exports in panel data model. The results illustrate several interesting findings. First, trends in producer prices and the structure of exports by trading partners are noticeably different among industries and countries, resulting in divergent movements between industry specific REER indices. Second, it seems that the theoretically expected link between exchange rate and export exists in some industries, which is not the case on an aggregate level. Finally, the impact of industry specific REERs on exports is more evident in traditional, low-technology industries, where one should expect for relative price changes to play significant role in determining export performance.

Keywords: Real effective exchange rate, CEE, Export, Panel data

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CONTENT

1 Introduction…………………………………………………………………………………...1

2 Literature……………………………………………………………………………………2

3 Construction of the real effective exchange rates…………………………………………...3

3.1. Trade basis………………………………………………………………………...3

3.2. Trading partners………………………………………………………………..…3

3.3. Weighting method…………………………………………………………....…4

3.4. Deflators…………………………………………………………………….....…4

4 The relationship between industry specific real effective exchange rates and exports…...5

4.1. Model and data……………………………………………………………………5

4.2. Estimation results………………………………………………………………....6

5 Conclusion…………………………………………………………………………..…...9

References………………………………………………………………………………….10

Appendix……………………………………………………………………………………11

1 Introduction

Discussions about the exchange rate movements often rely on aggregate indicators, such as the real effective exchange rates at the national level. Those aggregate indicators use weighting schemes based on aggregate trade data and broadly based price or cost indices as deflators and thus are useful for analysis at a macroeconomic level. However, this focus on aggregate indicators ignores specific characteristics among sectors or industries in the economy that can differ considerably. In terms of real effective exchange rates, such differences can be the result of different importance of the trading partners as competitors across industries and divergent price trends. Consequently, making conclusions based on aggregate indicators can be misleading in assessing the price or cost related competitive position in international trade, especially when distinctions across industries are large. Even though one should not disregard REER on the level of the whole economy, since it is a relatively straightforward and simple indicator of overall level of competitiveness between national economy and its trade partners, the question about the usefulness of such one-size-fits-all approach remains.

Many studies have examined the extent to which aggregate real effective exchange rate changes affect the economic performance. Few of these studies, however, have examined the importance of industry level real effective exchange rates. The purpose of this paper is therefore to construct the real effective exchange rates at industry level for selected CEE countries and to examine their contribution in economic analysis. Basically, the idea is to test whether what we consider appropriately constructed real effective exchange rates (deflated with producer price indices) could provide additional information on the dynamics of the inter-country and inter-industry competitiveness in selected CEE countries. This is particularly interesting because in some CEE countries aggregate REER and exports movements are counter-intuitive, in a sense that aggregate REER mostly exhibits trend appreciation, yet exports are at the same time growing.

To our knowledge, this paper contains the first set of industry specific exchange rates calculated for a group of countries. This enabled us to compare their movements in same industries across different countries. Besides, having this data set made it possible for us to perform panel data analysis. It is important to mention that our set of countries consists of a relatively homogenous group. CEE countries in our sample experienced process of economic transition from centrally planned to market economy and were members of the Central European Free Trade Agreement, before becoming EU members. Of course, every country had its own dynamics in this processes, but nevertheless their joint experience made them good candidates for a panel data analysis.

The remainder of this paper is structured as follows: in the second section literature on REER is briefly reviewed. The third section presents the general aspects of the methodology to calculate the real effective exchange rate indices. In section four, we examine the impact of REERs on exports using panel data approach, while the fifth section concludes the paper.

2 Literature

In general, there are numerous studies that focus on the evaluation of REER on an aggregate level, i.e. one index for the whole economy. These studies mostly propose the various methods of obtaining a single index number, consider the effect of using different deflators, discuss the issues of weighting schemes and different base years, examine the link between REER and other competitiveness indicators, etc. Recent survey of these methodological issues can be found in Schmitz et al. (2012), in which the authors presents the methodological framework adopted by the Eurosystem to calculate its set of effective exchange rates and harmonised competitiveness indicators, effectively updating the work of Buldorini et al. (2002) and is in line with BIS methodology (Turner and Van't dack, 1993). Besides, there is a wide range of literature on real exchange rates and their behaviour in transition economies. Most of this research tries to explain real exchange rates appreciation that has been a common feature in transition economies of Central and Eastern Europe. For survey of the literature and concise presentation of findings see for example Egert (2004); Egert et al. (2005); Mihaljek and Klau (2003).

One of the first exercises that used industry specific exchange rates to study industry level competitiveness was Goldberg (2004), who argues that REER at industry level, although data-intensive and cumbersome to construct, explain the relationship between exchange rate and firm profitability better than REER at aggregate level. But, she also warns that these indexes are not perfect indicators of changes over time in the competitiveness of U.S. producers relative to foreign competitors, because they do not adjust for industry-specific changes in productivity or the strategic pricing actions attributable to industries.

Besides Goldberg's study, Lee and Yi (2005) are another example of industry specific REER construction exercise. In their paper they measure Korea's real effective exchange rates at industry level using producer price indices in Korea's major trading partners, expecting that industry level PPI would present the characteristics of each industry in a more precise way. They analyze the influence of REER on export volume, finding substantially different relationships across industries. Also, they find that the influence of REER on export volume is in general reduced after the Korean crisis in 1997, which makes them conclude that the importance of non-price competitiveness should continue to increase in internationally competitive market.

Another example of sector specific REER indexes can be found in the work of Alexandre et al. (2009). In their study, they compute and compare aggregate and sector specific exchange rates for Portuguese economy. They find that sector specific exchange rates are strongly correlated with aggregate indices, but nevertheless much more informative in explaining changes in employment. Whereas aggregate indices are statistically insignificant in employment equations, regressions using sector specific exchange rate indices show a statistically significant effect of exchange rates on employment. It is important to note that their findings of significant correlation between sector specific and aggregate REER can be attributed to using a single deflator for all sector specific exchange rates – CPI, which basically causes the industry specific exchange rates to differ only due to different share of trade partners in specific industries.

3 Construction of the real effective exchange rates

In order to construct the real effective exchange rate indices we had to deal with several methodological issues. These relate to: (1) the trade data basis for weights calculations; (2) the choice of trading partners to be included in the indices; (3) the type of weighting scheme; and (4) the choice of deflators to obtain the real indices. The way these methodological issues were addressed is described in the following sections.

3.1 Trade basis

In line with the common practice followed by a number of central banks and international organisations that construct and publish the real effective exchange rates, the basis for weights calculations is data on trade in manufacturing industry. To conduct the analysis on industry level we used the information about the trade in goods in manufacturing industry classified according to the Classification of Product by Activity (CPA). Trade data in manufacturing is commonly used because of their significant sensitivity to changes in competition and relatively good availability of data on prices and costs in the manufacturing industry for a number of countries (Turner and Van't dack, 1993). Trade in services is also important part of international trade and the real effective exchange rates that include trade in services would be a better measure of overall competitiveness, particularly in small and open economies in which services play an important economic role. However, data on transactions in services and their prices are relatively scarce and show a low level of comparability across countries (Buldorini et al. 2002). Limitations regarding availability and quality of data are especially evident for emerging market economies and transition economies.

3.2 Trading partners

The choice of trading partners to be included in the basket for real effective exchange rate calculations depends not only on the relative importance of the respective countries as trading partners, but also on the availability of the data needed to construct the weights and data that will be used as the deflators to derive the real indices. The group of trading partners that is used to construct the REER indices presented in this paper includes 27 European Union member countries. The economies inside the European Union clearly represent the most important regional group for the Central and Eastern European external trade – the share of manufacturing exports to the EU countries in total exports of goods ranges on average from 59% in Lithuania to 82% in the Czech Republic in the period between 2009 and 2011.

3.3 Weighting method

The REER indices presented in this paper are constructed by using export trade weights. The export trade weights are the simple share of each partner country in relevant CEE country manufacturing exports to all partner countries, i.e. EU member states. That means that these weights capture only direct bilateral trade or direct export competition. Construction of weights that include third-market competition by "double-weighting" in this case would entail large data set and would be time exhausting. However, considering that trade flows of selected countries for which REER indices are calculated are mainly focused on countries inside the referenced group (i.e. European Union) the different weighting schemes would probably not give significantly different picture. Furthermore, the weights are fixed in the sense that the same weights are applied uniformly for the entire period over which the REER indices are calculated. The reference period is the average of 2009-2011, which was determined by the availability of the data at the time weights were constructed.

3.4 Deflators

The REER indices are defined as the relative prices between the particular country and its partner countries expressed in a common currency and are constructed by deflating the nominal exchange rates using appropriate price or cost indices. In this paper we used producer price indices as deflators in order to calculate the real effective exchange rates that will reflect the trend of price competitiveness of particular industry more realistically. The data on the producer price indices at the NACE level of 2 digits was obtained from the Eurostat database[1]. The general expression for the REER is therefore:

$$REER_{c,i} = \prod_{p=1}^{N} \left(e_{c,p} \frac{d_{p,i}}{d_{c,i}} \right)^{w_{p,i}} \qquad (1)$$

where $REER_{c,i}$ is the real effective exchange rate for particular CEE country c in specific manufacturing industry i, N is the number of trading partners p included in the reference group, $e_{c,p}$ is the exchange rate of particular CEE country c against the currency of the trading partner p, $w_{p,i}$ is the export trade weight assigned to each trading partner country p in specific manufacturing industry i, and $d_{p,i}$ and $d_{c,i}$ are the deflators for trading partner p and the CEE countries c in specific manufacturing industry i respectively. The REER indices are constructed in a way that their increase indicates real effective exchange rate depreciation.

The analysis of price or cost competitiveness is usually based on several indicators for deflating nominal bilateral exchange rates. The use of several deflators stems from the fact that there is no

[1] The link between the NACE and CPA can be seen in the coding. At all levels of CPA, the coding of the first 4 digits is identical to that used in NACE.

single deflator that could be recommended as an ideal indicator for measuring international price or cost competitiveness. Most frequently used deflators are consumer prices, producer prices, unit labour costs, export unit value indices and GDP deflators[2]. Bayoumi et al. (2011) explored the impact of different REER indices on trade flows in the euro area and showed that REER indices based on producer price indices, export unit values indices and unit labour costs are better indicators of price competitiveness than the CPI-based measures. However, these are all aggregate indicators, i.e. they are constructed using weights based on aggregate trade data and using broadly defined price or cost indicators. Hence, they can easily mask changes in export competitiveness of different sectors in the economy. This is particularly important when distinctions across industries are large, for instance when the producer price developments are considerably different between industries which is reflected in their real effective exchange rates. As reported in the Appendix, the REER indices at industry level in CEE countries show considerably different trends.

4 The relationship between real effective exchange rates and exports at industry level

When examining the relevance of the real effective exchange rates, researchers often try to estimate their impact on export volume, investment, employment or similar economic variables. The aim of this paper is not to perform an extensive study of the real effective exchange rate importance, but rather to examine whether REERs on industry level can be used as an explanatory variable in economic analysis at a disaggregated level. In particular, we decided to test whether such REERs can be used as export price competitiveness indicators at industry level, i.e. to examine their impact on real exports by estimating export equations.

4.1 Model and data

In order to examine the effects of REER indices on real exports at industry level we have created a quarterly panel data set consisting of seven selected CEE countries for which the necessary data exist[3] and estimated 17 export equations, each representing specific industrial activity within the manufacturing industry plus additional one for the total manufacturing industry[4]. The method used in estimation of the equations was ordinary least squares (OLS). The following general regression form is used, which is the similar as the one in Rose and Yellen (1989):

$$\Delta X_t^i = \alpha + \beta_1 \Delta REER_t^i + \beta_2 \Delta REER_{t-1}^i + ... + \beta_5 \Delta REER_{t-4}^i + \beta_6 \Delta Y_t^* + \varepsilon_t \qquad (2)$$

[2] For a detailed discussion about deflators for constructing REER indices see Turner and Van't dack (1993).

[3] Bulgaria, Czech Republic, Croatia, Hungary, Lithuania, Poland and Slovenia.

[4] The analysis was conducted for the industrial activities for which the data needed for REER construction was available (see the Appendix for the complete list of industrial activities within manufacturing industry).

where operator Δ denotes a first difference in logarithms of all variables, α is the common intercept, X is the real value of domestic exports for a particular manufacturing industry (obtained by deflating nominal export values by a producer price index in a corresponding manufacturing activity), *REER* is the real effective exchange rate index, Y^* is real gross domestic product in the European Union-27 (included in the equation to control for business cycle effects), index $i = 1....18$ indicates 17 specific manufacturing industries and total manufacturing industry, index t denotes different quarters from 2000Q1 to 2012Q2 and ε is an error term. Lagged values of REER were also included, in line with the assumption that exchange rate changes affect trade flows with a certain time lag. In theory it is expected that increase or depreciation of the real effective exchange rate and increase in the income of trading partners will have a positive effect on the value of exports. All the data containing seasonal components were seasonally adjusted. The results of the Dickey-Fuller test show that all series in levels are first-order integrated.

4.2 Estimation results

Preliminary results of the OLS estimation in first differences suggest that the problem of autocorrelation in residuals might be present in some of the equations. When correcting for this problem by introducing the AR(1) term, the size and significance levels of the estimated coefficients changes only marginally. This suggests that autocorrelation in residuals is not too significant, which is not surprising because the variables are in first differences. Furthermore, the problem of heteroscedasticity was present in all equations; hence we used a generalized least squares method with cross section weights.

An alternative to the simple OLS model is the fixed effects model, which would control for country specific differences. However, the tests for fixed effects redundancy suggest that a simple OLS model is preferred to the fixed effect model, although not for all industries. Nevertheless, analysis conducted for these industries using fixed effects model did not produce significantly different results, i.e. it resulted in the same conclusion. Additionally, the commonly used Hausman test was conducted suggesting no statistically significant difference between the fixed and random effects estimators.

Table 1 summarizes the results. In some industries, the results are consistent with the theory that the estimated coefficients describing the relationship between REER and real exports are positive and statistically significant. However, contrary to expectations, in some cases the sign of estimated coefficient turns out to be negative.

At the aggregate level, i.e. at the total manufacturing level, the REER seems not to be relevant in explaining the changes in real exports. On the other hand, the REER at industry level has statistically significant and positive influence on real exports in some industries. However, this is the case only after time lags are introduced. Therefore, we conducted a Wald test in order to examine the joint significance of the sum of the lags of REER indices in their first differences. The results suggest that statistically significant and positive influence of REER on real export exists in traditional, low-technology industries such as manufacture of food products (CPA10), manufacture of beverages (CPA11), manufacture of textiles (CPA13) and manufacture of leather and related products (CPA15). These findings are consistent with the fact that the majority of producers in traditional, low–technology manufacturing industries produce more similar products with a strong substitution effect, meaning that prices and their relative changes play more significant role for the buyers of their products. The importance of REER should be much less pronounced in industries in which competition is more than just price based, e.g. due to higher level of product specialization. In line with such assumption, REER does not have statistically significant and positive influence on real exports in high and medium-high-technology manufacturing industries like manufacture of computer, electronic and optical products (CPA26), manufacture of electrical equipment (CPA27), manufacture of machinery and equipment (CPA28) and manufacture of motor vehicles, trailers and semi-trailers (CPA29).

These results are similar to those obtained by Goldberg (2004), Alexandre et al. (2009) and Lee and Yi (2005), suggesting that REERs at industry level are more informative than those on aggregate level when examining their impact on corporate profit in United States, employment in Portugal and export volume in Korea, respectively.

As mentioned before, the sign of the coefficients describing the relationship between REERs and real exports takes positive and negative values. There could be several reasons for that. It is possible that the method of estimation we chose is not appropriate enough for capturing all the information in our panel data. Also, some other factors could be determining the dynamics of exports. Hence, statistically insignificant or theoretically unexpected impact of the real effective exchange rate on exports would not be surprising in the environment of other strong drivers of export growth (Benaček et al. 2003). In addition, REER indices constructed in described way might not be reflecting underlying dynamics in relative prices entirely accurately.

In general, our results demonstrate how one might fail to recognize the empirical importance of real effective exchange rates for the export performance if aggregate indices are used instead of those at industry level.

Table 1 Export and real effective exchange rates
Dependent variable: Real export
Method: OLS panel estimation in first differences

Industry	REER	REER(-1)	REER(-2)	REER(-3)	REER(-4)	GDPEU27	Constant	Adjusted R-squared	F-statistic (p-values)	Cross-sections included	Number of observation
Manufacturing (C)											
	-0.178	0.071	-0.092	-0.040	0.057	4.522***	0.001	0.378	0.000	7	315
	(0.120)	(0.120)	(0.120)	(0.120)	(0.118)	(0.325)	(0.002)		(0.990)		
Manufacture of food products (CPA10)											
	-0.354**	0.552***	-0.179	-0.042	0.388**	2.623***	0.020***	0.106	5.501**	7	315
	(0.166)	(0.165)	(0.161)	(0.160)	(0.158)	(0.581)	(0.004)		(0.020)		
Manufacture of beverages (CPA11)											
	-0.057	-0.163	0.098	0.411	0.601**	3.121***	0.007	0.056	4.140**	5	225
	(0.287)	(0.283)	(0.276)	(0.278)	(0.267)	(1.174)	(0.008)		(0.043)		
Manufacture of textiles (CPA13)											
	-0.305**	0.145	0.186	0.054	0.149	4.669***	-0.006*	0.276	3.981**	7	315
	(0.154)	(0.153)	(0.154)	(0.153)	(0.148)	(0.454)	(0.003)		(0.050)		
Manufacture of wearing apparel (CPA14)											
	0.064	-0.036	0.152	0.111	0.162	1.607***	-0.007*	0.034	2.562	7	315
	(0.135)	(0.131)	(0.118)	(0.117)	(0.117)	(0.482)	(0.004)		(0.110)		
Manufacture of leather and related products (CPA15)											
	-0.077	0.082	0.153	-0.270	0.510***	2.751***	-0.004	0.050	2.755*	7	315
	(0.162)	(0.169)	(0.170)	(0.171)	(0.165)	(0.747)	(0.005)		(0.098)		
Manufacture of wood and of products of wood and cork etc. (CPA16)											
	0.132	0.266*	0.226	-0.141	-0.128	4.924***	-0.011***	0.308	0.731	7	315
	(0.142)	(0.141)	(0.142)	(0.143)	(0.143)	(0.434)	(0.003)		(0.393)		
Manufacture of paper and paper products (CPA17)											
	0.025	0.081	-0.023	-0.127	0.090	3.217***	0.006**	0.164	0.008	7	315
	(0.133)	(0.132)	(0.132)	(0.129)	(0.123)	(0.402)	(0.003)		(0.929)		
Manufacture of chemicals and chemical products (CPA20)											
	-0.153	0.202	-0.015	0.037	-0.039	5.721***	-0.003	0.242	0.802	7	315
	(0.120)	(0.123)	(0.124)	(0.123)	(0.119)	(0.575)	(0.004)		(0.371)		
Manufacture of basic pharmaceutical products etc. (CPA21)											
	-0.413**	0.341*	-0.189	0.156	0.115	3.377***	0.030***	0.042	1.481	6	270
	(0.206)	(0.204)	(0.198)	(0.199)	(0.196)	(1.097)	(0.008)		(0.225)		
Manufacture of rubber and plastic products (CPA22)											
	0.231*	-0.101	0.095	0.014	-0.020	4.350***	0.015***	0.268	0.002	7	315
	(0.139)	(0.144)	(0.142)	(0.142)	(0.138)	(0.422)	(0.003)		(0.961)		
Manufacture of other non-metallic mineral products (CPA23)											
	-0.147	0.452***	-0.099	-0.019	0.162	4.585***	-0.002	0.273	2.794*	7	315
	(0.168)	(0.169)	(0.168)	(0.169)	(0.166)	(0.443)	(0.003)		(0.096)		
Manufacture of basic metals (CPA24)											
	0.160	0.295*	-0.103	-0.066	-0.014	7.905***	-0.012**	0.284	0.159	7	315
	(0.159)	(0.160)	(0.159)	(0.159)	(0.156)	(0.705)	(0.005)		(0.690)		
Manufacture of fabricated metal products etc. (CPA25)											
	-0.719***	0.229	0.187	0.140	0.003	5.982***	0.001	0.441	5.126**	7	315
	(0.147)	(0.152)	(0.154)	(0.153)	(0.146)	(0.438)	(0.003)		(0.024)		
Manufacture of computer, electronic and optical products (CPA26)											
	0.101	-0.113	-0.047	0.183	0.196	3.139***	0.022**	0.011	0.239	6	270
	(0.220)	(0.216)	(0.216)	(0.215)	(0.212)	(1.172)	(0.008)		(0.625)		
Manufacture of electrical equipment (CPA27)											
	-0.037	-0.028	-0.054	-0.145	0.001	4.325***	0.008**	0.177	0.682	7	315
	(0.154)	(0.145)	(0.142)	(0.141)	(0.140)	(0.507)	(0.004)		(0.410)		
Manufacture of machinery and equipment n.e.c. (CPA28)											
	-0.226	-0.050	-0.166	0.127	0.083	7.332***	0.005	0.409	0.000	6	270
	(0.189)	(0.186)	(0.184)	(0.185)	(0.185)	(0.564)	(0.004)		(0.988)		
Manufacture of motor vehicles, trailers and semi-trailers (CPA29)											
	0.178	0.267	0.038	-0.065	0.016	5.684***	0.009	0.154	0.274	5	225
	(0.240)	(0.235)	(0.230)	(0.230)	(0.225)	(0.847)	(0.006)		(0.601)		

Note: Sample period from 2000Q1 to 2012Q2. Standard errors are in parentheses. Number in parentheses next to REER indicates the lag length in quarters. F-statistic of the Wald test checks the null hypothesis that sum of all coefficients on lagged value of REER in first differences is equal to zero.
***, **, * Statistically significant at 1%, 5%, and 10%, respectively.

5 Conclusion

The real effective exchange rates reflect the development of the relative price or cost position of the economy. Hence they only relate to one aspect of international competitiveness and should therefore be seen as a rather narrow concept that does not capture all relevant aspects. They are nevertheless often used and perceived as useful indicators in economic analysis. This analysis is however usually based on aggregate indicators, such as real effective exchange rates deflated with aggregate price or cost indices, and therefore neglects differences that can exist between industries. Since differences between industries within one country and especially between countries can be substantial, it would be more appropriate to use REER indices at industry level. Such industry-specific indicators should be based on trade weights calculated at industry level and corresponding producer price indices in order to reflect price competitiveness of particular industry more realistically.

In this paper, we constructed the real effective exchange rate indices at industry level for seven CEE countries and explored their importance by estimating their impact on exports. The results show that trends in producer prices and the structure of exports by trading partners are noticeably different among industries and countries, resulting in divergent movements between industry specific REER indices. The econometrical analysis suggests that the results for some industries are consistent with the theory, especially in traditional, low-technology industries. This means that real effective exchange rates should also be monitored at a disaggregated level in order to enhance understanding of different factors that shape overall developments in the economy.

Although the REER indices presented in this paper prove helpful in understanding differences in relative price effects at industry level, they are not without shortcomings and can be further improved. This for instance refers to the construction of weights. In particular, both direct bilateral trade and third-market competition can be captured by double-weighting. Besides, more countries could be included in the basket of trading partners. Also, time-varying weights could be adopted, in order to capture the changing trade patterns. These "improved" weights would better represent trade flows and should increase the usefulness of the real effective exchange rate indices, as reliable indicators of price competitiveness. The analysis could be extended to countries other than CEE. Other econometrical techniques could also be used to examine the empirical importance of such indicators. This for instance could mean using panel cointegration techniques to test for the presence of long run relationships. In spite of potential methodological improvements, results presented in this paper should encourage the discussion about the effects of real effective exchange rate on specific industry.

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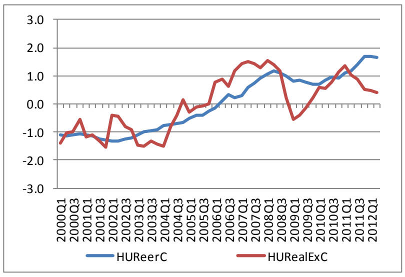
Appendix

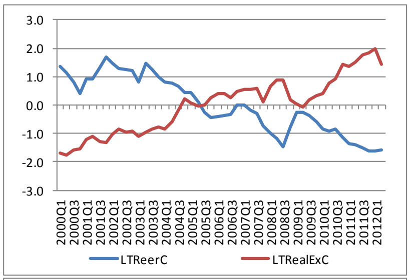
1 List of CPA/NACE sectors

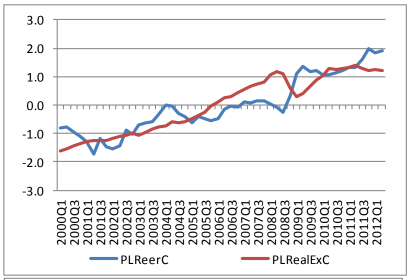
C	Manufacturing
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastic products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing

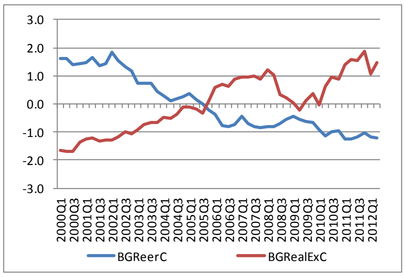
2 REER indices and real exports at industry level in CEE countries

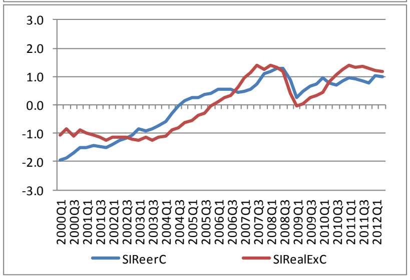
C Manufacturing

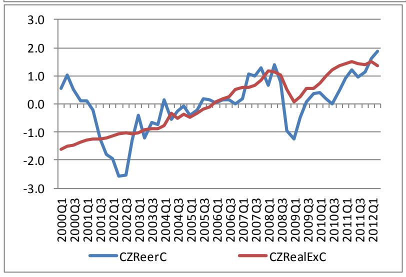


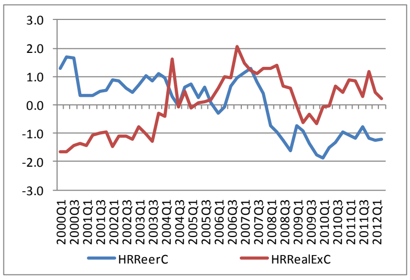




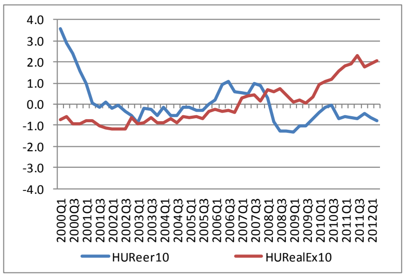


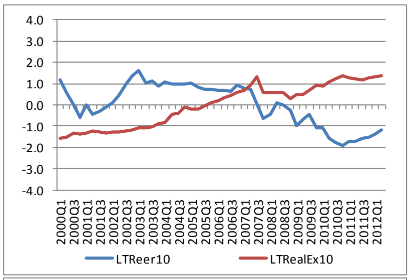


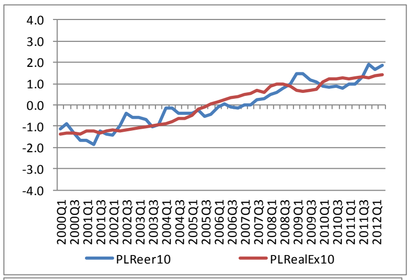


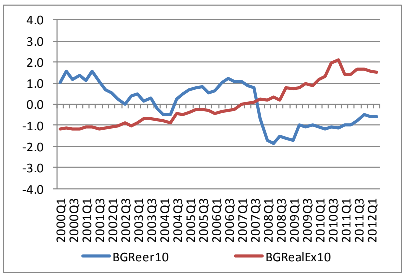


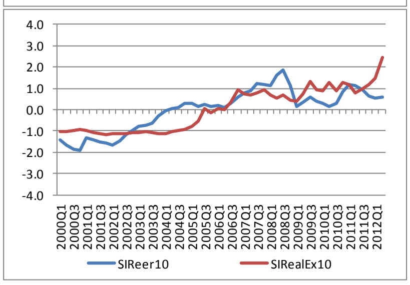
10 Manufacture of food products

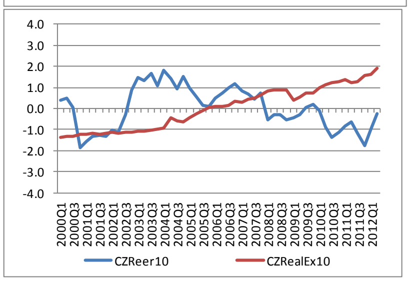


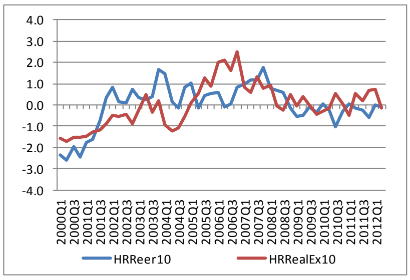




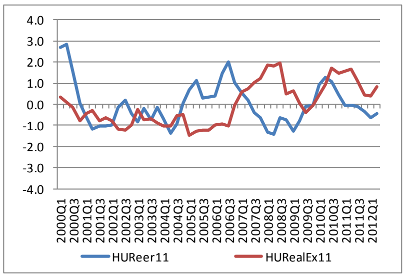


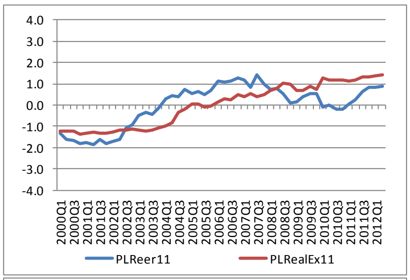


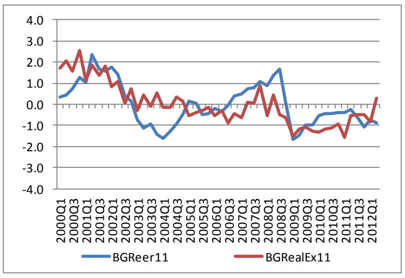


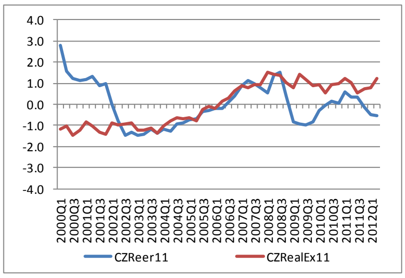


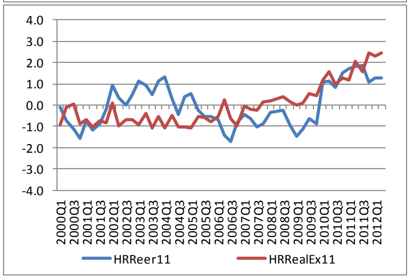
11 Manufacture of beverages



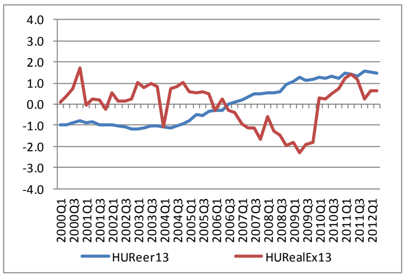


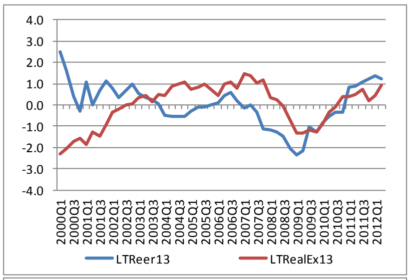


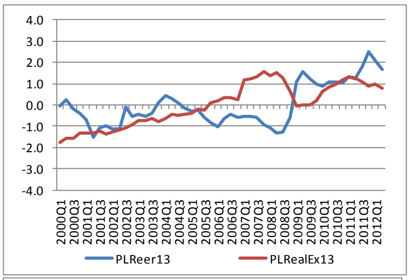


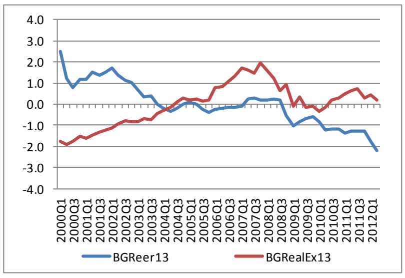


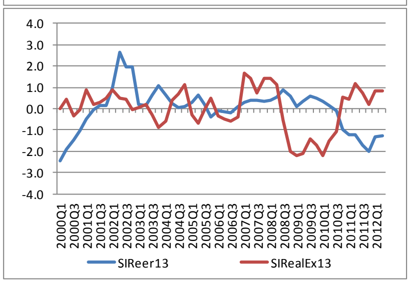
13 Manufacture of textiles

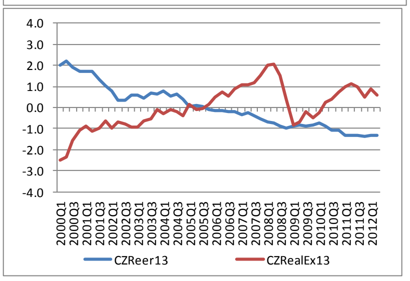


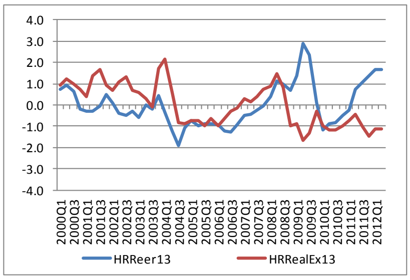




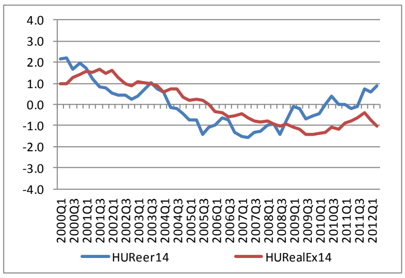


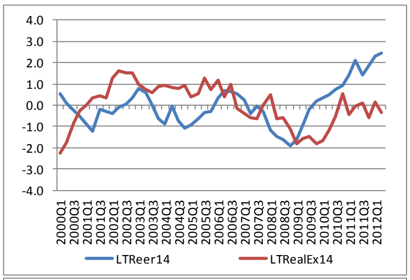


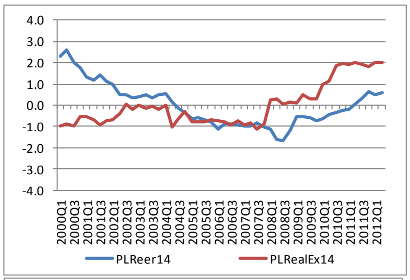


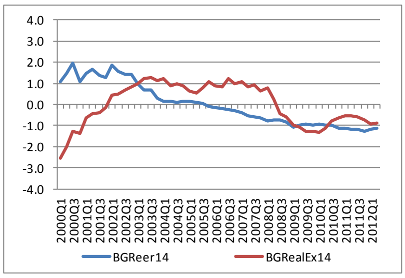


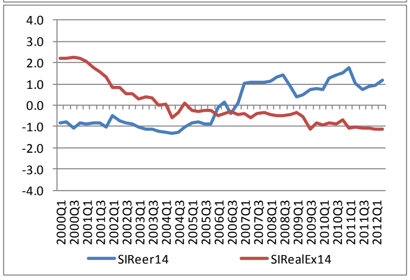
14 Manufacture of wearing apparel

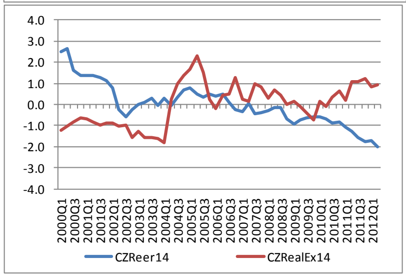


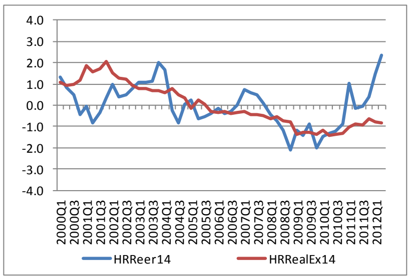




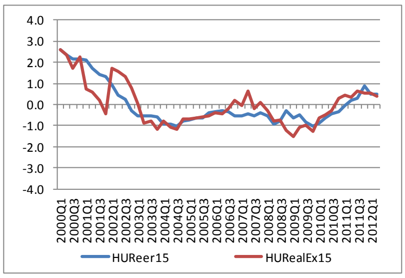


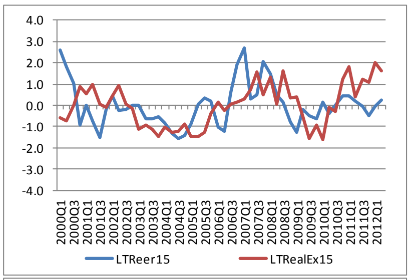


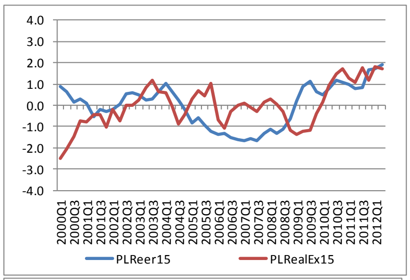


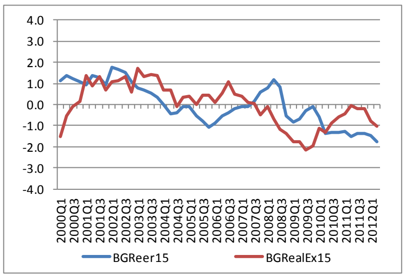


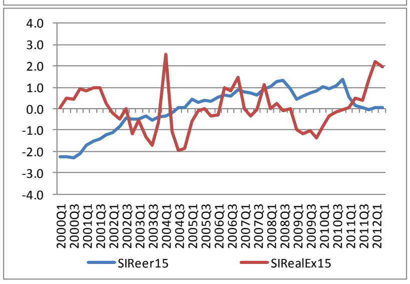
15 Manufacture of leather and related products

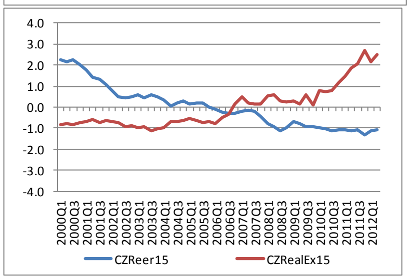


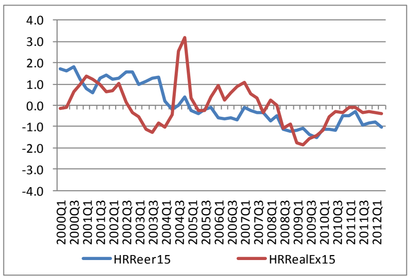




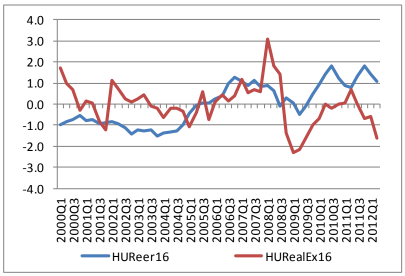


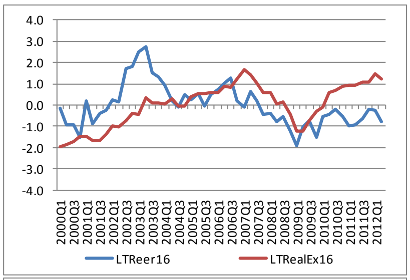


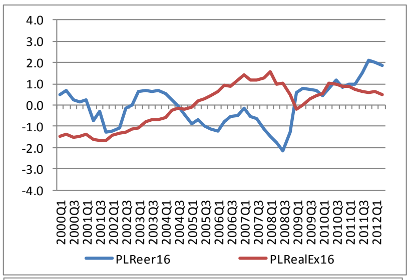


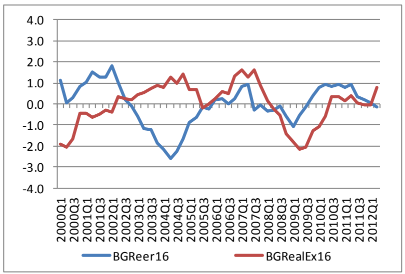


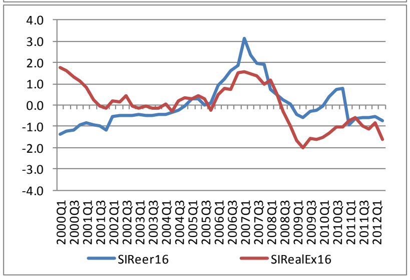
16 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials

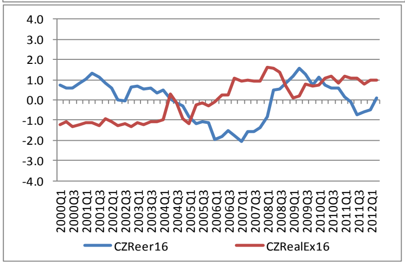


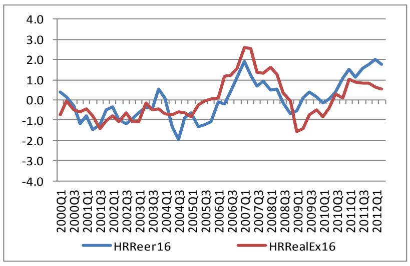




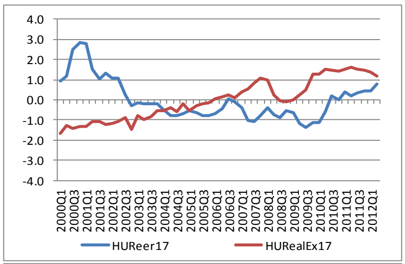


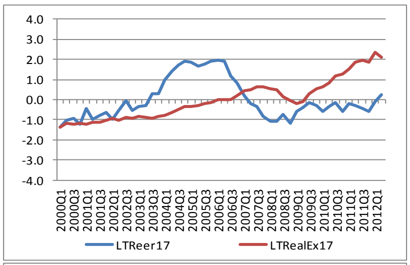


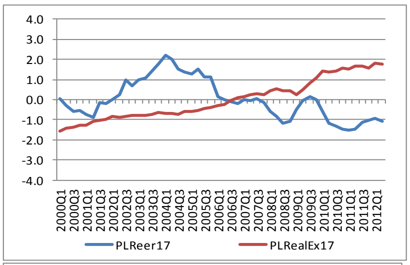


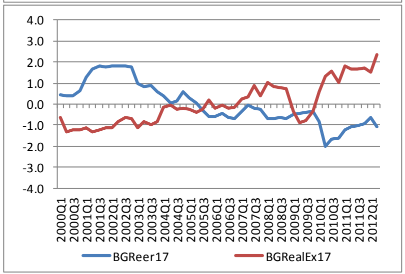


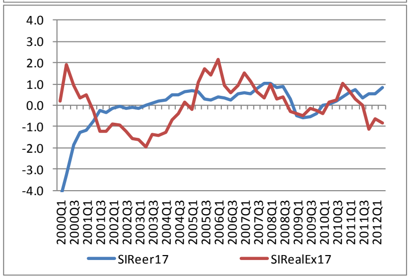
17 Manufacture of paper and paper products

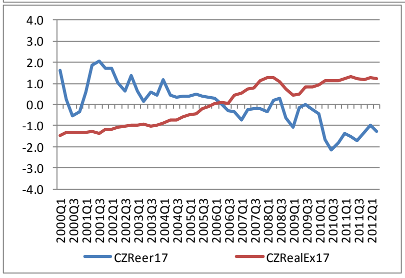


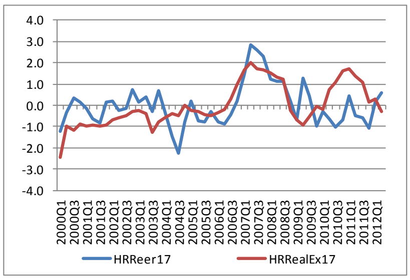




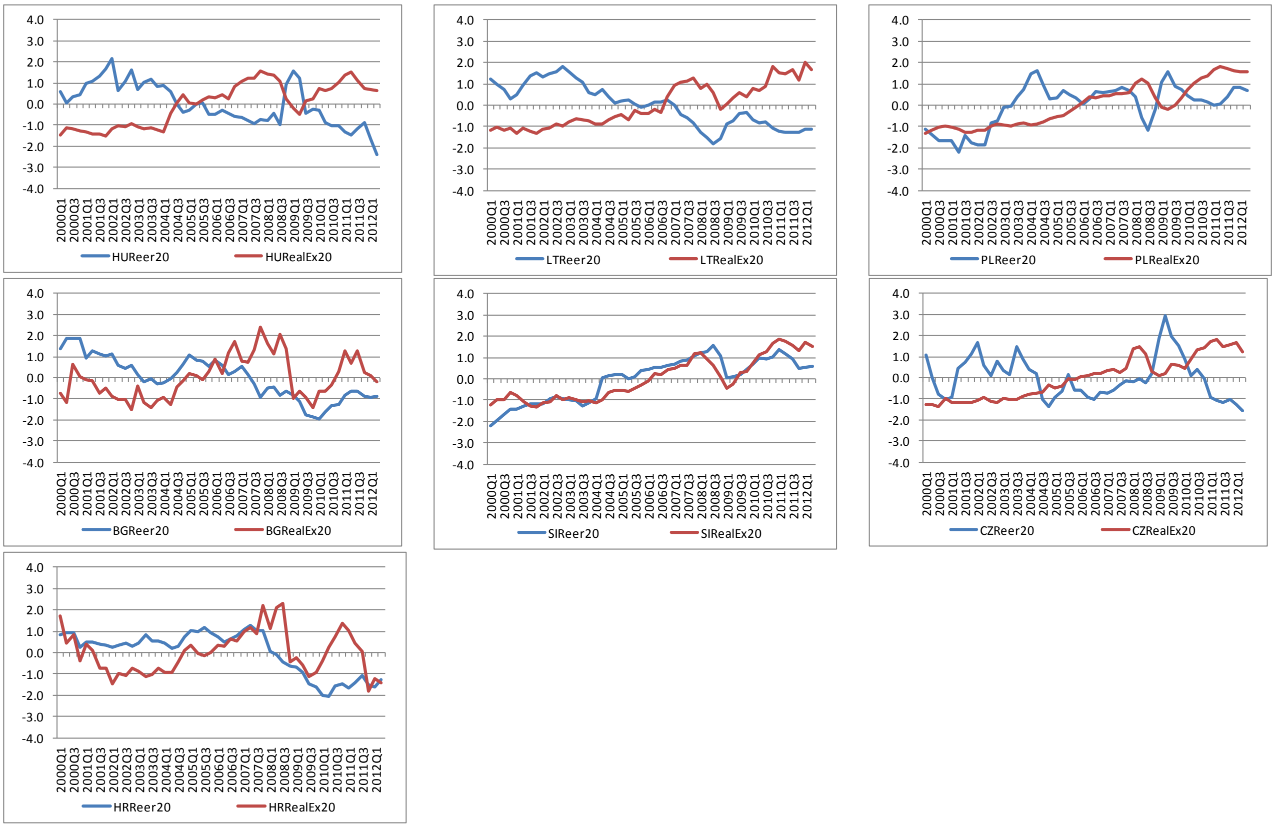




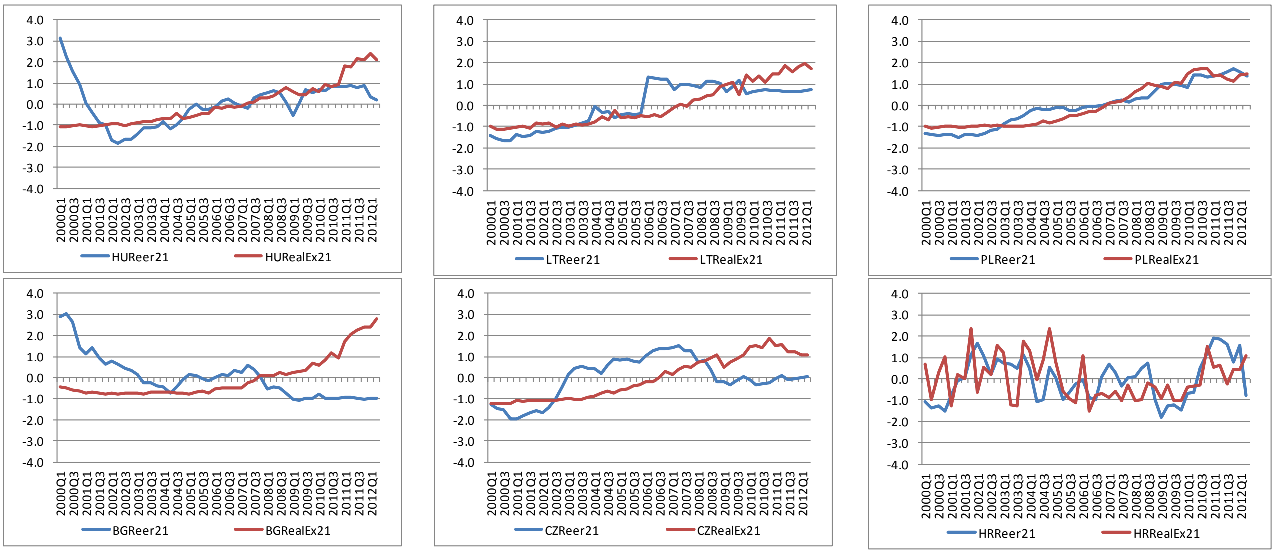




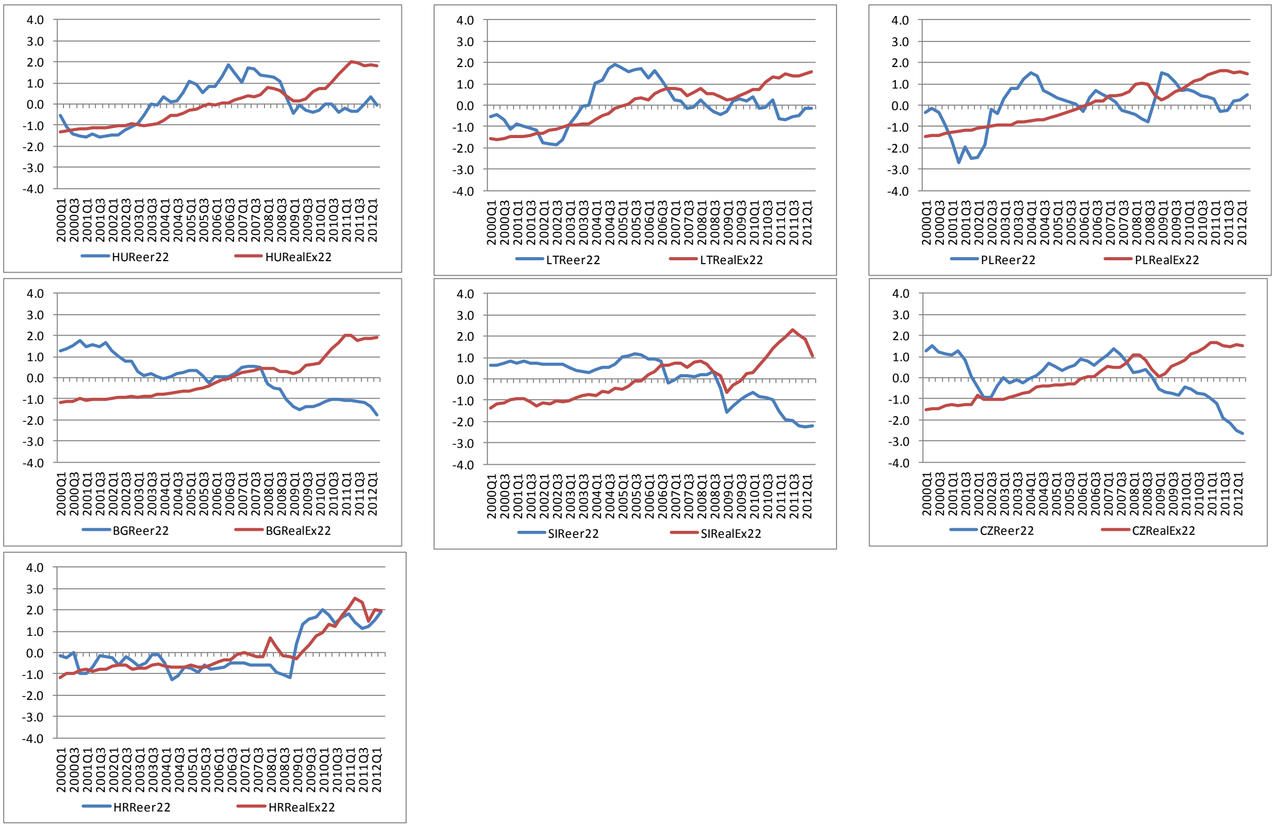
20 Manufacture of chemicals and chemical products



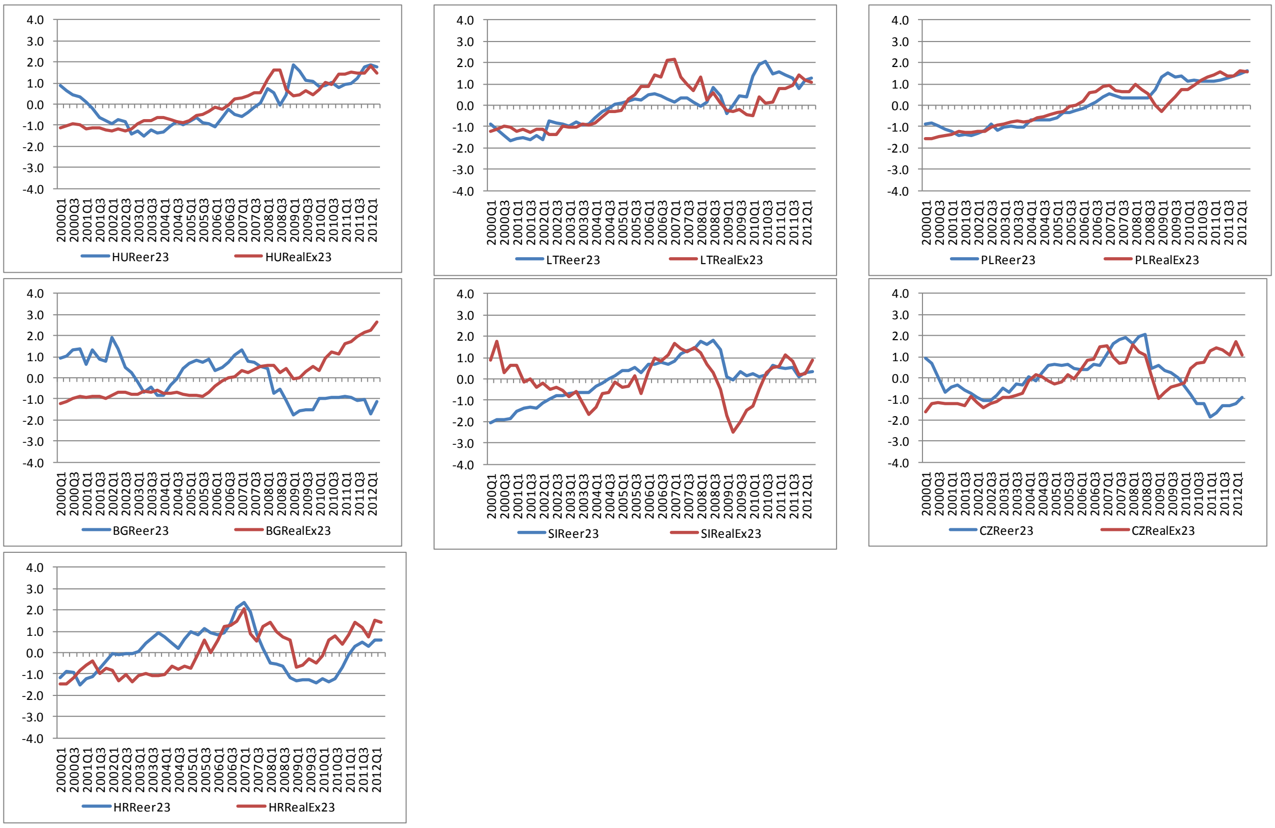
21 Manufacture of basic pharmaceutical products and pharmaceutical preparations



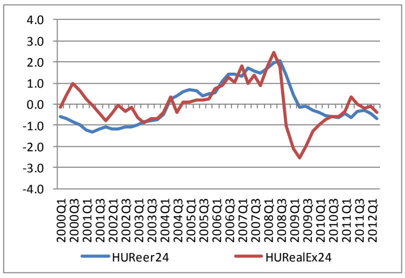
22 Manufacture of rubber and plastic products

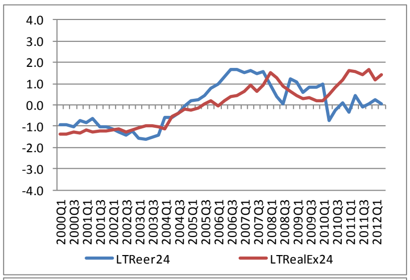


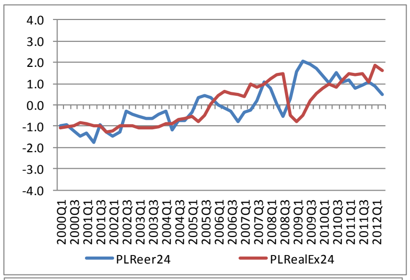
23 Manufacture of other non-metallic mineral products

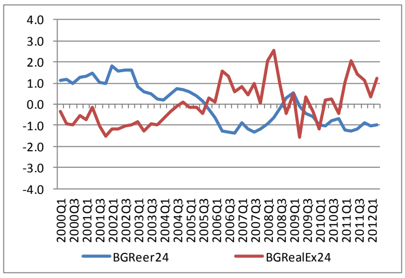


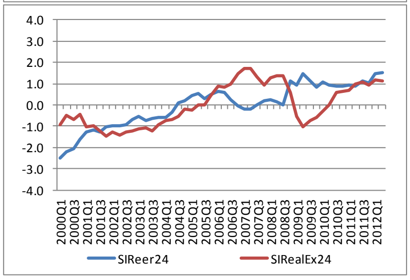
24 Manufacture of basic metals

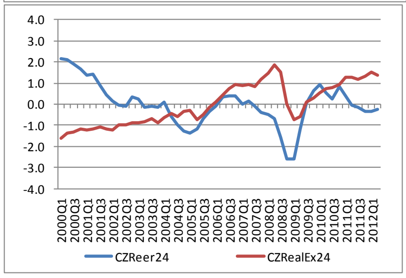


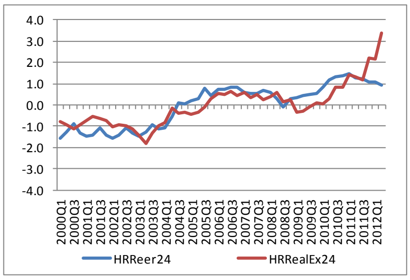




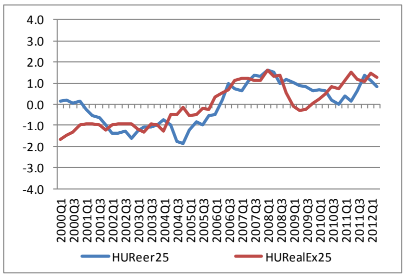


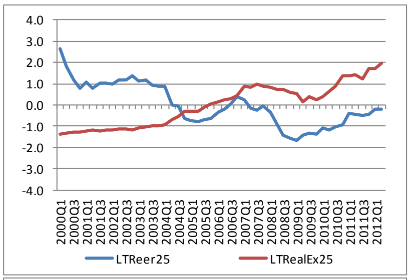


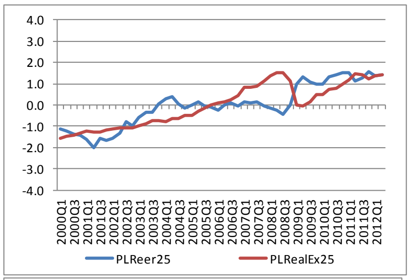


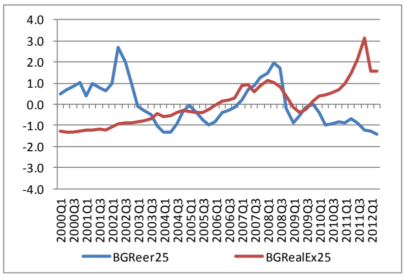


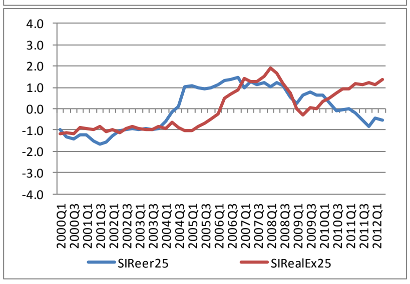
25 Manufacture of fabricated metal products, except machinery and equipment

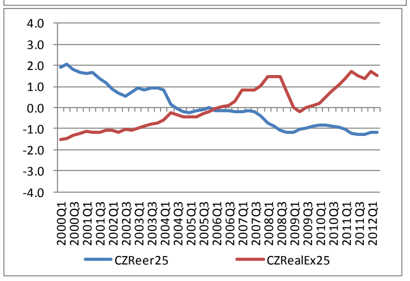


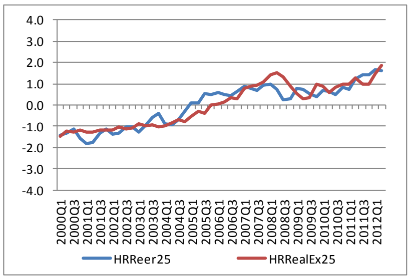




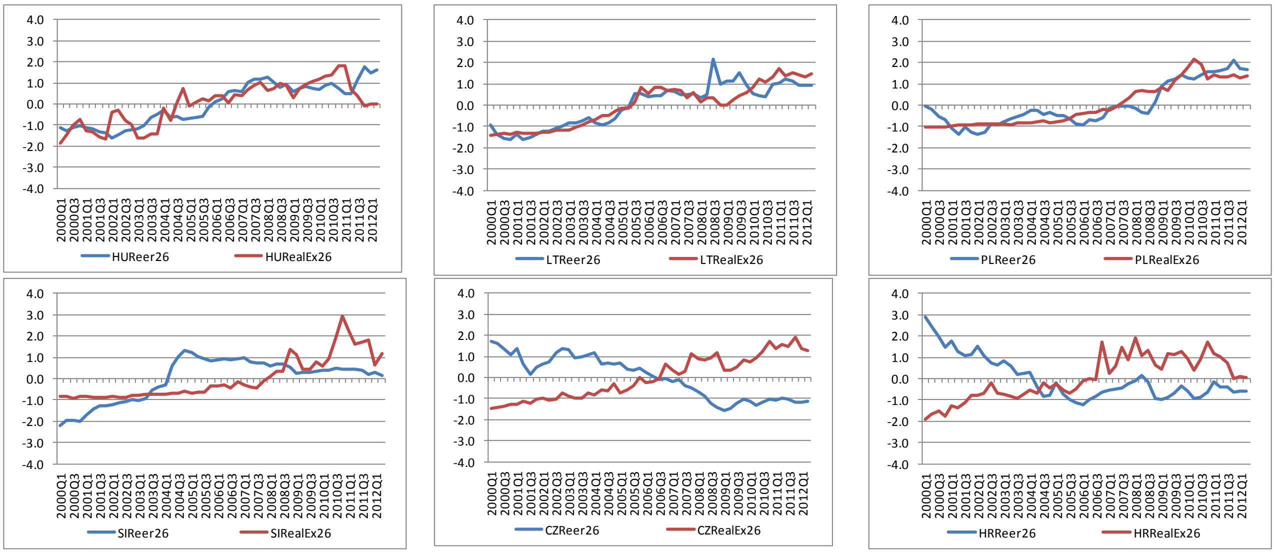




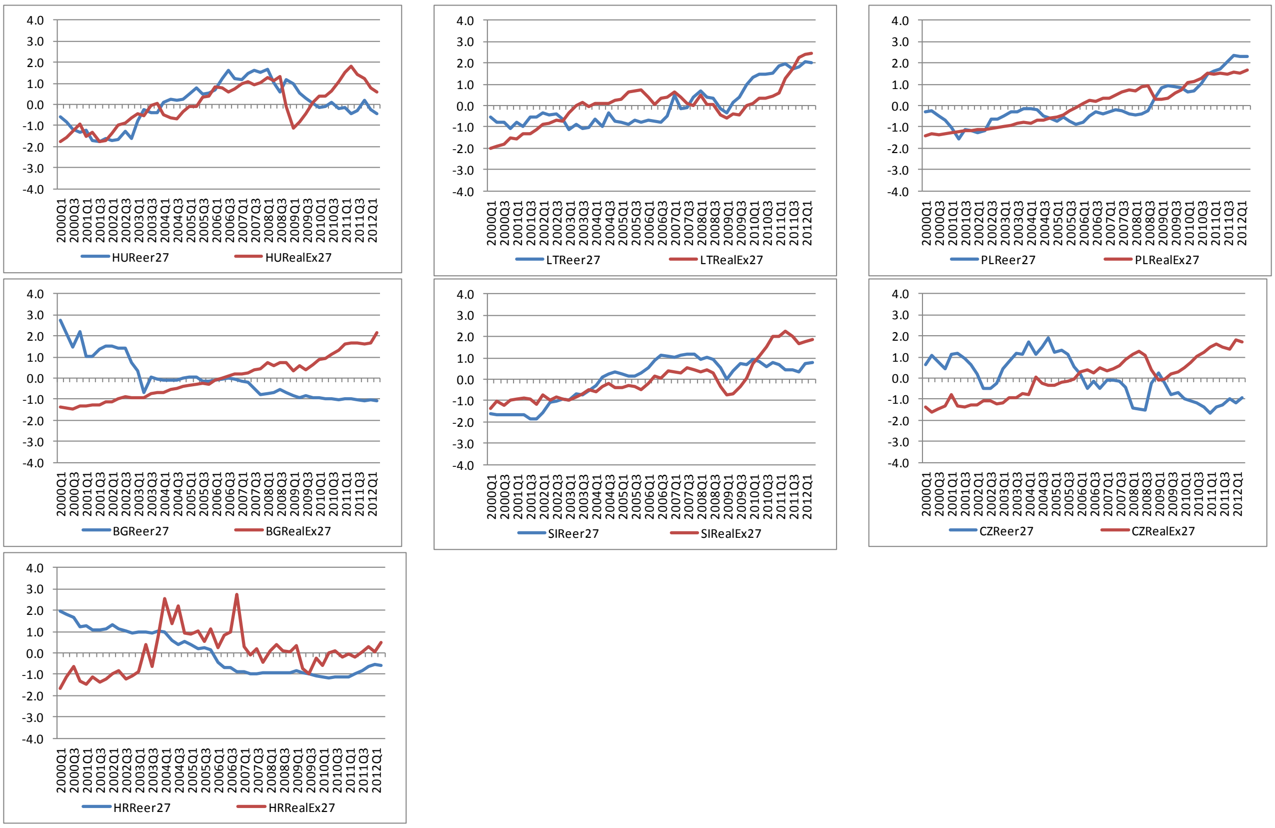




26 Manufacture of computer, electronic and optical products

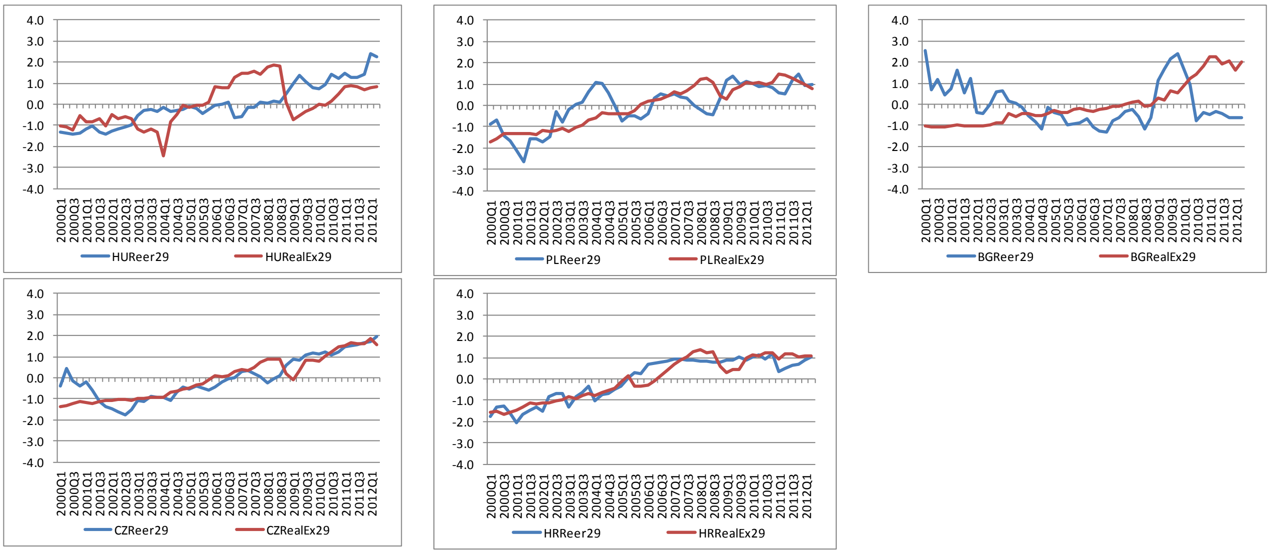


27 Manufacture of electrical equipment



28 Manufacture of machinery and equipment n.e.c.

29 Manufacture of motor vehicles, trailers and semi-trailers



Note: Each chart shows normalized data for the real effective exchange rates (Reer) and real exports (RealEx) in specific industries in selected CEE countries (Hungary – HU; Lithuania – LT; Poland – PL; Bulgaria – BG; Slovenia – SI; Czech Republic – CZ; Croatia – HR).