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"Industries, Costs and Macroeconomic Regimes in Central and Eastern European Countries : Towards Stylised Facts"

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INDUSTRIES, COSTS AND MACROECONOMIC REGIMES IN CENTRAL AND EASTERN EUROPEAN COUNTRIES: TOWARDS STYLISED FACTS[1]

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ABSTRACT

Economists have difficulties to conceptualise and model the relationship between macroeconomic policy and industry change. This paper explores the relationships between industry cost structures and macroeconomic regimes in central and east European countries (CEECs). It finds that the cost structures are more homogenous within industries than within countries. Changes in cost structures are dominantly intra-industry, i.e. unrelated to changes in industry structures though in some countries structural and specialisation effects are also significant. The paper links the intensity of changes in industry cost structures with a composite measure of macroeconomic stability. In the case of five CEECs, it finds that there is a country-specific relationship between changes in costs and macroeconomic stability. Based on these findings the paper provides arguments for integration of macroeconomic and industrial (technology) policies.

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1. INTRODUCTION

Macroeconomic policies are usually designed and implemented without explicitly taking into consideration their industry or structural effects and determinants. Macroeconomic stability, seen as an objective by itself, is assumed to be the best framework for structural change in the economy. The idea that there is complex relationship between macroeconomic policies and structural change is intuitively accepted but rarely explored analytically. In practice, this has led to a complete separation between macroeconomic and sectoral policies, whether industrial or technology policies.

In this paper, we explore the relationship between macroeconomic stability and intensity of structural change analysed via changes in industry cost structures. This relationship is of great relevance for countries of Central and Eastern Europe (CEECs) whose industries have undergone deep changes in cost structures while at the same time there has been improved macroeconomic stability. For the early years of transition the relationship between the tightness of macroeconomic policies and its effects on economic growth has been the subject of extensive debate among economists (for an overview see Lavigne, 1999, chapter 7). However, the entire debate is couched in aggregate terms by relating the deflationary/inflationary character of macroeconomic policies to the effects on growth. Given our poor understanding of the relationship between macro and micro/meso determinants and effects this is not surprising. In this paper we try to further our understanding of the relationship between macroeconomic regimes and micro/meso aspects by analysing changes in industry cost structures in several CEECs, and explore their relationship based on the two new composite measures of i) macroeconomic stability and ii) changes in cost intensity. The underlying idea is that the macroeconomic policy should take into account the intensity of changes in cost structures and its effects on tightness of the macroeconomic regime.

Our argument is developed in several steps.

First, we show that the cost structures within industries (across countries) are more homogenous than the cost structures within countries (across industries). This suggests that similar macroeconomic policies in different countries may have different industry (sectoral) effects and hence different overall effects on growth depending on industry and cost structures.

Second, we construct the indicator of changes in industries' cost structures, decompose it into intra-industry, structural and specialization components and show differences in the weights of different components in the CEECs. In five out of the six CEECs, the intra-industry component of change in cost intensity dominates.

Third, we construct a composite indicator for macroeconomic regimes for the CEECs based on ideal point method of multi-criteria decision-making (MCD). This enables us to plot the pattern of macroeconomic stability of the CEECs over time by using as the ideal point 'absolute stability', i.e. situation where the five key macroeconomic variables are zero.

Fourth, we relate the two indicators, the aggregate indicator of intensity of cost changes and the composite indicator of macroeconomic stability, and interpret their relationship for the five CEECs. We argue that macroeconomic policy should take into account the relationship between macroeconomic stability and intensity of changes in costs. Based on this criterion we hypothesize the implications for macroeconomic policies of the five CEECs.

The rest of the paper is organised into seven sections. The next section, on data, is followed by the five sections corresponding to each of the five outlined steps, with each section explaining results and methodology. This structuring of the paper is more suitable given that the paper uses different methodologies to build its argument. The conclusions summarise the main findings.

2. DATA

The analysis is based on three major costs – material costs, wages and salaries, and investments – at 2-digit industry level based on the NACE classification. These data, including output, are collected from national statistical yearbooks for the eleven CEECs (Bulgaria, Croatia, Czech R, Hungary, Estonia, Macedonia, Slovakia, Slovenia, Poland, Russia and Romania). However, only for six CEECs (Bulgaria, Czech R, Hungary, Slovakia, Romania and Poland) were time series available and comparable for the present analysis. Data are available for different years, for different countries and for 17 industries. Based on the overall data we econometrically estimate for the missing data for some costs and for some countries, in particular for Slovakia. In Annexes 1-3 we report the original data, while the calculations are based on original and estimated data.

For macroeconomic data, the source is EBRD (2002). For the years 1990-1992 for some countries, there is not data for all macroeconomic variables. We econometrically estimate for missing data for these countries in the same manner as for the data on costs.

3. MACROECONOMICS, INDUSTRIES AND COST STRUCTURES

Macroeconomic policies are said to affect the economy as a whole. However, most of macroeconomic instruments take the form of microeconomic adjustment to particular components of the system. As Stretton (1999) argues "those activities are macroeconomic only in the intention to influence some total of activity *as well as* the detailed activity which they directly influence" (p. 648). Despite intentions, macroeconomic polices will have important industry effects which will differ from industry to industry depending on the cost structure. Similar macroeconomic policies may have very different overall effects primarily through their differential industry (sectoral) rather than macroeconomic effects.

This reasoning is based on the assumption that the cost structure of any industry is homogenous across different countries at similar levels of development. Kamin et al. (1982) show this to be the case by comparing Canada, Israel and the US. An OECD (1983) analysis shows very homogenous cost structures in the case of the mechanical engineering industry between France, Germany and the UK. In our analysis we begin from the following two assumptions.

First, cost components of the same industries in different countries are relatively stable and reflect long-term financial and technical features of a specific industry. The technological features determine cost structures of industries. Equally, development of technology assumes the basic cost structure, i.e. for the cost profile to be similar for similar industries and technologies.

Second, technology determines the distribution of expenditures on current output and investments for future output. Although this relationship can be determined by macroeconomic conditions, in the long term, industry-specific features determine this relationship. Imbalances between flow of funds for current production and flow of funds for future production determine the long-term 'health' of industry and enterprise.

Based on these two assumptions we want to test whether the cost structures of industries in different countries at similar levels of development are homogenous, i.e. similar. The contrary hypothesis would be that the cost structures in the same industries are very much country- rather than industry-specific. If the first hypothesis were correct, this would justify the exploration of the industry (sectoral) aspects of different macroeconomic policies.

In order to find out whether the cost structures across countries or industries are similar or different we collect data on three costs (investments, wages and salaries, material costs) at the industry level for six CEECs[4][5]. We calculate the shares of each of the costs in output and analyse the relationship between data across industries and across countries by using standard deviations and coefficients of variation, by one-way analysis of variance, and by correspondence analysis.

Data on shares of respective costs in output are presented in Annex 1-4. Table 1 shows the average standard deviation and coefficient of variation in shares of costs in output for Bulgaria, Czech R, Hungary, Slovakia, Romania and Poland, both within countries (across industries) and within industries (across countries). Figures 1 and 2 show coefficients of variation for the three costs within industries and within countries. Abbreviations for industries in figure 1 are explained in **Annex 12.**

Based on table 1 and figures 1 and 2 and Annexes 1-4 we find the following:

i) Data show a consistent ordering of costs according to size. The share of material costs is the highest and is followed by wages & salaries, and then investments.

ii) The higher is the share of the costs the higher is its absolute variation within countries and industries. The average absolute variation of material costs within countries is 9.31 standard deviations, wages & salaries 6.15 and investment 5.70 standard deviations. In absolute terms, the variation is the smallest in Hungary with respect to all three types of costs (material costs 7.68, wages & salaries 4.07, and investment 4.98) (see Annexes 1-3).

iii) However, the relative variation in shares of costs is inversely proportional to the size of the costs, i.e. the variation is bigger for the smaller costs. The coefficient of variation within countries for material costs is 14.18%, for wages & salaries 48.83% and for investment 63.03% (table 1). In relative terms, there is no clear country pattern across all three types of costs. In material costs and investment, Romania has the highest coefficient of variation, while in wages & salaries Bulgaria has the highest coefficient (Annexes 1-3).

iv) Variation in costs within industries (across countries) is smaller than the variation within countries (across industries) for all three costs (table 1). Cost structures across industries are more

[4] Unfortunately, data on taxation as the only remaining aggregate cost in turnover (sales) are not available.
[5] CEECs are at relatively similar levels of development, which further justify their comparison.

homogenous than the cost structures within countries. In continuation of this section, we further explore this feature of industries.

One-way analysis of variance (table 2) shows that differences in the variation between countries are statistically significant from the mean for material costs and for wages and salaries but are not significantly different from the mean for investment. One-way analysis of variance for industries as groups shows that differences in variation between industries for all three costs are statistically significant from the mean. Coefficients of determination (R^2), which show the ratio between group variance and total variance, are consistently higher for differences between industries than between countries (table 2).

Table 1: Average share of costs in output in six CEECs

		Material cost	Wages & Salaries	Investment
Standard deviation	**Within industries**	8.49	4.74	3.71
	Within countries	9.31	6.15	5.7
Coefficient of variation	**Within industries**	12.76	37.99	38.94
	Within countries	14.18	48.83	63.03

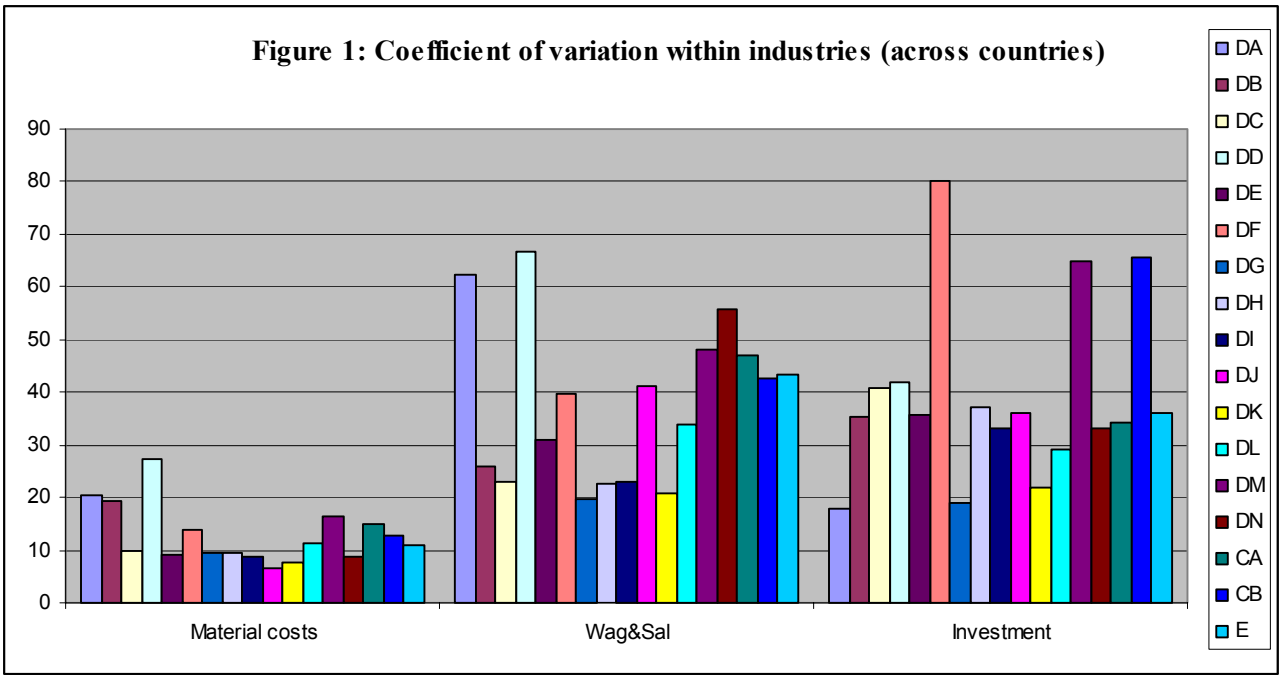


Figure 2: Coefficient of variation within countries (across industries)

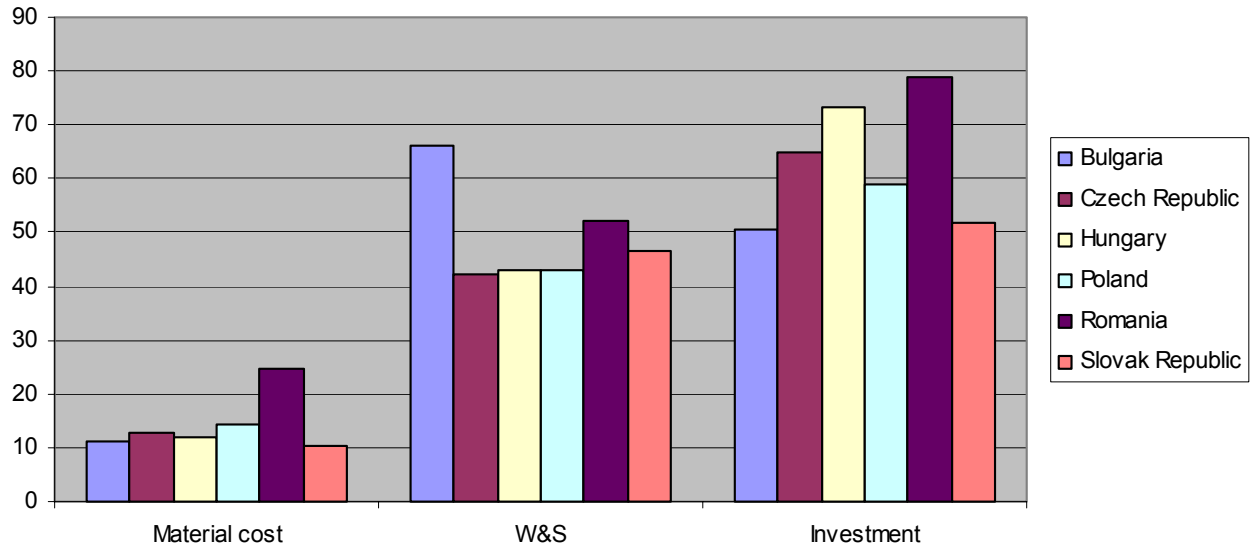


Table 2: Coefficient of determination (R^2) for differences between countries and between sectors

Between countries	**R^2**	**ANOVA**
- Material costs	0.22	Significant
- Wages and salaries	0.25	Significant
- Investment	0.07	Not significant
Between industries	**R^2**	**ANOVA**
- Material costs	0.37	Significant
- Wages and salaries	0.49	Significant
- Investment	0.50	Significant

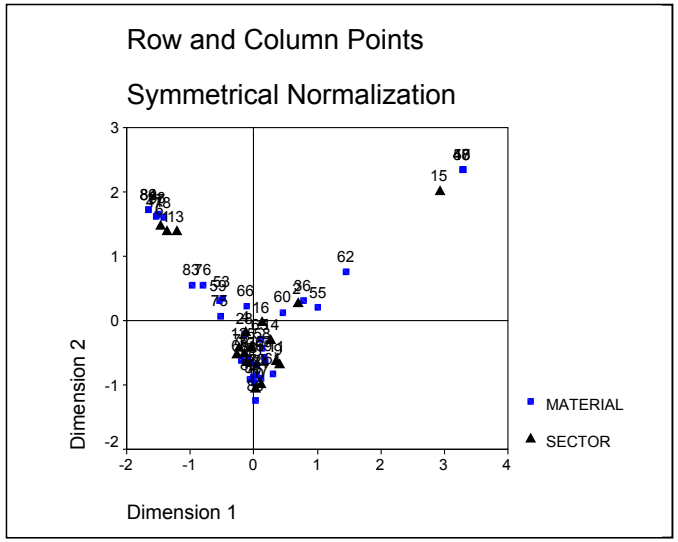
We use correspondence analysis to graphically present the profiles of costs across countries and across sectors. This technique defines a measure of distance between any two points, where points are the values of the discrete variables. The main purpose of technique is graphic presentation of the relationships between variables rather than calculation of the significance of the relationships. Figure 3 shows the correspondence map, displaying two dimensions, emerging from the principal components analysis of point distances. It maps in the upper row the distances between shares of costs and industry and in the lower row distances between shares of cost and country. We apply

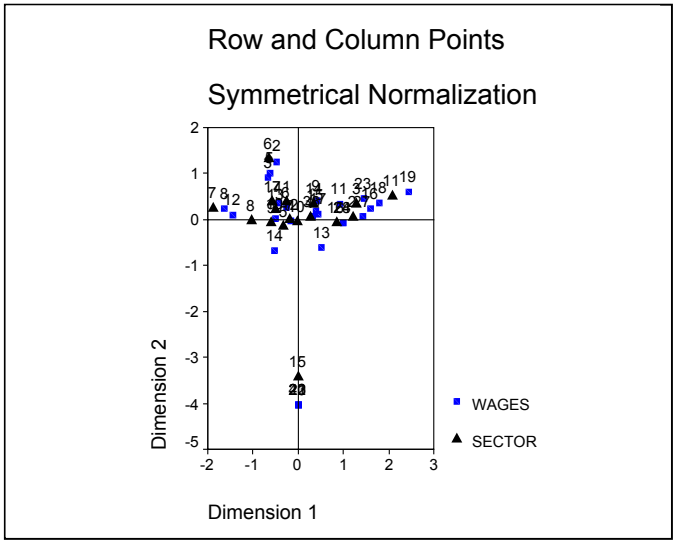
symmetric normalization, which standardises both industry and cost profiles[6]. Visual reading of figure 3 shows that data for costs and industries are much more concentrated than for costs and countries. In particular, there are more data points for sectors and costs that are in the same quadrants. Data for countries and costs are more dispersed across four quadrants than data for industries and costs. Profiles of industry-based costs show consistent patterns when compared to countries, despite a few outliers.

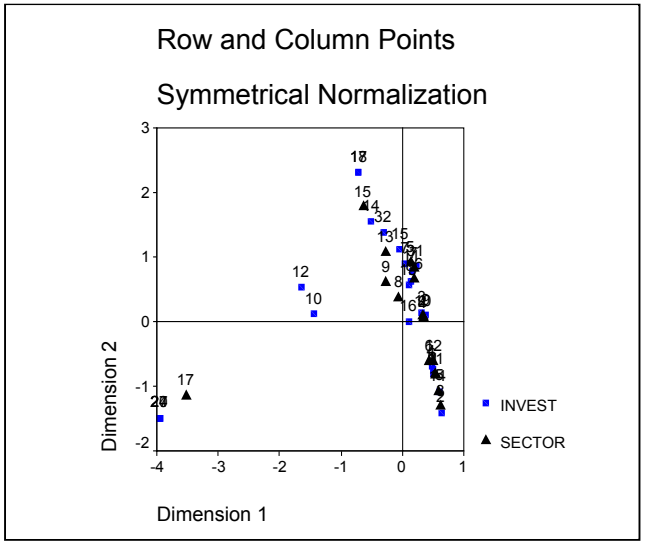
In summary, different statistical measures (standard deviations, coefficients of variation, one-way ANOVA and correspondence analysis) suggest that the cost structures within industries (across countries) are more homogenous than the cost structures within countries (across industries).

[6] Two underlying dimensions for industry explain 26.3% of the variation for material costs, 29% for wages and salaries and 37.3% for investments. The first two dimensions for countries explain for material costs 56.8% of the variation, 59.9% for wages and salaries and 56.2% for investments. We should bear in mind that there are 17 sectors (industries) and 6 countries, which form the basis for mapping distances and for extracting the underlying dimensions.

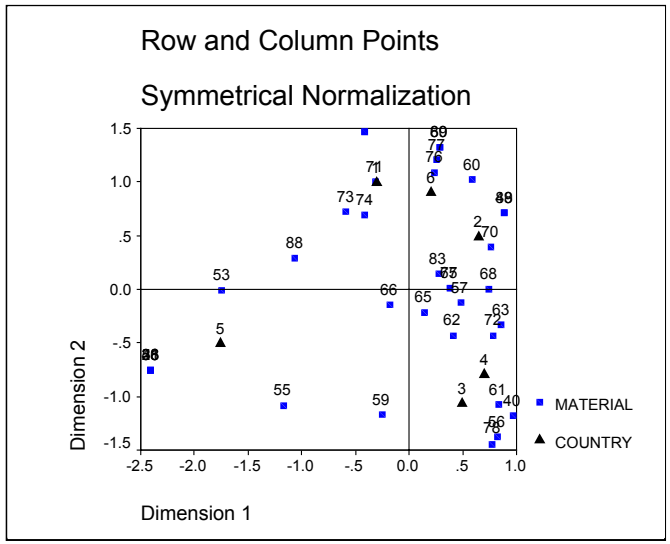
Figure 3: Correspondence map (for sector codes see Annex 12)



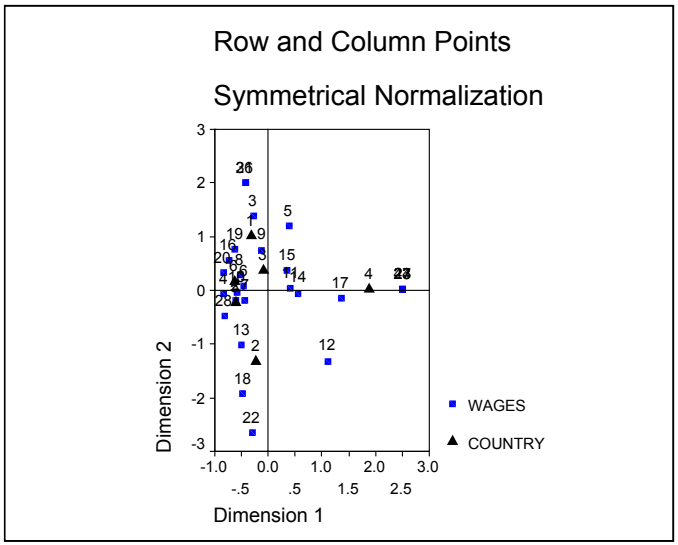




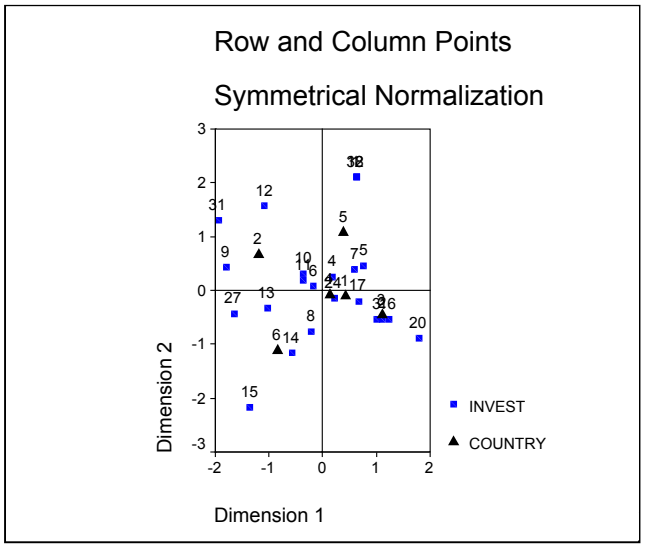
MATERIAL COSTS



WAGES & SALARIES



INVESTMENTS



4. MEASURING INTENSITY AND TYPE OF CHANGES IN COST STRUCTURES

In section 3 we established the rationale for exploring the industry aspects of macroeconomic policies. In this section, we measure the intensity of changes in cost structures and try to find out whether the cost change is predominantly intra-industry, structural, or with specialisation effects.

A change in cost intensity, defined as change in the ratio of respective costs in output, may be decomposed into three effects (OECD, 1997):

- The *intra-industry* effect (**Iis**), independent of the changes of shares of industry in manufacturing output
- The *structural (inter-industry)* effect (**Ist**), which is positive (negative) when the share of industries with higher shares of respective cost increase (decrease)
- The *specialisation component (mixed interactive effect)* (**Isp**), which is positive (negative) when the share of the respective cost rises (decreases) in industries whose share in manufacturing output increases.

The algebra is as follows:

$$\mathbf{r_{tj.} - r_{0j}} = \sum_j \mathbf{r_{tj}\, v_{tj}} - \sum_j \mathbf{r_{0j}\, v_{0j}} = \mathbf{Iis_j + Ist_j + Isp_j}$$

With

$$\mathbf{Iis_j} = \sum_j \mathbf{v_{0j}\,(r_{tj} - r_{0j})}\ , \quad \mathbf{Ist_j} = \sum_j \mathbf{r_{0j}\,(v_{tj} - v_{0j})}\ , \quad \mathbf{Isp_i} = \sum_j \mathbf{(r_{tj} - r_{0j})\,.\,(v_{tj} - v_{0j})}$$

Where:

r_t, r_o - Cost intensity of industry at time t, 0

r_{tj}, r_{0j} - Cost intensity of jth industry at time t, 0

v_{tj}, v_{0j} - Share of jth industry in output at time t, 0

Indicators of change in the cost intensity (change in ratio of respective costs in output) are calculated for each of the three costs: material costs, wages and salaries, and investments. We also

calculate the change in total cost intensity by summing up individual components for each of the costs. Summation of these three components gives the overall change or change in aggregate costs. We should bear in mind that the share of individual costs is already weighted by the contribution of individual industries in manufacturing output and by the share of respective cost in industry output.

Data are not available for all industries and for all years. For most of the countries data are available for eight years but for different sub-periods. First, we calculate coefficients for the available years. Second, we normalise calculated indicators over the same period 1990-1999 by dividing the available number of years by 10, which is the observed period. Annexes 5-9 show changes in aggregate costs and in all components by industries and countries. Table 3 shows changes in aggregate costs and in all components at country level.

Table 3: Changes in intra-industry, structural and specialization components, and total costs in the period 1990/99 for Czech Republic, Hungary, Poland, Romania, Slovak Republic

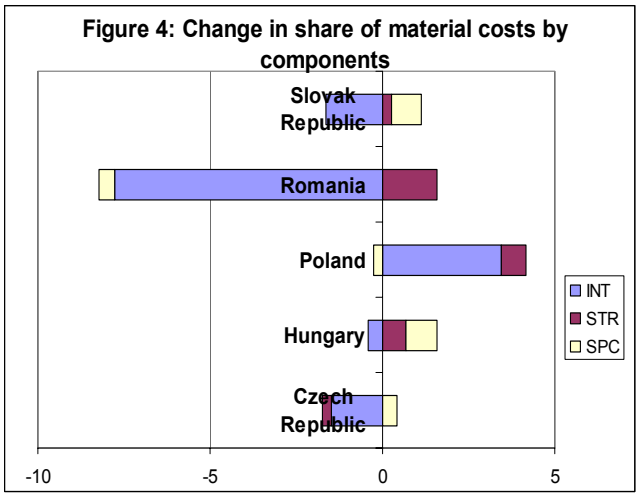
Country	Material costs				Wages & Salaries			
	Intra.	Struct.	Spec.	Total	Intra.	Struct.	Spec.	Total
Czech Republic	-1.50	-0.23	0.42	-1.31	1.34	0.21	-0.40	1.14
Hungary	-0.41	0.68	0.89	1.16	-1.37	0.02	-0.33	-1.69
Poland	3.45	0.70	-0.26	3.89	0.92	0.86	-1.32	0.46
Romania	-7.79	1.58	-0.43	-6.64	-1.98	-1.15	0.02	-3.12
Slovak Republic	-1.66	0.27	0.87	-0.52	1.21	0.37	-0.55	1.03
Country	**Investments**				**All costs**			
	Intra.	Struct.	Spec.	Total	Intra.	Struct.	Spec.	Total
Czech Republic	-0.63	0.08	-0.21	-0.76	-0.79	0.06	-0.19	**-0.93**
Hungary	0.10	0.39	-0.52	-0.03	-1.69	1.10	0.03	**-0.56**
Poland	1.67	-0.20	0.07	1.54	6.05	1.36	-1.51	**5.89**
Romania	1.81	1.84	-1.74	1.91	-7.96	2.26	-2.15	**-7.85**
Slovak Republic	0.05	0.05	0.00	0.10	-0.40	0.68	0.32	**0.61**

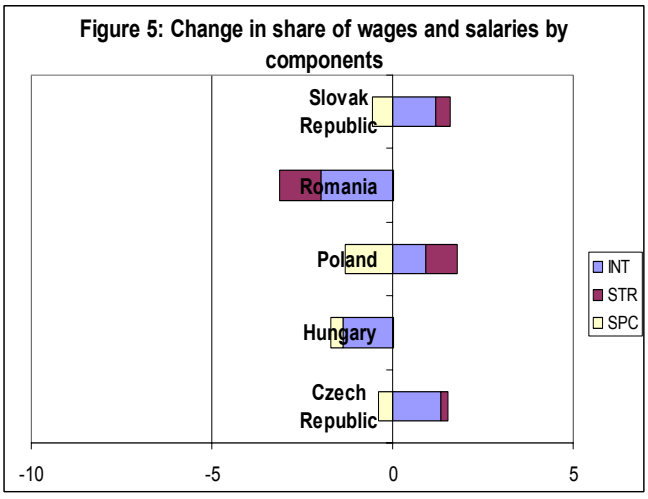
Table 3 and figures 4-7 show changes in individual costs by components. The net change in the share of material costs is largest in Romania (-7.79) and Poland (3.35) but with the opposite sign. The smallest net change in material costs has been in the Slovak economy. The dominant component in the change of material cost in all countries, except Hungary, is the intra-industry component or change unrelated to structural pattern. In Hungary, the structural and specialization components are dominant, which is quite compatible with other indicators, in particular trade and FDI, which show deep structural change in this economy (Hotopp et al., 2002).

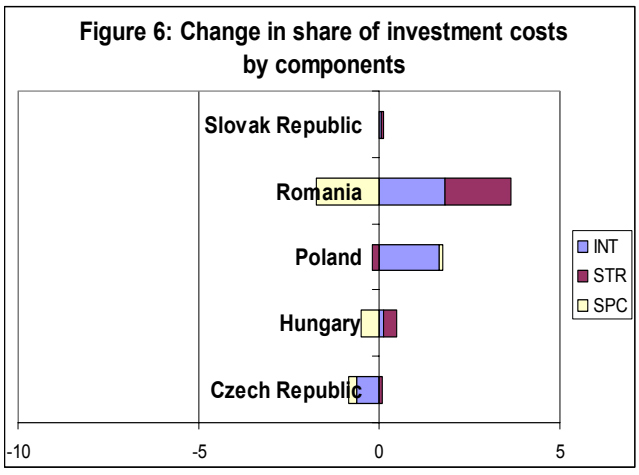
Changes in the share of wages and salaries and investments are of much smaller magnitude than changes in material costs. This may be expected given the high share of material costs when compared to wages and salaries and investment costs. In wages and salaries, the intra-industry component is the strongest for all countries, except Poland, where the change in the specialization component is the biggest. In Poland, shares of wages and salaries decreased in industries that increased their share in manufacturing. However, the other two components (intra-industry and structural) have been strong enough to compensate for this effect so that overall the share of wages

and salaries has somewhat increased. Changes in wages and salaries, similarly to material costs, have been the strongest in Romania. Beside the intra-industry based relative decline in wages and salaries there is a strong impact of a structural effect or decline in wages and salaries in industries that already have low shares of wages and salaries. In other countries, the dominant component is the intra-industry pattern where the share of wages and salaries changes independently of changes in industry structure.

Regarding costs of investments, Poland, and partly Czech Republic, are the only countries where in relative terms the intra-industry effect is the strongest. Unlike in other costs, where the intra-industry effect is the strongest, in investments the structural and specialisation components have affected the share of investment cost. However, the change of this cost is significant only in Romania (1.91) and Poland (1.54).







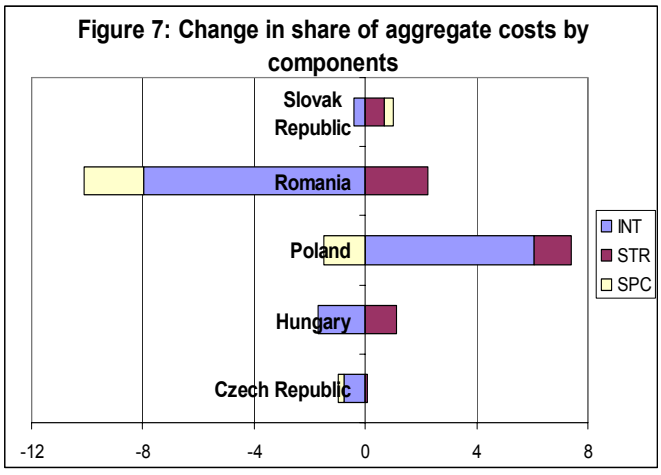
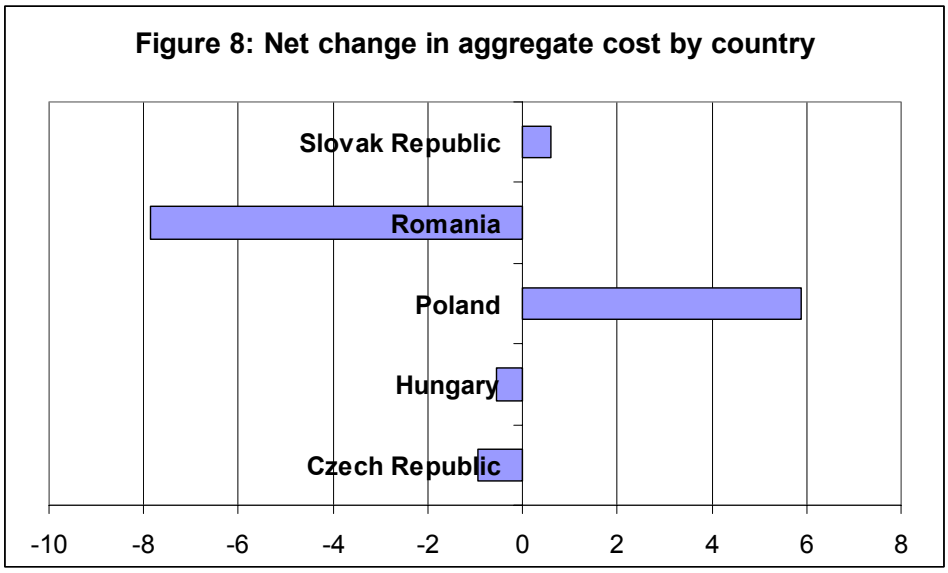


Table 3 and figure 7 show changes in individual components for the summed and weighted three costs. A large change in relative shares of material costs of Romania and Poland within industries has strongly affected the overall change in cost intensity. In these two economies, we find also the biggest change in structural and specialisation effects when compared to other countries. The relative importance of the structural component is the biggest in Slovakia, and then in Hungary, whereas it is the smallest in Czech Republic.



Poland, and marginally Slovakia, are the only countries where the share of aggregate costs has increased (table 8). Romania has the biggest change in costs in all three components. Overall, its share of aggregate costs has declined significantly but this can be attributed to material costs and wages and salaries while investments have increased their share. In Romania, the structural component has increased while others have declined (figure 7). The increase in the share of industries with high aggregate costs was too weak to compensate for the big decline of aggregate costs irrespective of the industry (intra-industry component) and decline of costs in industries whose share in the economy has increased (specialisation effect).

Overall, changes in the cost intensity show two different situations among the six CEECs.

i) Changes in cost structures in Romania and Poland are substantial while in the other three economies they are marginal. In the case of Romania, this may be a sign of substantial changes due to opening what was previously the most closed CEE economy. In Poland, an intensive change in its cost structure is most likely driven by the growth of the Polish economy during the 1990s. However, the direction of change between Poland and Romania has been the opposite. While the

Romanian economy has decreased the share of aggregate costs, the Polish economy has increased the share of aggregate costs in output. This may indicate problems for the long-term cost competitiveness of Polish economy, especially as the dominant component of change is the intra-industry component.

ii) Changes in Slovakia, Hungary and Czech Republic are significantly less intensive than in the other two economies. This relative lack of change in the cost structure may be due to costs and prices that are in line with the world market levels or, on the contrary, the sign of lagging adjustments in costs. Table 4 shows a strong structural component in changes of aggregate cost structure in Hungary, and balanced change across all three aggregate cost components for Slovakia. This would suggest that in these two economies the structural change has been relatively advanced. In Czech R, most dominant is the intra-industry component (76% of total change in aggregate costs in absolute terms, table 4). Despite a similar intensity of change in aggregate costs between these three countries, changes in their cost components are country-specific.

Table 4: Shares of individual components in total aggregate costs (based on absolute values)

	Intra.	Struct.	Spec.	Total
Czech Republic	**0.76**	0.06	0.18	1
Hungary	**0.60**	**0.39**	0.01	1
Poland	**0.68**	0.15	0.17	1
Romania	**0.64**	0.18	0.17	1
Slovak Republic	0.29	**0.49**	0.23	1

Our point of departure is the relationship between changes in the cost structure and macroeconomic regime. A high intensity of changes in cost structure would require accommodative macroeconomic policy. On the other hand, countries with the small changes in cost structures could afford tighter criteria for macroeconomic stability simply because they have less need to adjust their cost structures.

In this section, we measured the degrees of changes in cost intensity across the five CEECs. In the next section, we measure the degree of macroeconomic stability via a composite indicator with the aim to relate these two measures in section 6.

5. MEASURING STABILITY OF MACROECONOMIC REGIMES

Macroeconomic stability has been of paramount importance for the CEECs for several reasons. First, price stability is essential for the efficient process of reallocation of resources and filtering profitable from unprofitable products, firms and industries. Second, stability is important for attracting foreign capital, and for operating open trade regimes.

Macroeconomic stability is a complex notion and cannot be reduced to one variable, whether prices or exchange rates or budget deficits. The effects of macroeconomics on industry operate via the 'macroeconomic regime' or composition of different variables rather than via individual macroeconomic variables. Objectives to be achieved by individual macroeconomic variables are substitutable to some extent. For example, low inflation may be substituted by a high budget deficit or vice versa. An appreciating exchange rate may be substituted by a high current account deficit and vice versa. Macroeconomic stability could be achieved by a different portfolio (mix) of macroeconomic variables that form country-specific 'macroeconomic regime'.

In order to account for any substitutability of macroeconomic variables and to capture the overall degree of stability we construct a composite indicator of macroeconomic regime. In its construction we use the following macroeconomic variables: i) interest rate, ii) inflation, iii) ratio between purchasing power parities (PPP) and nominal exchange rate, iv) budget deficit, and v) current account. We construct the composite indicator for the macroeconomic regime for the CEECs based on the Ideal Point method of multi-criteria decision-making (MCD). The novelty of this indicator is that it enables us to capture two components of the macroeconomic regime.

First, it represents the aggregation of five single indicators (interest rate, inflation, exchange rate, budget deficit, and current account) into one aggregate indicator. Second, it enables us to measure the distance of an individual country in a specific year from the ideal state or 'reference country'. The 'reference country' is a state where interest rate, inflation, budget deficit, and current account deficits are zero and where the difference between nominal and PPP based exchange rates is also zero. Annex 10 explains the logic and arithmetic behind the Ideal Point MCD method.

Figures 9 and 10 plot the actual values of the composite indicator of macroeconomic stability for individual CEECs including Russia and the Ukraine. Figure 11 plots the values of this indicator for the group of five CEECs for which we have data on costs at industry level. Figure 12 plots values for the group of all CEECs including Russia and Ukraine. In order to improve readability of

data, figures 13 and 14 plot values for the same countries' groups but on a logarithmic scale. Annex 11 gives numerical values of the composite indicator of macroeconomic stability for all CEECs, including Russia.

Figure 9 shows differences across countries in the overall macroeconomic stability for five CEECs. The Czech Republic had a relatively high but continually decreasing value of the composite indicator throughout the 1990s. Hungary had the most stable macroeconomic regime during the 1990s with the composite indicator hovering continuously around 1. Hungary is also the only country that did not experience any short burst of aggregate macroeconomic instability during the early 1990s, as did all other CEECs. Slovakia experienced a short burst in the overall instability in 1991, which was followed by a stable macroeconomic regime or the lowest distance of the value of the composite indicator of macroeconomic stability from the 'reference country'.

After strong instability in 1990, Poland managed to continually improve overall macroeconomic stability. Romania's overall instability was very high during most of the 1990s. Values of the composite indicator continued to be high even during the second half of the 1990s, a period in which other CEECs significantly improved.

Figure 10 shows the situation in the other six CEECs, including Russia and Ukraine, for which we do not have enough detailed data on changes in cost structures. Bulgaria had high overall instability, which culminated in its 1997 macroeconomic crisis when the value of the composite indicator shot up to 5 points above the ideal point. This was followed by setting up the currency board and reducing the overall degree of macroeconomic instability to levels below Romanian but above central European economies.

Croatia's overall macroeconomic stability is close to Slovak levels. However, the macroeconomic stability of Croatia was achieved only after 1994, with the macroeconomic stabilisation programme, introduction of a new currency and full current account convertibility.

Slovenia has a significantly lower degree of overall macroeconomic stability when compared to Croatia or Slovakia. However, Slovenia is continuously improving its macroeconomic stability.

Macedonia, Russia and Ukraine had very similar patterns of overall macroeconomic (in)stability with periods of very strong instability between 1992 and 1994/5 which were then followed by improved overall macro-stability. While Macedonia has reduced the overall macroeconomic

instability to very low levels, which are similar to those of Czech R, Russia and Ukraine continued to have the highest levels of overall macroeconomic instability at the end of the 1990s.

Figures 11 and 12 show differences among countries in the value of the overall composite indicator. Figure 11 clearly shows differences between Romania, at one extreme, and Slovakia, at the other, with Poland, Czech R and Hungary in between. Hungary has the most consistent macroeconomic regime. Figure 12 plots all eleven CEECs, including Russia and Ukraine. This figure clearly shows the difference between Russia and Ukraine, and central European countries with the relatively high degree of overall macroeconomic stability.

Figures 13 and 14 show changes in the distance of the composite indicator of the macroeconomic stability for individual CEECs including Russia and Ukraine on a logarithmic scale. By magnifying differences between countries, we more easily discern patterns over time. Figure 13 shows very small variations of value of the indicator for Hungary, a declining but relatively high value for Czech Republic when compared to Poland, and especially Slovakia, which exhibits the strongest overall macroeconomic stability. Romania shows a declining but very high degree of macroeconomic instability when compared to central European countries in figure 13.

Figure 14 shows indicator values for all eleven CEECs including Russia and Ukraine on a logarithmic scale. Differences between bursts of macroeconomic instability of Bulgaria, Macedonia, Ukraine, and Russia, when compared to central European countries become clearly visible. Romanian instability in this group of countries no longer seems so dramatic. A strong shift between periods of macroeconomic stability and instability becomes very discernible in the case of Croatia as well as the very stable macroeconomic regime of Slovakia. Levels of overall macroeconomic stability in Hungary, Czech R and Poland are medium when compared with, on the one hand, Russia and Ukraine and, on the other hand, Croatia and Slovakia.

Figure 15 plots the relationship between the stability of macroeconomic regimes expressed as the coefficient of variation of distances from the ‘reference country’ and the average tightness of macroeconomic regime or its distance from the ‘reference country’. There is a positive relationship between these two variables, i.e. macroeconomic regimes that vary are on average also looser. Ukraine is the country with by far the loosest macroeconomic regime. Variation of this regime is also the highest but not as extreme as its average distance from the absolute stability situation. Croatia, Macedonia and Russia have the biggest shifts in their macroeconomic regimes, which resulted in on average relatively loose macroeconomic regimes. Contrasting with them, Romania

has a similarly loose macroeconomic regime but which has not been subject to radical changes as has been the case in Croatia and Macedonia. Bulgaria has on average a similar degree of looseness as Romania, Croatia and Macedonia but the intensity of changes in macroeconomic regime has been in between these two extremes.

Central European economies have all recorded on average tighter macroeconomic regimes than other CEE countries. Differences among them range from Hungary as the country with smallest variation in macroeconomic regime and its average tightness, and Poland, which experienced the biggest change but maintained on average a disproportionately tighter macroeconomic regime.

Our measure of the stability of macroeconomic regimes has confirmed general intuition on individual countries and is compatible with data on individual macroeconomic variables. By synthesizing five indicators and by plotting the progress of countries over time we have managed to compress quite a complex aspect of macroeconomics into a single indicator. However, our composite indicator of the overall stability of macroeconomic regime merely synthesizes the description of the situation. It cannot tell us anything about whether the achieved levels of macroeconomic stability are sustainable, appropriate or incompatible with the degrees of structural change, in particular whether they can accommodate differences in the intensity of changes in costs across different countries. In the next section we link the composite indicator of macroeconomic (in)stability with the changes in cost structures.

Figure 9: Changes in distance of the composite indicator of macroeconomic stability for individual CEECs

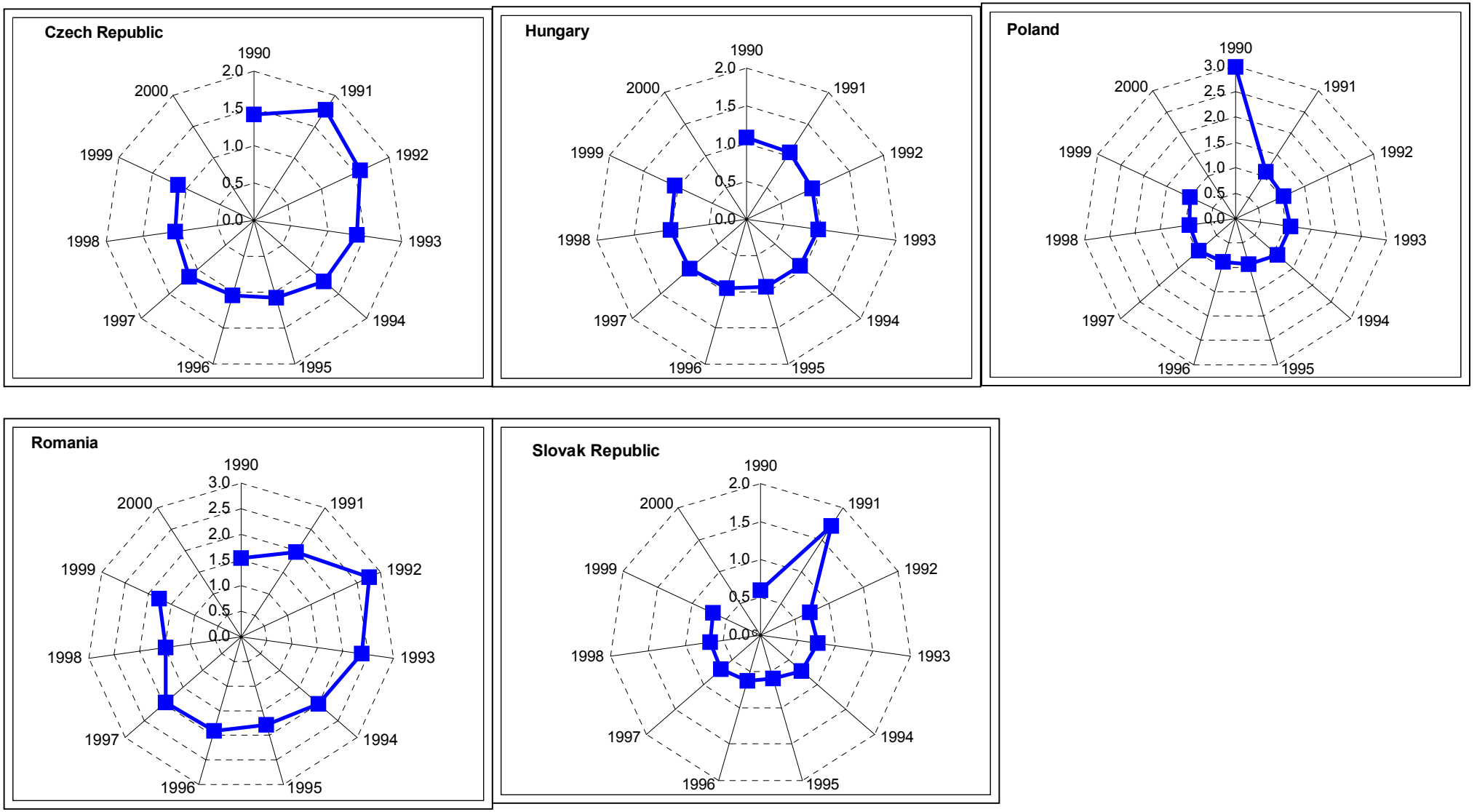


Figure 10: Changes in distance of the composite indicator of macroeconomic stability for individual CEECs including Russia and Ukraine

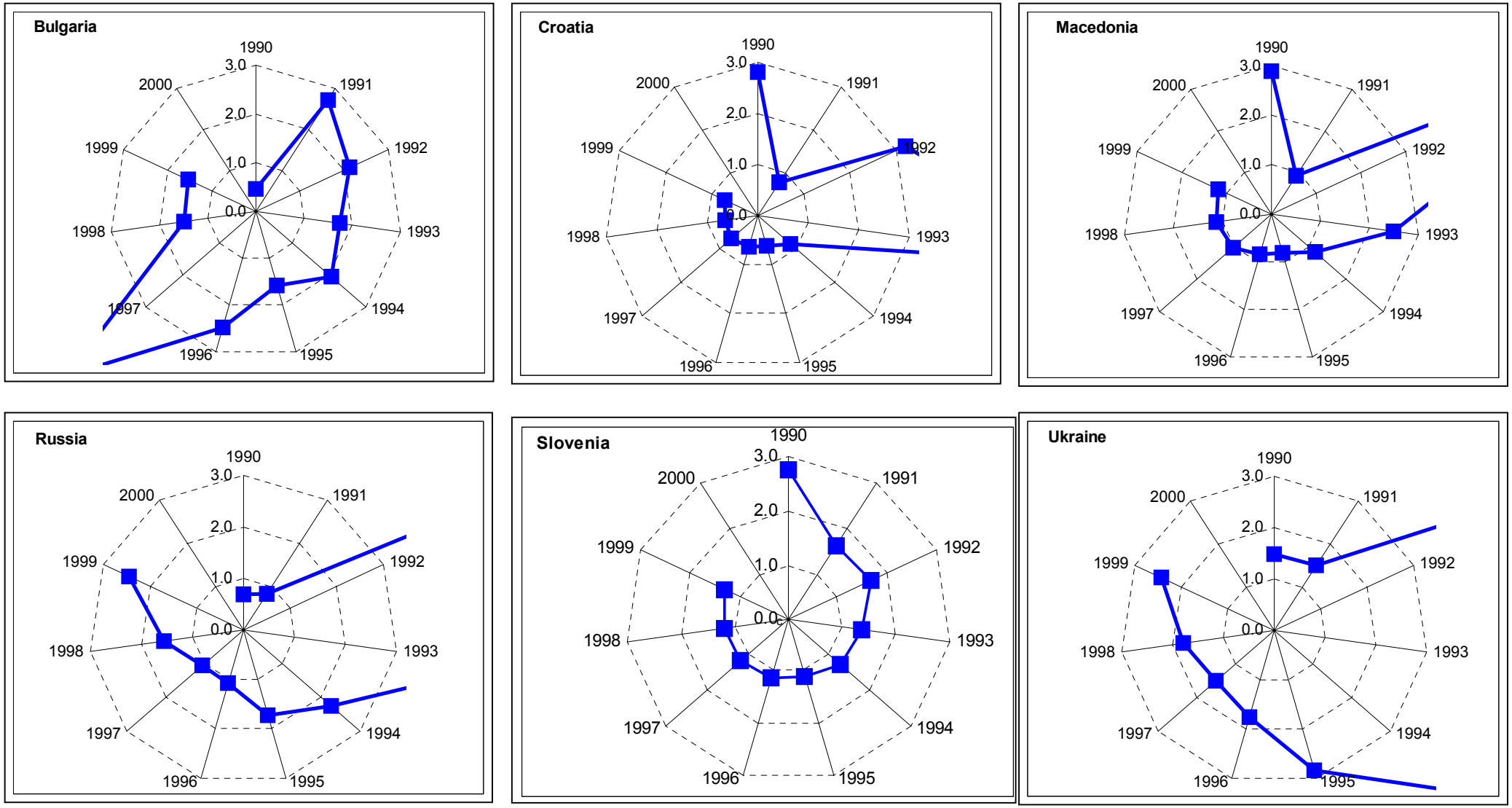


Figure 11: Changes in distance of the composite indicator of macroeconomic stability for the group of CEECs

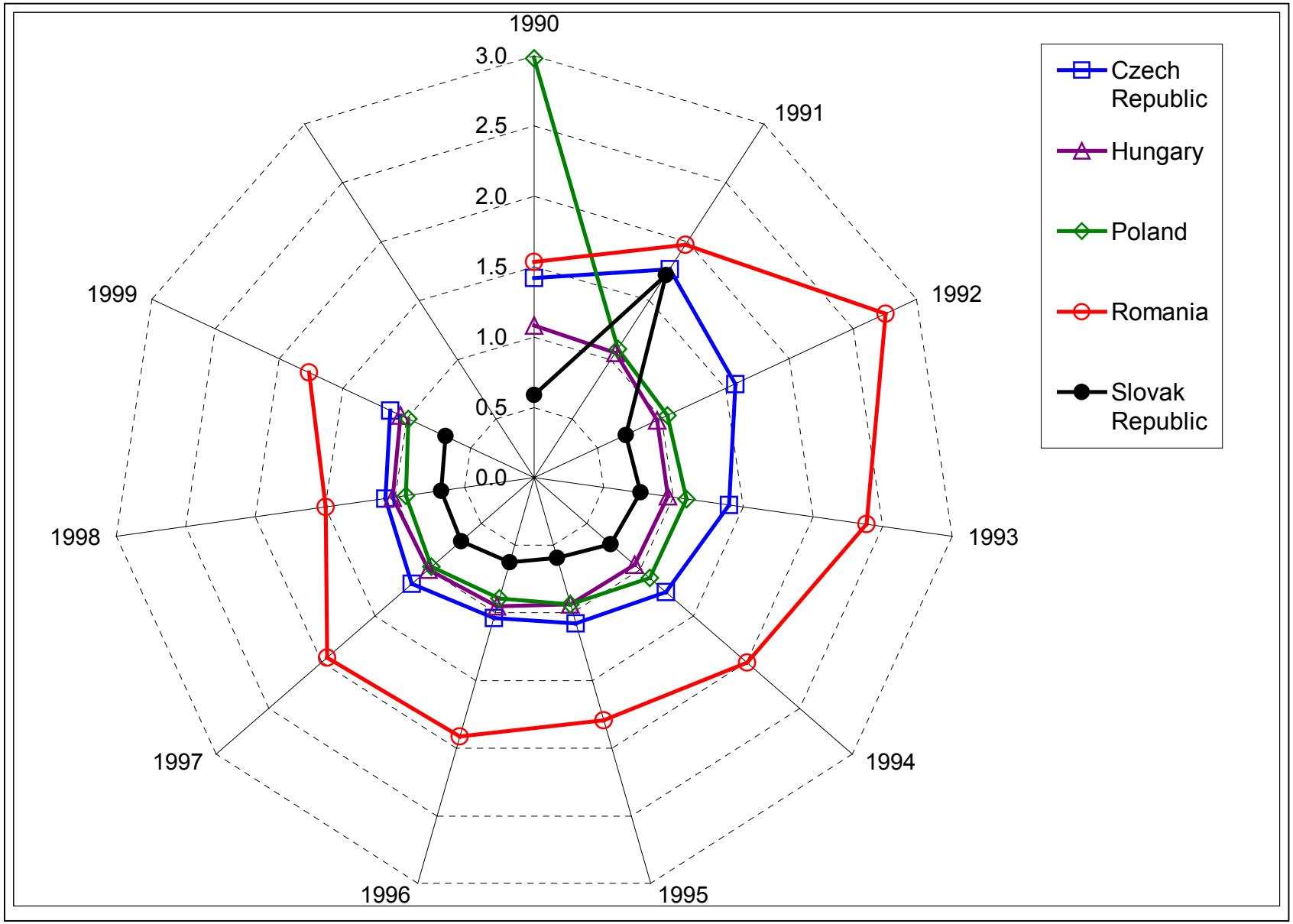


Figure 12: Changes in distance of the composite indicator of macroeconomic stability for group of the CEECs including Russia and Ukraine

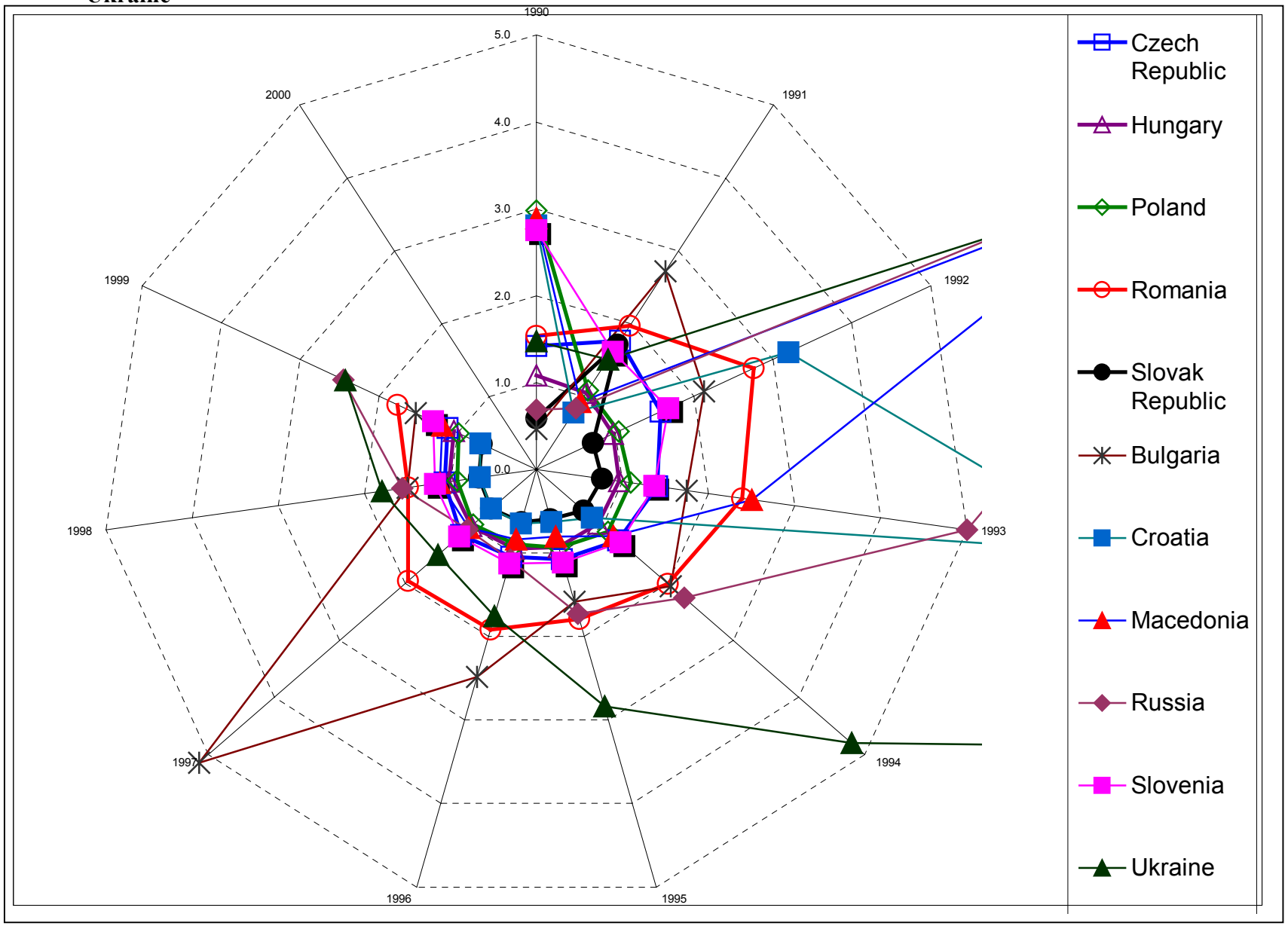


Figure 13: Changes in distance of the composite indicator of macroeconomic stability for individual CEECs (logarithmic scale)

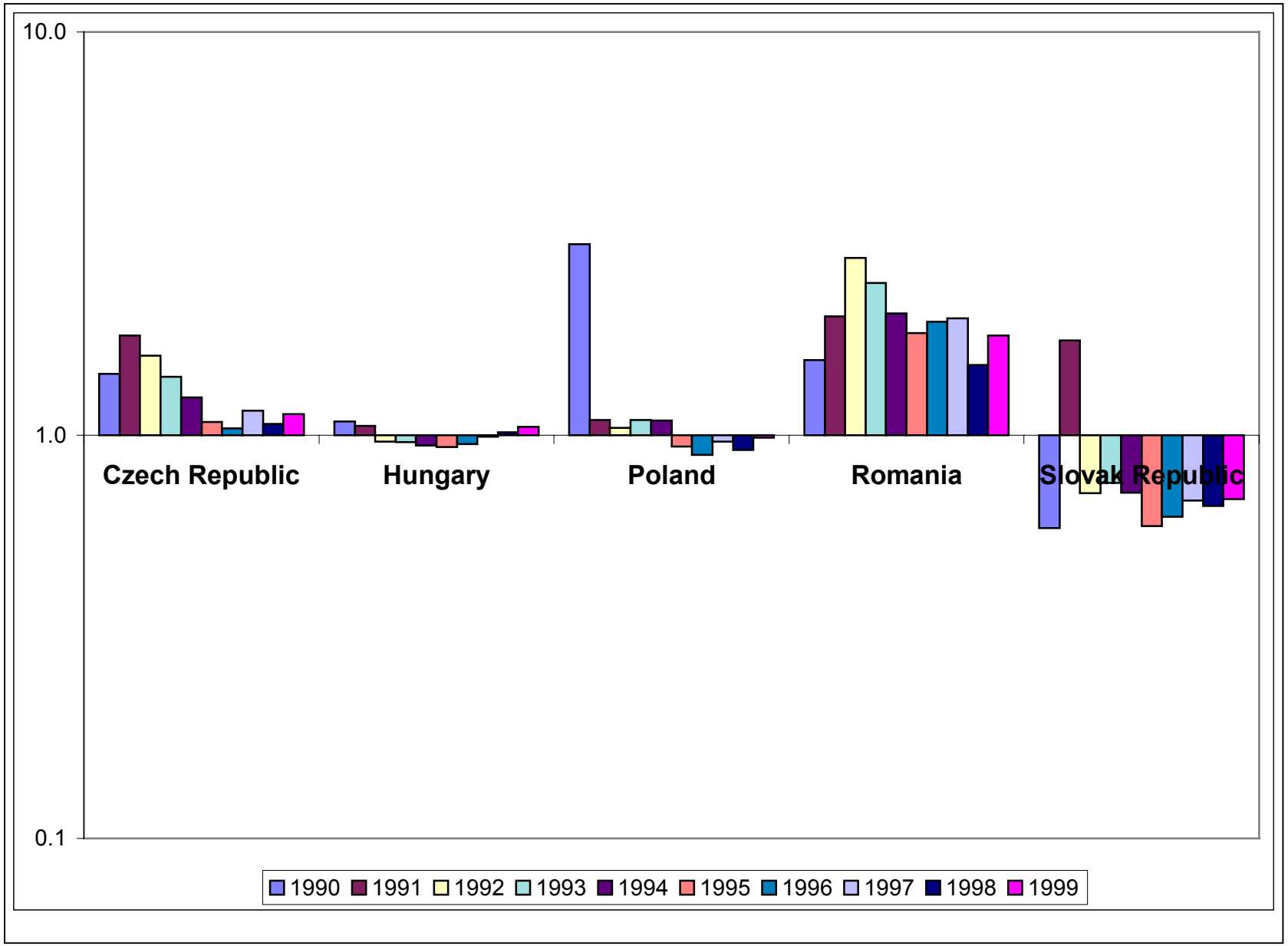


Figure 14: Changes in distance of the composite indicator of macroeconomic stability for individual CEECs including Russia and Ukraine (logarithmic scale)

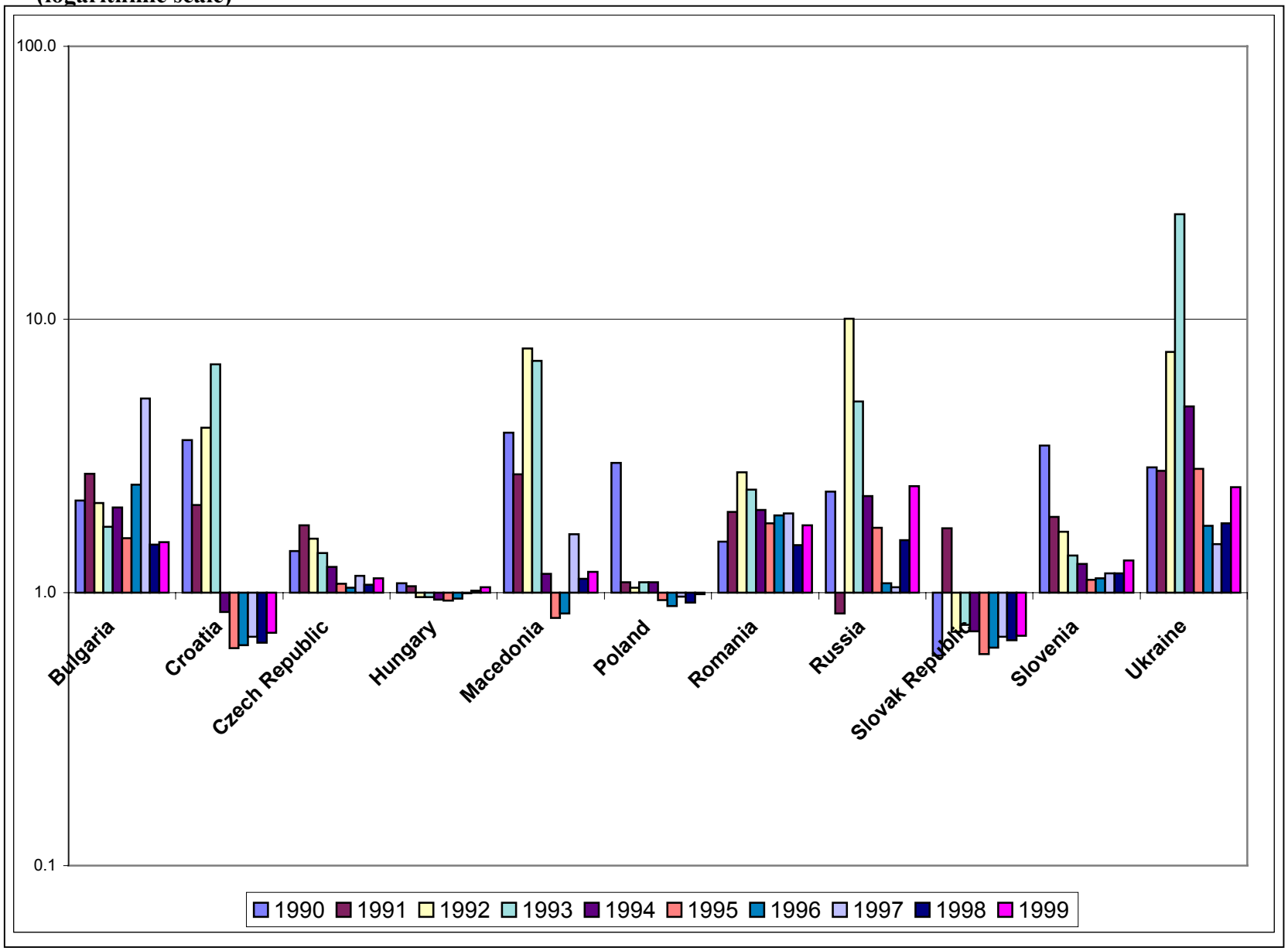
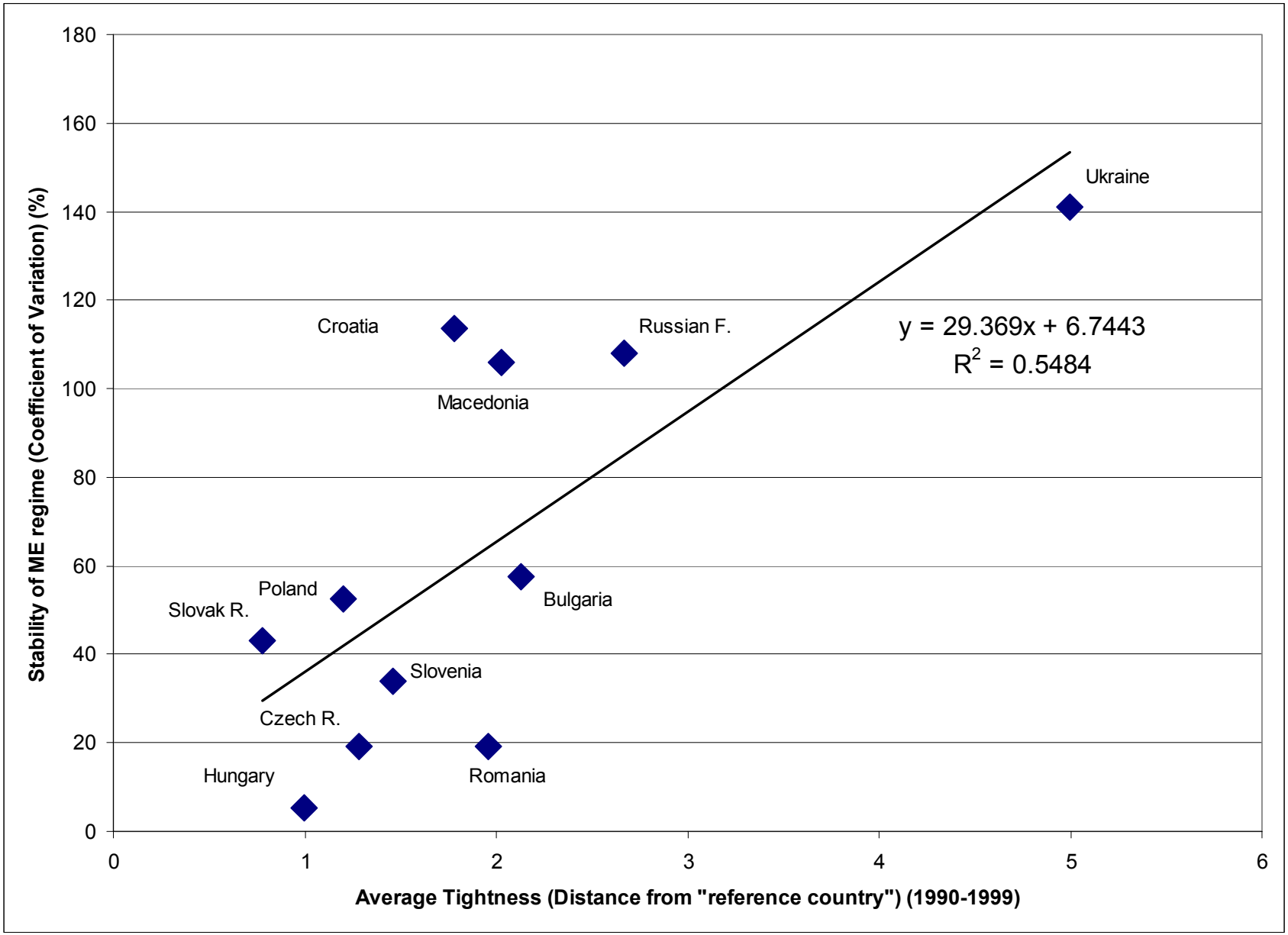


Figure 15: Relationship between the stability of macroeconomic regimes and their average tightness for the group of CEECs



6. THE RELATIONSHIP BETWEEN MACROECONOMIC REGIME AND INTENSITY OF CHANGES IN COST STRUCTURES

Macroeconomic stability has its macroeconomic as well as micro-economic determinants. However, in macroeconomic policy micro-factors are usually not taken into account due to complexities of linking micro and macro processes. In particular, macroeconomic policy has difficulties in capturing the macro-economic effects of structural change like technical change or changes in profitability and competitiveness at an industry level. These changes emerge at the macro level with delay and coupled with a variety of cyclical factors, which makes it difficult to isolate the role of structural factors.

Structural change in the CEECs is a rare example of deep structural change. A combination of deep IT driven structural change and the introduction of EMU is another such challenge for macroeconomic, in particular monetary, policy. In such situations we can observe deep changes in terms of prices and even more important in terms of costs. Unlike changes in prices, changes in costs are relatively more difficult to discern and derive their macroeconomic implications.

A strong change in shares of individual costs across a large number of industries would suggest that there is deep structural change taking place. In section 4, we measured the degree of change in material costs, wages and salaries and investment costs across five CEECs. In this section, we relate the aggregate indicator of the intensity of cost changes and the composite indicator of macroeconomic stability. We assume that there is a relationship between the macroeconomic regime and the degree of intensity of change in costs. Tighter macroeconomic regimes are suitable for situations where changes in the cost intensity are smaller. When change in the cost structure is intensive, the macroeconomic policy should accommodate this change. We assume that the macroeconomic regimes most conducive to deep changes in industry and cost structure are those of an 'accommodative' type, i.e. those that have managed to combine the need for macroeconomic stability with need to promote structural change. We should bear in mind that the tightness of macroeconomic regime in this case cannot be equated with the tightness of monetary policy. The tightness or accommodating character of a macroeconomic regime is an umbrella term for the final effect of diverse policy mixes or portfolios of the most important macroeconomic variables (current account and budget balances, prices, exchange rates and interest rates).

Figure 16 relates changes in the aggregate cost intensity to changes in the average distance from the 'reference country'. We plot countries based on absolute values of indicators and thus focus on the relationship between intensity of change in the cost intensity and distance from the 'reference country'. Our five countries get grouped into three groups.

Slovakia, Hungary and Czech R. have relatively small changes in cost intensity when compared to Poland and Romania. The macroeconomic regime, in terms of average distance from the 'reference country', seems to have been compatible with the intensity of changes in cost structures in Slovakia, Czech R. and Hungary. Although there are differences in the overall stability of the macroeconomic regimes between the three countries, it seems that all three share structurally similar features, i.e. low change in cost intensity. Changes in their cost structures were comparatively much less intensive than changes in the Polish and, in particular the Romanian economy. Such a structural situation has enabled these countries to pursue relatively stable macroeconomic regimes.

On the other hand, the intensity of changes in costs in Romania has been comparatively much more intensive than in Slovakia, Czech R and Hungary. Hence, strong structural change in profitability and competitiveness of its industry would require a looser macroeconomic regime, which has to accommodate much deeper change in the cost structure than was the case in the three central European economies. Whether Romanian macroeconomic policy was right or wrong during the 1990s is secondary here. What figure 16 suggests is only that the macroeconomic policy of Romania had to accommodate a much deeper structural change in cost intensity than was the case in central Europe.

The Polish economy also faced very intensive change in its cost structure. These changes have not been so large as in Romania but were much more intensive than has been the case in Slovakia, Hungary and Czech Republic. However, this intensive change in the cost structure has been accommodated within the macroeconomic framework of similar stability to the other three central European economies, which have experienced much smaller changes in the cost structures. Figure 16 does not tell us what is the proper relationship between changes in the cost intensity and the overall macroeconomic stability but only that there are differences between countries. If we had data for a large sample of countries, it would have been possible to find out the functional form of this relationship.

Based on a comparison of Poland with three central European economies we can only hypothesize that the Polish macroeconomic regime does not seem sustainable given the intensity of changes in its cost structure. An alternative hypothesis would be that changes in the cost structures of Slovakia, Hungary and Czech R are too small for the given degree of overall macroeconomic stability, which would suggest that these countries are lagging behind in restructuring. However, this latter hypothesis seems much less plausible at least in the case of Hungary, given its profound structural change in exports and industry structure.

Figure 17 shows changes in the aggregate cost intensity and changes in the average distance from the 'reference country' but in relative terms. The Romanian adjustment in costs led to the overall net decline of the share of aggregate costs in output while the Polish adjustment has actually increased the share of aggregate costs in output. Provided that overall taxation, as the main remaining cost in turnover, has not changed then the cost competitiveness of the Romanian economy has improved while the cost competitiveness of the Polish economy declined[7]. Alternatively, we could hypothesize that given the intensity of changes in its cost structure the Polish macroeconomic regime may have difficulties in accommodating structural change. Hence, we could hypothesize that despite a stable macroeconomic regime, changes in the cost structure of the Polish economy are sign of its deteriorating cost competitiveness.

This first hypothesis may be true only as long as the change in the cost structure is predominantly intra-industry based but not if it is structural, i.e. driven by changes in the shares of industries. Table 4 and figure 18 show that this is the case in four out of the five CEECs, including Poland. In the four economies, excluding Slovakia, the share of the intra-industry component in the overall cost aggregate is 60-76%. In the Slovak economy, the most significant element is the structural component with a 49% share. This suggests that changes in the cost intensity are due to changes in the share of industries rather than to shares of changes of costs in output.

Figure 17 shows that change in the cost intensity of Slovakia has the opposite sign to Hungary and Czech R. However, the increased share of aggregate costs in the Slovak economy does not seem to be a cause for concern given that the dominant effects on changes of aggregate cost are structural (increased share of industries with high share of aggregate costs) and specialization effect.

[7] This conclusion is quite in line with the analysis of Kubielas (2002) on structural change and innovation in the Polish economy.

Figure 19 plots the relationship between the stability of macroeconomic regimes expressed as the coefficient of variation of distances from the 'reference country' and the intensity of changes in cost structures. The two countries with the biggest shift from loose to tight macroeconomic regimes are Poland and Slovakia. However, unlike Poland this shift in the case of Slovakia does not seem to be problematic as the change in aggregate cost intensity in Slovakia is very low. Romania's macroeconomic regime has changed relatively little in terms of tightness when compared to Poland and Slovakia but its change in costs is the most intensive. Czech R, and especially Hungary, have experienced small changes in cost intensity but also very small shifts in the stability of the overall macroeconomic regime.

Figure 20 shows changes in macroeconomic regime and in aggregate cost intensity during the 1990s[8]. In all countries, except Poland, the share of aggregate costs declines while in Poland it has increased. Patterns of relationship between these two variables are country-specific. Romania has the highest range of changes in both macroeconomic regime and in cost intensity. This is clearly represented in figure 21, which plots ranges in both variables in absolute terms. Among central European economies, Poland has the highest change in cost intensity but a similar change in macroeconomic regime. For the given range of change in cost intensity Poland has a small range of change in macroeconomic regime (see figure 21). Hungary has the smallest changes in both macroeconomic regime and cost intensity (figure 21).

The relationship between the macroeconomic regime and changes in cost structure, which is presented in figure 20, contains the impact not only of the structural component but also of the cyclical component, i.e. short and medium-term demand and supply fluctuations. These two factors affect jointly the macroeconomic regime and are affected by the macroeconomic adjustments. Especially, in the short term (2-3 years) this causes erratic behaviour of the curves in figure 20. However, in the long run it is more likely that the impact of structural change predominates over cyclical factors. This can be presented as a net effect or the range of changes in both variables. Figure 21 shows the range of changes in cost intensity and changes in macroeconomic regime. Despite the annual fluctuations in figure 20 we see that there is a country-specific relationship between these two variables, which reflects the relationship between structural features (cost intensity) and macroeconomic regimes.

[8] **Figure 20** plots only available but not estimated data as in other tables and figures. Hence, periods for different countries are different, depending primarily on the availability of data for costs.

Figure 16: Changes in aggregate cost intensity and changes in average distance from reference macroeconomic stability (absolute values)

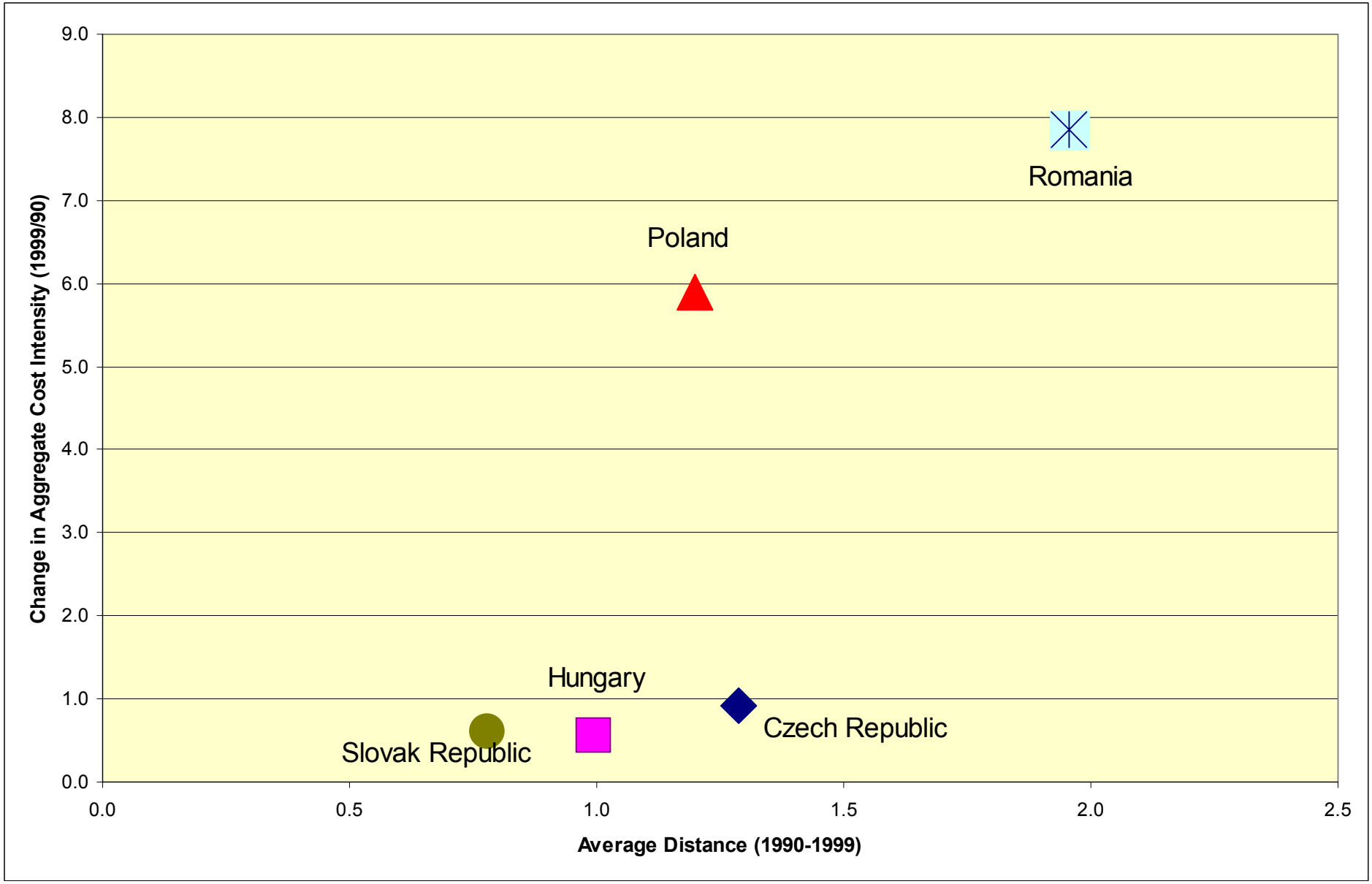


Figure 17: Changes in aggregate cost intensity and changes in average distance from reference macroeconomic stability (relative values)

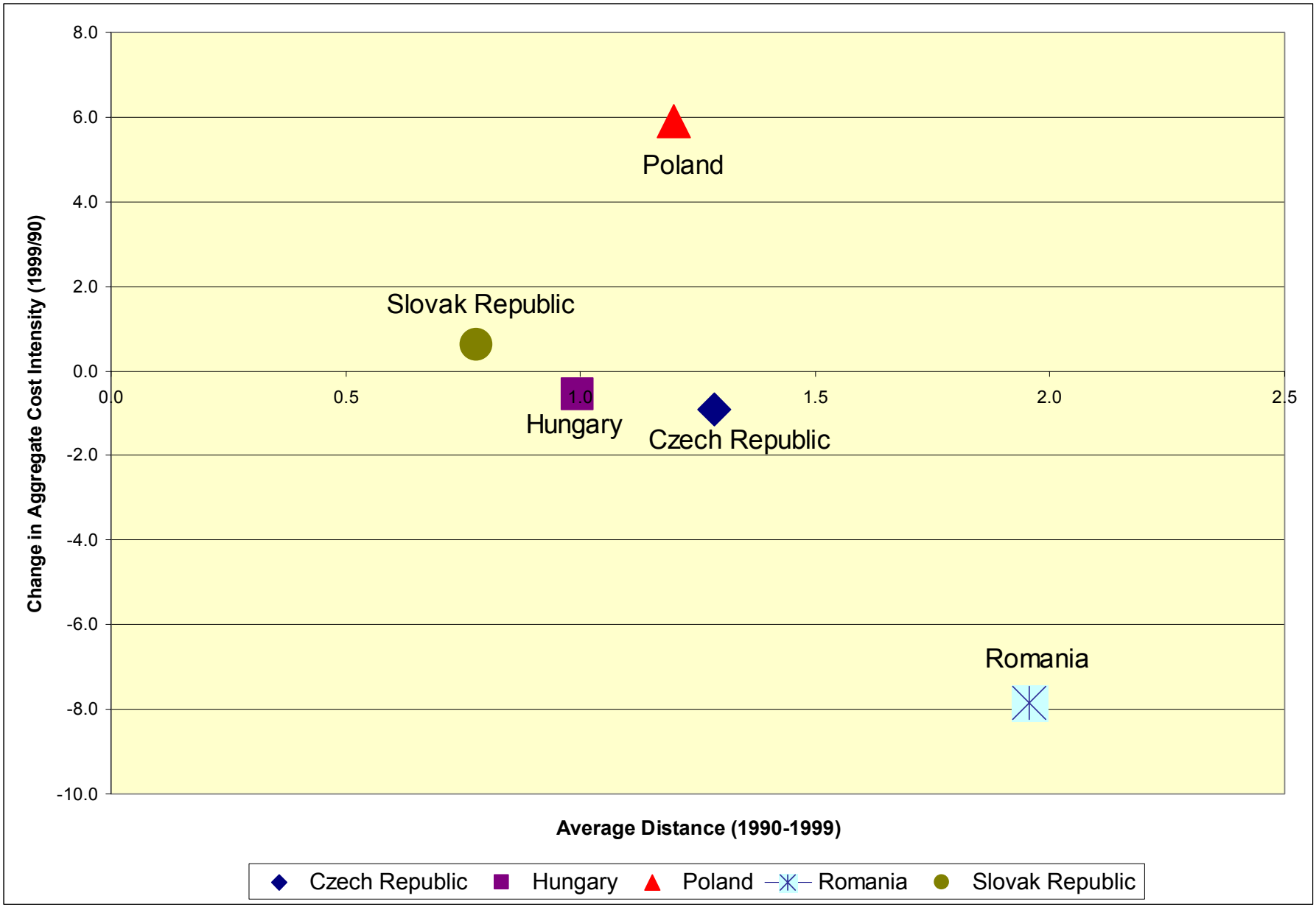


Figure 18: Changes in aggregate cost intensity by components and changes in average distance from reference macroeconomic stability (absolute values)

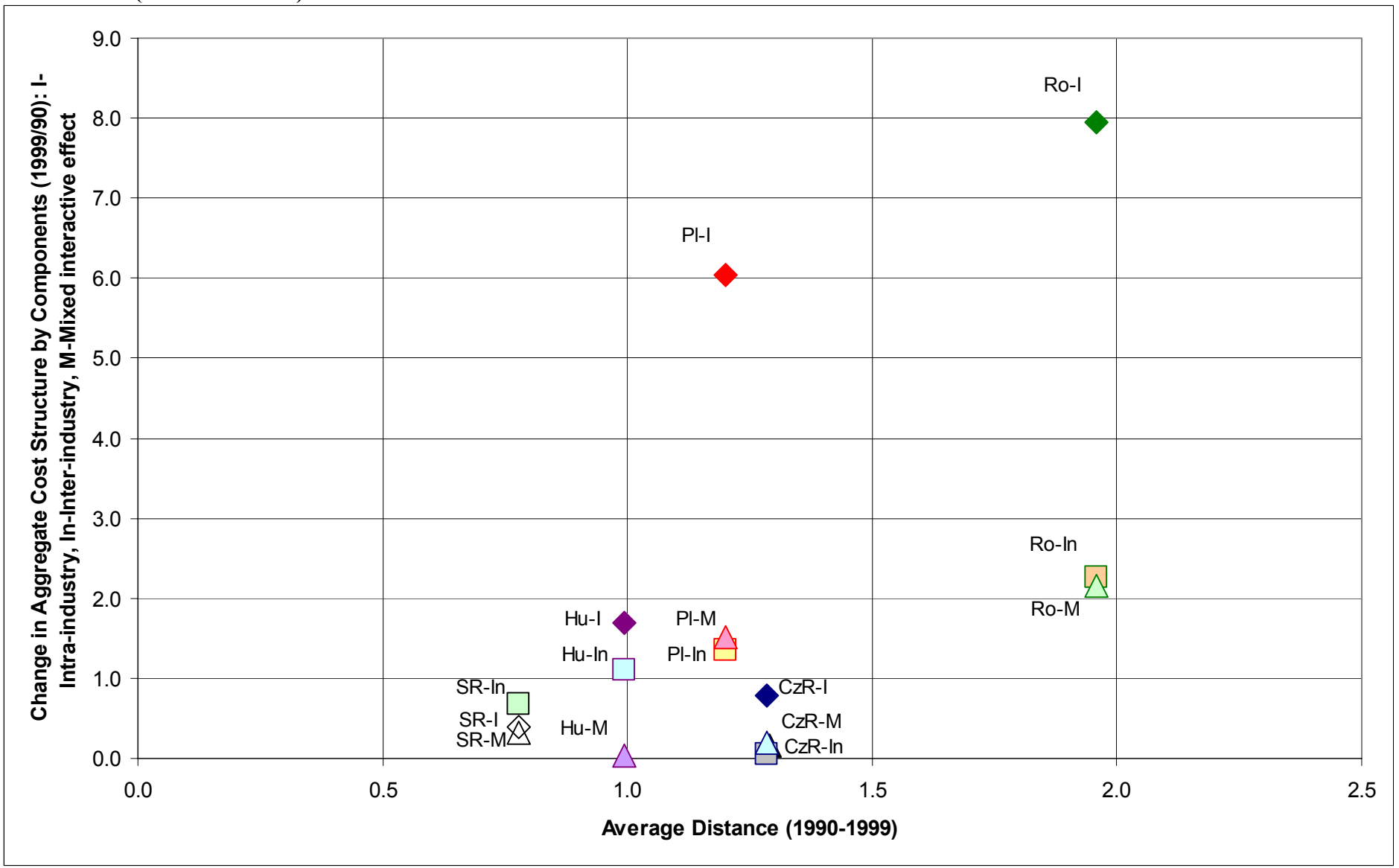


Figure 19: Relationship between the stability of ME regime and the intensity of change in cost structures

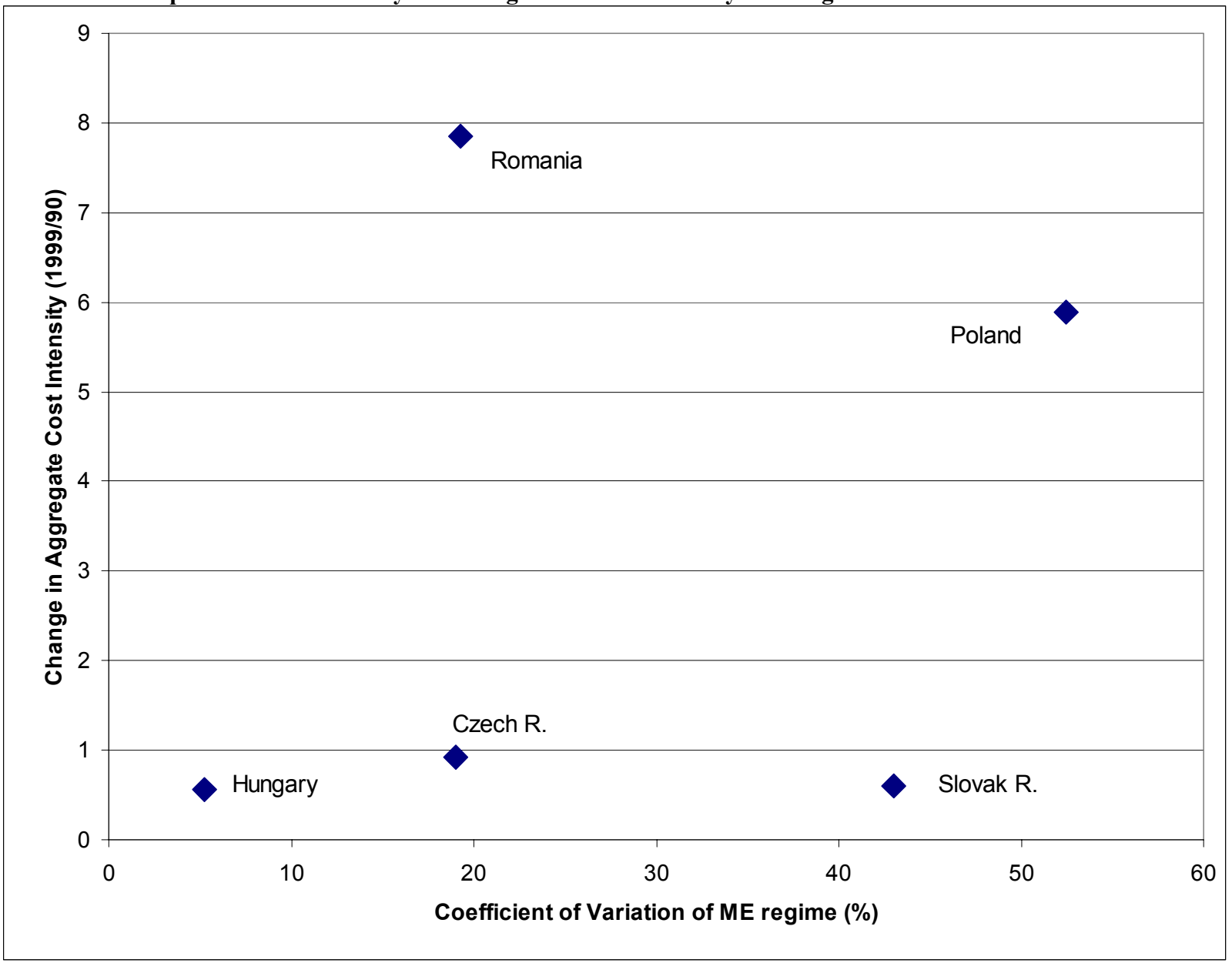


Figure 20: Changes in aggregate cost intensity and change in macroeconomic regime

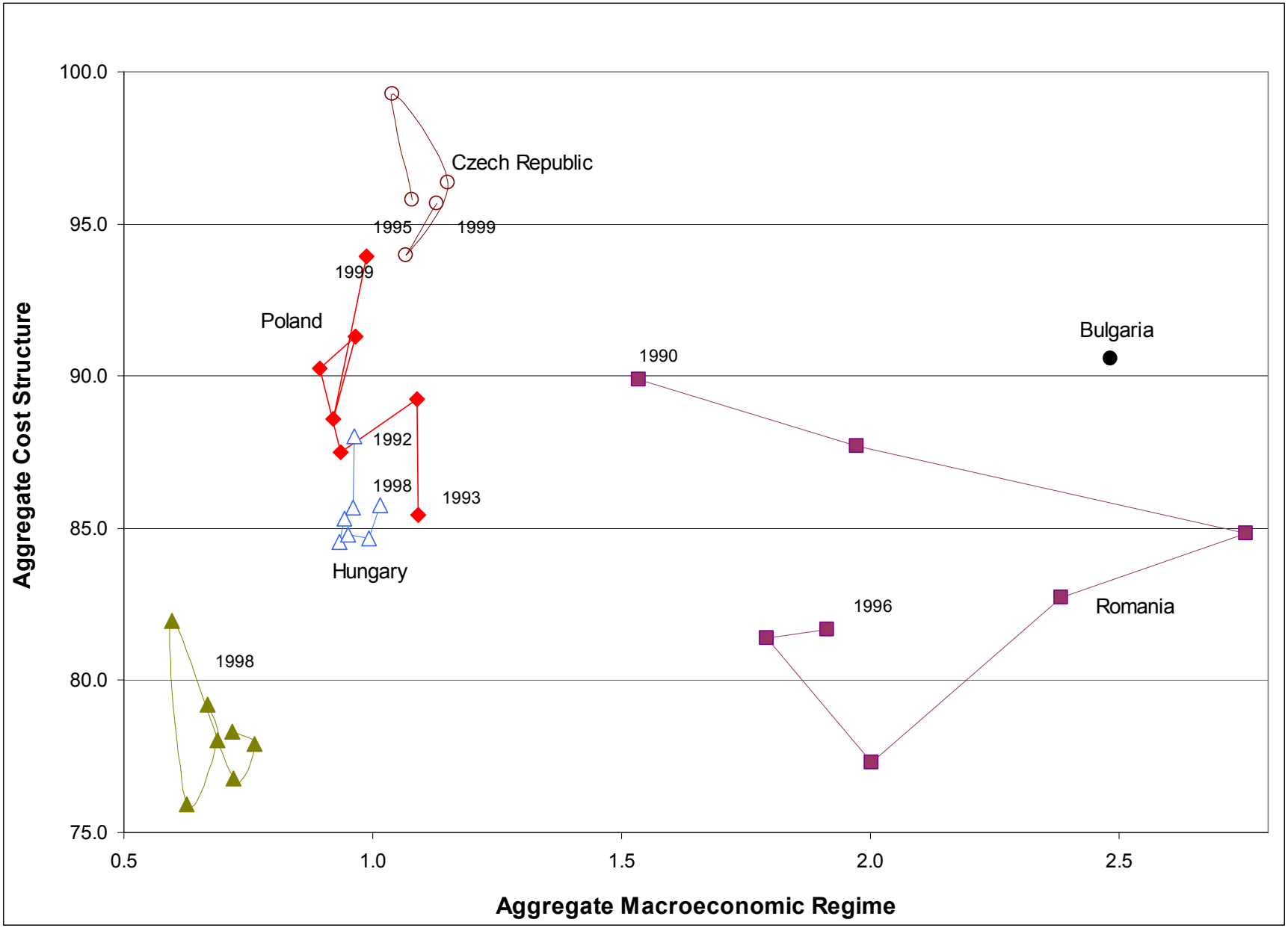
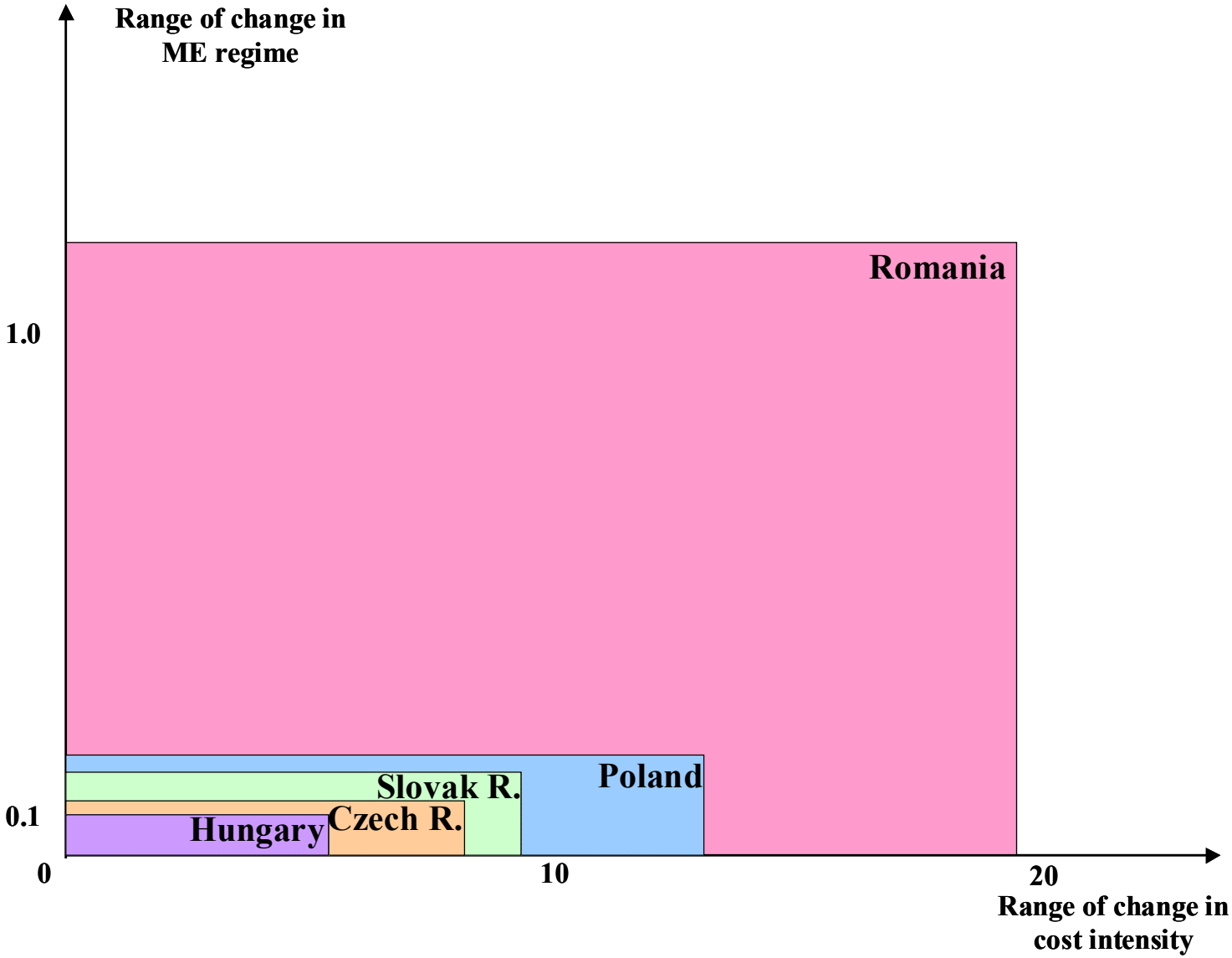


Figure 21: Range of change in macroeconomic regime and in cost intensity



7. CONCLUSION

We explored the relationship between the macroeconomic regimes and the intensity of change in the cost structures. Change in the cost structure can be considered as a structural factor, which may strongly affect macroeconomic policy and *vice versa*. The importance of change in the cost structure for macroeconomic policy has been recognised through IT-based technical change. In this paper, we explored the relationship between changes in the cost structure and the macroeconomic regimes in the case of the CEECs. These economies have experienced large-scale changes in competitiveness of their industries, which have been accompanied by different degrees of changes in their cost structures. Our analysis was based on data for three costs (material costs, wages and salaries, investments) for which data are available at the industry level for the six CEECs.

We showed that the cost structures within industries are more homogenous than the cost structures within countries. When cost structures are more industry- than country-specific this fully justifies the exploration of industry aspects of macroeconomic policies. Similar macroeconomic polices will have different sectoral (industry) and then overall growth effects. A successful macroeconomic policy would have to take explicitly into account the underlying industry structure, and in particular, the intensity of changes in costs.

We calculated the aggregate indicator of changes in cost for each of three costs as well as three major components of change (intra-industry, structural, and specialisation component). Analysis of changes in costs and their components show strong change in the cost intensity of Poland and Romania, on one hand, and the low intensity for Hungary, Czech R and Slovakia, on the other. The predominant component is the intra-industry or change in costs, which affects all sectors equally. Only in Hungary and Slovakia is the relative share of structural component significant. The share in aggregate costs has increased in Poland, and marginally for Slovakia, and decreased for the other four economies.

In order to establish the relationship between changes in the cost structure and the macroeconomic regime we constructed a composite indicator of the macroeconomic regime based on the Ideal Point multi-criteria decision-making method. This indicator is based on five macroeconomic variables (interest rates, prices, current account deficits, budget deficits, and ratio between PPP and nominal exchange rates). This indicator synthesizes the overall state of the macro economy by allowing for mutual substitutions between different variables, and assumes that what

matters is the overall policy mix or the relationship between each of the five variables. We also plot the state of overall macroeconomic stability in terms of the distance from the ideal state for eleven CEECs for the period between 1990 and 1999.

All CEECs have a clear trend towards increased macroeconomic stability. However, the levels and dynamics differ across individual countries. Within the group of six CEECs for which we have detailed data on their cost structures at the industry level, there are differences between Romania, on the one hand, and Poland, Slovakia, Czech R, and Hungary, on the other, in terms of degree of stability of their macroeconomic regimes.

The relationship between the composite indicator of macroeconomic regime and changes in the cost intensity for these countries shows three different situations. For Hungary, Czech R and Slovakia, low intensity of changes in costs is accompanied by a high degree of overall macroeconomic stability. For Romania, a very strong intensity of changes in costs is accompanied by the overall weak macroeconomic stability during the 1990s. For Poland, the high intensity of changes in costs is accompanied by a high degree of overall macroeconomic stability. The Polish pattern is distinctively different from the other two patterns and indicates either a too tight macroeconomic regime or, given the increasing share of aggregate cost in output, problems in its cost competitiveness.

This paper is exploratory in character; it is based on a limited number of countries and limited sets of data on costs. This has prevented us from econometrically testing the relationship between cost intensity and changes in macroeconomic regime. Despite these limitations, the paper, through changes in cost intensity, establishes the relationship between the structural factors and macroeconomic regime in the case of the CEECs.

The exploration of the relationship between the structural factors and the macroeconomic regime is important in periods of deep technical change, which change the cost structure of the economy.

Implicitly our approach assumes that macroeconomic policy should take into account the relationship between macroeconomic stability and the intensity of change in costs. This issue is of great relevance for the accession process, where nominal convergence criteria are often pursued irrespective of the underlying structural factors. We consider that the change in cost structures is one of the indicators which should be taken into account when considering the appropriateness of

nominal convergence criteria for individual countries. In addition, our methodological framework can be used for exploring the relationship between macroeconomic policy and technical change in other countries.

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ANNEX 1: SHARE OF MATERIAL COSTS IN OUTPUT: BULGARIA, CZECH REPUBLIC, HUNGARY, POLAND, ROMANIA, SLOVAK REPUBLIC

Co-de	SECTOR	Bulga-ria	Czech Rep.	Hun-gary	Po-land	Rom-ania	Slovak Rep.	St.dev –within	Average share -	Coeff. of Variation-
		1996	1999	1998	1999	1996	1998	ind.	within ind.	within ind.
DA	Food products; beverages& tobacco	77.96	76.90	78.60	75.63	41.79	77.17	14.51	71.34	20.34
DB	Textiles and textile products	66.42	65.98	55.30	62.33	36.67	60.48	11.15	57.86	19.27
DC	Leather and leather products	73.95	63.92	56.87	61.37	59.39	*68.13*	6.60 *(6.25)*	63.10 *(63.94)*	10.45 *(9.77)*
DD	Wood and wood products	75.76	71.15	66.37	67.29	28.51	*66.85*	6.29 *(17.10)*	68.24 *(62.65)*	9.22 *(27.30)*
DE	Pulp, paper & paper products; publishing & printing	76.44	72.59	67.43	65.06	58.29	69.62	6.29	68.24	9.22
DF	Coke, refined petroleum products & nuclear fuel	84.49	89.03	59.31	83.40	88.05	77.68	11.05	80.33	13.76
DG	Chemicals, chemical products and man-made fibres	83.79	73.16	63.34	68.80	73.40	70.43	6.78	72.15	9.40
DH	Rubber and plastic products	82.54	68.39	68.60	65.80	65.18	*75.14*	7.11 *(6.69)*	70.10 *(70.94)*	10.15 *(9.43)*
DI	Other non-metallic mineral products	71.41	61.07	61.22	61.02	55.71	*67.12*	5.71 *(5.50)*	62.09 *(62.92)*	9.20 *(8.75)*
DJ	Basic metals and fabricated metal products	82.34	74.31	72.33	70.24	71.83	80.65	5.01	75.28	6.66
DK	Machinery and equipment n.e.c.	67.43	63.91	61.97	61.63	55.57	69.57	4.92	63.35	7.76
DL	Electrical and optical equipment	71.57	68.08	75.06	63.87	53.90	*71.53*	8.18 *(7.60)*	66.50 *(67.33)*	12.29 *(11.28)*
DM	Transport equipment	53.12	77.62	78.95	78.23	66.90	88.05	12.16	73.81	16.47
DN	Manufacturing n.e.c.	73.96	70.82	62.09	66.87	58.65	*71.51*	6.23 *(5.94)*	66.48 *(67.32)*	9.38 *(8.83)*
CA	Mining and quarrying of energy producing materials	62.56	48.41	57.87	40.27	55.09	*57.87*	8.70 *(8.04)*	52.84 *(53.68)*	16.46 *(14.99)*
CB	Mining and quarrying except energy producing materials	74.65	60.99	55.22	*59.63*	*53.08*	*65.75*	9.98 *(7.81)*	63.62 *(61.55)*	15.69 *(12.69)*
E	Electricity, gas and water	71.21	70.67	61.09	56.80	74.88	74.70	7.52	68.23	11.02

	supply									
	St.dev - (within country)	8.13 *(8.13)*	8.73 *(8.73)*	7.68 *(7.68)*	9.66 *(9.47)*	14.96 *(14.56)*	7.90 *(7.30)*			
	Average share - (within country)	73.51 *(73.51)*	69.23 *(69.23)*	64.80 *(64.80)*	65.54 *(65.19)*	58.99 *(58.64)*	74.26 *(71.31)*			
	Coeff. of Variation - (within country)	11.06 *(11.06)*	12.61 *(12.61)*	11.85 *(11.85)*	14.74 *(14.52)*	25.36 *(24.82)*	10.64 *(10.23)*			
	Average st.dev.	**9.51** **(*9.31*)**						**8.88** **(*8.49*)**		
	Average coeff. Of variation	**14.38** **(*14.18*)**								**13.42** **(*12.76*)**

Note: Data in brackets and italics are corrected values, based on econometrically estimated values for missing data.

ANNEX 2: SHARE OF WAGES AND SALARIES IN OUTPUT: BULGARIA, CZECH REPUBLIC, HUNGARY, POLAND, ROMANIA, SLOVAK REPUBLIC

Co-de	SECTOR	Bulga-ria	Czech Rep.	Hun-gary	Po-land	Rom-ania	Slovak Rep.	St.dev –within	Average share -	Coeff. of Variation-
		1996	1999	1998	1999	1996	1998	ind.	within ind.	within ind.
DA	Food products; beverages& tobacco	5.09	7.63	6.55	17.65	4.32	6.09	4.92	7.89	62.32
DB	Textiles and textile products	13.42	17.03	17.72	27.22	18.13	16.06	4.70	18.26	25.73
DC	Leather and leather products	11.51	18.77	17.54	23.46	16.89	*15.18*	4.28 *(3.96)*	17.63 *(17.22)*	24.26 *(22.97)*
DD	Wood and wood products	36.35	11.38	6.87	15.94	10.59	*13.77*	11.70 *(10.52)*	16.23 *(15.82)*	72.14 *(66.50)*
DE	Pulp, paper & paper products; publishing & printing	7.48	10.35	7.07	14.42	7.88	7.73	2.83	9.16	30.88
DF	Coke, refined petroleum products & nuclear fuel	*3.47*	2.11	5.44	5.59	2.98	2.64	1.64 *(1.47)*	3.75 *(3.71)*	43.66 *(39.67)*
DG	Chemicals, chemical products and man-made fibres	*8.83*	8.05	8.48	12.67	8.08	8.27	2.00 *(1.79)*	9.11 *(9.06)*	21.96 *(19.78)*
DH	Rubber and plastic products	*10.05*	10.60	8.23	14.55	10.06	*8.24*	2.66 *(2.32)*	10.86 *(10.29)*	24.52 *(22.51)*
DI	Other non-metallic mineral products	14.66	12.56	10.99	17.76	10.10	*10.75*	3.07 *(2.93)*	13.21 *(12.80)*	23.27 *(22.87)*
DJ	Basic metals and fabricated metal products	*10.08*	13.04	7.23	17.51	7.25	6.77	4.76 *(4.26)*	10.36 *(10.31)*	45.96 *(41.31)*
DK	Machinery and equipment n.e.c.	19.23	18.52	11.98	23.28	19.53	16.43	3.76	18.16	20.68
DL	Electrical and optical equipment	15.68	14.57	6.14	17.24	10.13	*10.30*	4.54 *(4.19)*	12.75 *(12.34)*	35.62 *(33.91)*
DM	Transport equipment	8.14	7.80	3.75	11.53	14.33	4.69	4.49 *(4.02)*	8.42 *(8.37)*	53.36 *(48.01)*
DN	Manufacturing n.e.c.	2.79	13.11	9.45	23.55	15.07	*10.34*	7.62 *(6.89)*	12.79 *(12.38)*	59.57 *(55.64)*
CA	Mining and quarrying of energy producing materials	21.76	22.51	14.98	43.21	13.27	*20.69*	11.93 *(10.72)*	23.14 *(22.73)*	51.54 *(47.14)*
CB	Mining and quarrying except	16.56	13.53	7.69	*24.21*	28.57	*15.65*	8.80	16.59	53.03

	energy producing materials							*(7.53)*	*(17.70)*	*(42.55)*
E	Electricity, gas and water supply	5.92	6.02	10.26	15.88	8.19	6.63	3.83	8.82	43.44
	St.dev - (within country)	9.12 *(8.20)*	5.16 *(5.16)*	4.07 *(4.07)*	8.39 *(8.23)*	6.28 *(6.28)*	4.77 *(4.94)*			
	Average share - (within country)	14.21 *(12.41)*	12.21 *(12.21)*	9.43 *(9.43)*	18.84 *(19.16)*	12.08 *(12.08)*	8.37 *(10.60)*			
	Coeff. of Variation - (within country)	64.23 *(66.08)*	42.25 *(42.25)*	43.11 *(43.11)*	44.54 *(42.96)*	52.01 *(52.01)*	56.96 *(46.61)*			
	Average st.dev.	**6.30** **(*6.15*)**						**5.15** **(*4.74*)**		
	Average coeff. of variation	**50.52** **(*48.83*)**								**40.70** **(*37.99*)**

Note: Data in brackets and italics are corrected values, based on econometrically estimated values for missing data.

ANNEX 3: SHARE OF INVESTMENTS IN OUTPUT: BULGARIA, CZECH REPUBLIC, HUNGARY, POLAND, ROMANIA, SLOVAK REPUBLIC

Co-de	SECTOR	Bulga-ria	Czech Rep.	Hun-gary	Po-land	Rom-ania	Slovak Rep.	St.dev –within	Average share -	Coeff. of Variation-
		1996	1999	1998	1999	1996	1998	ind.	within ind.	within ind.
DA	Food products; beverages& tobacco	5.92	6.88	5.36	6.63	6.86	8.92	1.21	6.76	17.96
DB	Textiles and textile products	6.31	9.23	3.09	4.70	7.97	*8.15*	2.46 *(2.33)*	6.26 *(6.58)*	39.32 *(35.48)*
DC	Leather and leather products	6.94	4.59	2.22	2.69	5.67	*6.32*	1.99 *(1.94)*	4.42 *(4.74)*	44.91 *(40.89)*
DD	Wood and wood products	6.52	13.67	3.79	7.61	6.79	*9.57*	3.65 *(3.35)*	7.68 *(7.99)*	47.49 *(41.93)*
DE	Pulp, paper & paper products; publishing & printing	7.02	11.94	3.36	7.95	7.87	*8.15*	3.06 *(2.74)*	7.63 *(7.72)*	40.05 *(35.53)*
DF	Coke, refined petroleum products & nuclear fuel	2.89	4.34	16.17	11.78	1.31	6.39	5.72	7.15	80.02
DG	Chemicals, chemical products and man-made fibres	8.44	9.82	7.25	8.38	11.28	11.88	1.81	9.51	19.03
DH	Rubber and plastic products	3.96	10.91	4.34	8.73	7.50	*8.98*	2.95 *(2.75)*	7.09 *(7.40)*	41.62 *(37.14)*
DI	Other non-metallic mineral products	16.89	12.35	7.78	14.22	6.69	*13.48*	4.30 *(3.93)*	11.59 *(11.90)*	37.15 *(32.99)*
DJ	Basic metals and fabricated metal products	8.60	7.40	3.65	6.11	4.41	3.81	2.04	5.66	36.10
DK	Machinery and equipment n.e.c.	5.52	6.22	4.15	4.83	3.96	*6.83*	0.94 *(1.15)*	4.94 *(5.25)*	19.14 *(21.81)*
DL	Electrical and optical equipment	4.90	9.88	6.27	5.94	5.13	*8.32*	2.01 *(1.96)*	6.42 *(6.74)*	31.33 *(29.06)*
DM	Transport equipment	11.63	8.39	7.87	10.26	32.47	15.16	9.28	14.30	64.91
DN	Manufacturing n.e.c.	6.16	6.46	2.22	4.30	6.18	*6.96*	1.81 *(1.79)*	5.06 *(5.38)*	35.69 *(33.31)*
CA	Mining and quarrying of energy producing materials	17.37	12.82	8.69	7.19	18.24	*14.76*	4.97 *(4.51)*	12.86 *(13.18)*	38.64 *(34.24)*
CB	Mining and quarrying except	6.73	31.48	8.26	*13.74*	8.52	*15.64*	11.85	13.75	86.18

	energy producing materials							*(9.21)*	*(14.06)*	*(65.49)*
E	Electricity, gas and water supply	10.23	27.53	20.89	24.62	12.88	27.25	7.42	20.57	36.10
	St.dev - (within country)	4.03 *(4.03)*	7.39 *(7.39)*	4.98 *(4.98)*	5.19 *(5.19)*	7.14 *(7.14)*	8.37 *(5.50)*			
	Average share - (within country)	8.00 *(8.00)*	11.41 *(11.41)*	6.79 *(6.79)*	8.50 *(8.80)*	9.04 *(9.04)*	12.24 *(10.62)*			
	Coeff. of Variation - (within country)	50.40 *(50.40)*	64.81 *(64.81)*	73.34 *(73.34)*	61.11 *(58.90)*	78.96 *(78.96)*	68.41 *(51.78)*			
	Average st.dev.	**6.18** **(*5.70*)**						**3.97** **(*3.71*)**		
	Average coeff. of variation	**66.17** **(*63.03*)**								**42.10** **(*38.94*)**

Note: Data in brackets and italics are corrected values, based on econometrically estimated values for missing data.

ANNEX 4: SHARE OF MATERIAL COSTS, WAGES AND SALARIES AND INVESTMENTS IN OUTPUT (CORRECTED VALUES): BULGARIA, CZECH REPUBLIC, HUNGARY, POLAND, ROMANIA, SLOVAK REPUBLIC

Code	SECTOR	Material costs -st.dev - (within ind.)	W&S - st.dev - (within ind.)	Investment - st.dev - (within ind.)	Material cost - coeff. of Variation-(within ind.)	W&S - coeff. of Variation - (within ind.)	Investment - coeff. of Variat.- (within ind.)
DA	Food products; beverages and tobacco	14.51	4.92	1.21	20.34	62.32	17.96
DB	Textiles and textile products	11.15	4.70	2.33	19.27	25.73	35.48
DC	Leather and leather products	6.25	3.96	1.94	9.77	22.97	40.89
DD	Wood and wood products	17.10	10.52	3.35	27.30	66.50	41.93
DE	Pulp, paper & paper products; publishing & printing	6.29	2.83	2.74	9.22	30.88	35.53
DF	Coke, refined petroleum products & nuclear fuel	11.05	1.47	5.72	13.76	39.67	80.02
DG	Chemicals, chemical products and man-made fibres	6.78	1.79	1.81	9.40	19.78	19.03
DH	Rubber and plastic products	6.69	2.32	2.75	9.43	22.51	37.14
DI	Other non-metallic mineral products	5.50	2.93	3.93	8.75	22.87	32.99
DJ	Basic metals and fabricated metal products	5.01	4.26	2.04	6.66	41.31	36.10
DK	Machinery and equipment n.e.c.	4.92	3.76	1.15	7.76	20.68	21.81
DL	Electrical and optical equipment	7.60	4.19	1.96	11.28	33.91	29.06
DM	Transport equipment	12.16	4.02	9.28	16.47	48.01	64.91
DN	Manufacturing n.e.c.	5.94	6.89	1.79	8.83	55.64	33.31
CA	Mining and quarrying of energy producing materials	8.04	10.72	4.51	14.99	47.14	34.24
CB	Mining and quarrying except energy producing materials	7.81	7.53	9.21	12.69	42.55	65.49
E	Electricity, gas and water supply	7.52	3.83	7.42	11.02	43.44	36.10
	Average	**8.49**	**4.74**	**3.71**	**12.76**	**37.99**	**38.94**

Standard deviation & Coefficient of Variation	Bulgaria 1996	Czech Republic 1999	Hungary 1998	Poland 1999	Romania 1996	Slovak Republic 1998	Average
Material cost – St.dev - (within count.)	8.13	8.73	7.68	9.47	14.56	7.30	**9.31**
W&S - St.dev - (within count.)	8.20	5.16	4.07	8.23	6.28	4.94	**6.15**
Investment - St.dev - (within count.)	4.03	7.39	4.98	5.19	7.14	5.50	**5.70**
Material cost - Coeff. Variation - (within count.)	11.06	12.61	11.85	14.52	24.82	10.23	**14.18**
W&S - Coeff. Variation - (within count.)	66.08	42.25	43.11	42.96	52.01	46.61	**48.83**
Investment - Coeff. Variation - (within count.)	50.40	64.81	73.34	58.90	78.96	51.78	**63.03**

ANNEX 5: CHANGES IN INTRA-INDUSTRY, STRUCTURAL AND SPECIALISATION COMPONENTS AND TOTAL COSTS IN THE PERIOD 1999/1990 BY INDUSTRIES – DATA FOR CZECH REPUBLIC

Code	SECTOR	Material costs				Wages & Salaries			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	-0.040	0.919	-0.008	0.871	0.090	0.072	0.018	0.181
DB	Textiles and textile products	-0.149	-0.247	0.023	-0.373	0.094	-0.043	-0.015	0.036
DC	Leather and leather products	-0.042	-0.142	0.016	-0.168	0.023	-0.028	-0.009	-0.014
DD	Wood and wood products	-0.031	0.363	-0.023	0.309	0.011	0.046	0.008	0.065
DE	Pulp, paper &paper products; publishing &printing	0.005	0.096	0.000	0.101	0.045	0.010	0.003	0.058
DF	Coke, refined petroleum products & nuclear fuel	0.169	-0.869	-0.080	-0.780	0.026	-0.010	-0.012	0.003
DG	Chemicals, chemical products and man-made fibres	0.008	0.298	0.001	0.307	-0.010	0.035	-0.002	0.023
DH	Rubber and plastic products	-0.034	0.580	-0.028	0.519	-0.002	0.087	-0.002	0.084
DI	Other non-metallic mineral products	-0.045	0.467	-0.017	0.404	0.012	0.088	0.004	0.104
DJ	Basic metals and fabricated metal products	-0.742	-2.654	0.244	-3.152	0.585	-0.230	-0.193	0.162
DK	Machinery and equipment n.e.c.	-0.086	-0.075	0.003	-0.158	0.085	-0.018	-0.003	0.064
DL	Electrical and optical equipment	0.011	0.776	0.006	0.793	0.005	0.164	0.003	0.172
DM	Transport equipment	-0.005	1.884	-0.004	1.876	-0.061	0.232	-0.043	0.128
DN	Manufacturing n.e.c.	0.025	0.225	0.006	0.256	0.012	0.040	0.003	0.055
CA	Mining and quarrying of energy producing materials	-0.537	-0.991	0.278	-1.250	0.276	-0.189	-0.143	-0.056
CB	Mining and quarrying except energy producing materials	-0.002	0.017	0.000	0.015	0.004	0.003	0.001	0.008
E	Electricity, gas and water supply	-0.003	-0.879	0.000	-0.881	0.143	-0.053	-0.022	0.069
All sectors – sum for period 1990-1999		**-1.496**	**-0.231**	**0.418**	**-1.309**	**1.338**	**0.207**	**-0.402**	**1.143**
Code	**SECTOR**	**Investments**				**All costs**			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	-0.132	0.088	-0.025	-0.069	-0.082	1.080	-0.015	0.983
DB	Textiles and textile products	0.035	-0.016	-0.004	0.015	-0.020	-0.306	0.004	-0.322
DC	Leather and leather products	-0.005	-0.010	0.002	-0.013	-0.024	-0.180	0.009	-0.195
DD	Wood and wood products	0.000	0.039	0.000	0.040	-0.019	0.448	-0.015	0.414
DE	Pulp, paper &paper products; publishing &printing	-0.041	0.009	-0.002	-0.033	0.009	0.115	0.002	0.126
DF	Coke, refined petroleum products & nuclear fuel	-0.043	-0.065	0.023	-0.085	0.152	-0.944	-0.070	-0.862
DG	Chemicals, chemical products and man-made fibres	-0.049	0.026	-0.005	-0.028	-0.050	0.359	-0.006	0.303
DH	Rubber and plastic products	-0.046	0.098	-0.034	0.018	-0.081	0.766	-0.064	0.621
DI	Other non-metallic mineral products	-0.127	0.085	-0.034	-0.076	-0.160	0.640	-0.047	0.433
DJ	Basic metals and fabricated metal products	0.222	-0.082	-0.051	0.089	0.065	-2.967	0.001	-2.901
DK	Machinery and equipment n.e.c.	-0.083	0.030	-0.010	-0.063	-0.084	-0.063	-0.010	-0.157
DL	Electrical and optical equipment	-0.013	0.076	-0.005	0.058	0.004	1.016	0.004	1.024
DM	Transport equipment	-0.098	0.180	-0.053	0.028	-0.164	2.296	-0.099	2.032
DN	Manufacturing n.e.c.	-0.039	0.019	-0.007	-0.028	-0.003	0.284	0.002	0.283

CA	Mining and quarrying of energy producing materials	0.121	-0.082	-0.058	-0.020	-0.140	-1.262	0.077	-1.325
CB	Mining and quarrying except energy producing materials	0.017	0.005	0.002	0.024	0.020	0.025	0.002	0.048
E	Electricity, gas and water supply	-0.350	-0.319	0.052	-0.617	-0.209	-1.251	0.031	-1.430
All sectors – sum for period 1990-1999		**-0.629**	**0.080**	**-0.210**	**-0.759**	**-0.787**	**0.056**	**-0.194**	**-0.925**

ANNEX 6: CHANGES IN INTRA-INDUSTRY, STRUCTURAL AND SPECIALISATION COMPONENTS AND TOTAL COSTS IN THE PERIOD 1999/1990 BY INDUSTRIES – DATA FOR HUNGARY

Code	SECTOR	Material costs				Wages & Salaries			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	0.362	-2.909	-0.085	-2.632	-0.176	-0.255	0.047	-0.384
DB	Textiles and textile products	-0.064	-0.364	0.013	-0.415	-0.035	-0.085	0.007	-0.113
DC	Leather and leather products	-0.043	-0.294	0.021	-0.317	-0.007	-0.028	0.002	-0.032
DD	Wood and wood products	-0.016	-0.348	0.005	-0.359	-0.019	-0.027	0.006	-0.041
DE	Pulp, paper &paper products; publishing &printing	-0.171	-0.477	0.032	-0.617	-0.086	-0.058	0.018	-0.126
DF	Coke, refined petroleum products & nuclear fuel	0.256	-1.042	-0.091	-0.876	-0.040	-0.059	0.011	-0.089
DG	Chemicals, chemical products and man-made fibres	-0.592	-0.754	0.106	-1.241	-0.050	-0.095	0.011	-0.134
DH	Rubber and plastic products	-0.036	0.327	-0.010	0.281	-0.006	0.004	0.000	-0.002
DI	Other non-metallic mineral products	-0.089	-0.071	0.004	-0.156	-0.027	-0.027	0.003	-0.051
DJ	Basic metals and fabricated metal products	-0.297	-0.471	0.029	-0.739	-0.161	-0.058	0.019	-0.200
DK	Machinery and equipment n.e.c.	0.059	-0.600	-0.014	-0.555	-0.054	-0.055	0.008	-0.101
DL	Electrical and optical equipment	0.345	4.678	0.562	5.584	-0.212	0.529	-0.258	0.059
DM	Transport equipment	0.109	5.227	0.358	5.694	-0.143	0.427	-0.266	0.018
DN	Manufacturing n.e.c.	0.036	-0.314	-0.012	-0.290	-0.026	-0.025	0.006	-0.046
CA	Mining and quarrying of energy producing materials	0.126	-0.709	-0.105	-0.687	-0.030	-0.085	0.019	-0.096
CB	Mining and quarrying except energy producing materials	-0.008	-0.058	0.002	-0.063	-0.038	-0.019	0.012	-0.044
E	Electricity, gas and water supply	-0.391	-1.137	0.075	-1.454	-0.262	-0.065	0.020	-0.307
All sectors – sum for period 1990-1999		**-0.415**	**0.685**	**0.890**	**1.160**	**-1.374**	**0.019**	**-0.335**	**-1.690**

Code	SECTOR	Investments				All costs			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	0.144	-0.004	-0.002	0.138	0.330	-3.167	-0.040	-2.878
DB	Textiles and textile products	-0.010	-0.005	0.001	-0.014	-0.110	-0.453	0.020	-0.543
DC	Leather and leather products	0.001	-0.004	0.000	-0.004	-0.049	-0.327	0.022	-0.354
DD	Wood and wood products	0.008	-0.002	-0.001	0.005	-0.027	-0.377	0.011	-0.394
DE	Pulp, paper &paper products; publishing &printing	-0.078	0.005	-0.002	-0.076	-0.336	-0.531	0.048	-0.819
DF	Coke, refined petroleum products & nuclear fuel	0.090	-0.088	-0.020	-0.017	0.306	-1.189	-0.100	-0.983
DG	Chemicals, chemical products and man-made fibres	0.044	0.016	0.004	0.064	-0.598	-0.833	0.121	-1.311
DH	Rubber and plastic products	0.001	0.014	0.000	0.015	-0.042	0.346	-0.010	0.294
DI	Other non-metallic mineral products	0.025	0.004	0.001	0.030	-0.091	-0.095	0.009	-0.176
DJ	Basic metals and fabricated metal products	-0.162	0.048	-0.026	-0.140	-0.620	-0.480	0.021	-1.079
DK	Machinery and equipment n.e.c.	0.015	-0.011	-0.002	0.002	0.020	-0.666	-0.008	-0.654
DL	Electrical and optical equipment	-0.001	0.038	0.000	0.036	0.131	5.244	0.304	5.679
DM	Transport equipment	-0.361	0.514	-0.406	-0.252	-0.394	6.168	-0.313	5.461
DN	Manufacturing n.e.c.	-0.002	-0.005	0.001	-0.007	0.008	-0.344	-0.006	-0.342

CA	Mining and quarrying of energy producing materials	…	…	…	…	…	…	…	…
CB	Mining and quarrying except energy producing materials	…	…	…	…	…	…	…	…
E	Electricity, gas and water supply	0.381	-0.125	-0.068	0.188	-0.272	-1.328	0.027	-1.573
All sectors – sum for period 1990-1999		**0.095**	**0.394**	**-0.521**	**-0.032**	**-1.694**	**1.098**	**0.034**	**-0.562**

ANNEX 7: CHANGES IN INTRA-INDUSTRY, STRUCTURAL AND SPECIALISATION COMPONENTS AND TOTAL COSTS IN THE PERIOD 1999/1990 BY INDUSTRIES – DATA FOR POLAND

Code	SECTOR	Material costs				Wages & Salaries			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	2.041	-0.867	-0.186	0.988	1.344	-0.123	-0.122	1.098
DB	Textiles and textile products	0.147	-0.733	-0.044	-0.630	0.283	-0.255	-0.084	-0.056
DC	Leather and leather products	-0.017	-0.179	0.006	-0.190	0.036	-0.054	-0.012	-0.030
DD	Wood and wood products	0.033	0.404	0.013	0.450	-2.294	0.985	-0.887	-2.195
DE	Pulp, paper &paper products; publishing &printing	-0.041	0.911	-0.022	0.848	0.059	0.165	0.032	0.255
DF	Coke, refined petroleum products & nuclear fuel	0.994	-1.162	-0.399	-0.567	0.137	-0.050	-0.055	0.032
DG	Chemicals, chemical products and man-made fibres	-0.038	0.061	-0.001	0.021	0.140	0.008	0.003	0.151
DH	Rubber and plastic products	0.074	0.533	0.035	0.642	0.046	0.104	0.021	0.172
DI	Other non-metallic mineral products	-0.034	0.385	-0.008	0.343	0.044	0.099	0.011	0.154
DJ	Basic metals and fabricated metal products	0.044	-0.015	0.000	0.029	0.251	-0.003	-0.001	0.247
DK	Machinery and equipment n.e.c.	0.091	-0.082	-0.004	0.006	0.130	-0.027	-0.005	0.098
DL	Electrical and optical equipment	0.080	0.870	0.036	0.986	0.022	0.235	0.010	0.266
DM	Transport equipment	0.338	1.517	0.194	2.049	-0.090	0.304	-0.052	0.162
DN	Manufacturing n.e.c.	0.099	0.464	0.037	0.600	0.049	0.158	0.018	0.226
CA	Mining and quarrying of energy producing materials	-0.129	-0.694	0.048	-0.775	0.388	-0.549	-0.144	-0.306
CB	Mining and quarrying except energy producing materials	…	…	…	…	…	…	…	…
E	Electricity, gas and water supply	-0.234	-0.716	0.035	-0.915	0.381	-0.133	-0.057	0.191
All sectors – sum for period 1990-1999		**3.450**	**0.697**	**-0.261**	**3.886**	**0.925**	**0.862**	**-1.323**	**0.464**

Code	SECTOR	Investments				All costs			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	0.354	-0.060	-0.032	0.262	3.739	-1.050	-0.341	2.349
DB	Textiles and textile products	0.056	-0.042	-0.017	-0.003	0.486	-1.030	-0.145	-0.689
DC	Leather and leather products	0.004	-0.006	-0.001	-0.003	0.024	-0.239	-0.008	-0.224
DD	Wood and wood products	0.040	0.031	0.016	0.088	-2.220	1.420	-0.858	-1.658
DE	Pulp, paper &paper products; publishing &printing	0.009	0.104	0.005	0.117	0.027	1.179	0.015	1.221
DF	Coke, refined petroleum products & nuclear fuel	0.396	-0.062	-0.159	0.175	1.527	-1.274	-0.613	-0.359
DG	Chemicals, chemical products and man-made fibres	0.101	0.005	0.002	0.109	0.202	0.074	0.004	0.280
DH	Rubber and plastic products	0.048	0.053	0.023	0.124	0.169	0.690	0.079	0.937
DI	Other non-metallic mineral products	0.196	0.039	0.049	0.284	0.206	0.522	0.051	0.780
DJ	Basic metals and fabricated metal products	0.089	-0.001	0.000	0.087	0.383	-0.019	-0.001	0.363
DK	Machinery and equipment n.e.c.	0.062	-0.004	-0.002	0.055	0.282	-0.113	-0.011	0.159
DL	Electrical and optical equipment	0.005	0.082	0.002	0.089	0.107	1.186	0.048	1.341
DM	Transport equipment	0.271	0.069	0.156	0.496	0.520	1.889	0.298	2.707
DN	Manufacturing n.e.c.	0.027	0.022	0.010	0.060	0.176	0.644	0.065	0.886

CA	Mining and quarrying of energy producing materials	-0.105	-0.154	0.039	-0.221	0.153	-1.398	-0.057	-1.301
CB	Mining and quarrying except energy producing materials	…	…	…	…	…	…	…	…
E	Electricity, gas and water supply	0.121	-0.277	-0.018	-0.174	0.268	-1.125	-0.040	-0.898
All sectors – sum for period 1990-1999		**1.674**	**-0.201**	**0.071**	**1.544**	**6.049**	**1.358**	**-1.513**	**5.893**

ANNEX 8: CHANGES IN INTRA-INDUSTRY, STRUCTURAL AND SPECIALISATION COMPONENTS AND TOTAL COSTS IN THE PERIOD 1999/1990 BY INDUSTRIES – DATA FOR ROMANIA

Code	SECTOR	Material costs				Wages & Salaries			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	-2.443	1.286	-0.461	-1.618	-0.154	0.103	-0.024	-0.075
DB	Textiles and textile products	-1.633	-1.958	0.743	-2.848	-0.101	-0.842	0.053	-0.890
DC	Leather and leather products	-0.034	-0.180	0.008	-0.206	-0.048	-0.098	0.016	-0.130
DD	Wood and wood products	-0.383	0.146	-0.080	-0.317	-0.075	0.019	-0.007	-0.063
DE	Pulp, paper &paper products; publishing &printing	-0.024	0.451	-0.017	0.409	-0.091	0.063	-0.031	-0.058
DF	Coke, refined petroleum products & nuclear fuel	-0.707	-0.320	0.046	-0.981	0.057	0.022	0.012	0.091
DG	Chemicals, chemical products and man-made fibres	-0.607	0.324	-0.045	-0.328	-0.065	-0.006	0.001	-0.070
DH	Rubber and plastic products	0.081	-0.205	-0.015	-0.139	-0.024	-0.083	0.008	-0.098
DI	Other non-metallic mineral products	-0.109	0.143	-0.010	0.023	-0.191	0.089	-0.036	-0.137
DJ	Basic metals and fabricated metal products	-0.402	0.377	-0.022	-0.047	-0.311	0.122	-0.036	-0.226
DK	Machinery and equipment n.e.c.	0.215	-1.353	-0.085	-1.223	-0.223	-0.844	0.112	-0.955
DL	Electrical and optical equipment	0.220	-0.165	-0.022	0.032	-0.205	-0.128	0.044	-0.290
DM	Transport equipment	-0.431	-0.064	0.009	-0.487	-0.326	-0.163	0.052	-0.437
DN	Manufacturing n.e.c.	0.049	0.281	0.015	0.344	-0.237	0.054	-0.025	-0.208
CA	Mining and quarrying of energy producing materials	-0.969	-1.001	0.245	-1.725	0.192	-0.069	-0.021	0.102
CB	Mining and quarrying except energy producing materials	0.027	-0.078	-0.004	-0.055	-0.107	-0.027	0.008	-0.126
E	Electricity, gas and water supply	-0.638	3.899	-0.733	2.528	-0.072	0.631	-0.109	0.451
All sectors – sum for period 1990-1999		**-7.788**	**1.582**	**-0.430**	**-6.636**	**-1.982**	**-1.155**	**0.018**	**-3.118**

Code	SECTOR	Investments				All costs			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	0.518	0.046	0.080	0.644	-2.079	1.435	-0.405	-1.049
DB	Textiles and textile products	0.464	-0.104	-0.243	0.117	-1.269	-2.904	0.553	-3.621
DC	Leather and leather products	0.050	-0.011	-0.017	0.023	-0.032	-0.288	0.007	-0.313
DD	Wood and wood products	0.071	0.001	0.006	0.079	-0.388	0.167	-0.080	-0.301
DE	Pulp, paper &paper products; publishing &printing	0.055	0.014	0.018	0.087	-0.061	0.528	-0.029	0.438
DF	Coke, refined petroleum products & nuclear fuel	0.011	0.013	0.002	0.026	-0.638	-0.285	0.060	-0.863
DG	Chemicals, chemical products and man-made fibres	0.431	-0.003	-0.005	0.423	-0.240	0.314	-0.049	0.025
DH	Rubber and plastic products	0.054	-0.036	-0.019	-0.002	0.111	-0.324	-0.026	-0.238
DI	Other non-metallic mineral products	0.049	0.026	0.009	0.084	-0.251	0.259	-0.037	-0.030
DJ	Basic metals and fabricated metal products	-0.042	0.057	-0.005	0.010	-0.755	0.556	-0.064	-0.263
DK	Machinery and equipment n.e.c.	-0.079	-0.188	0.040	-0.227	-0.087	-2.385	0.067	-2.405
DL	Electrical and optical equipment	0.027	-0.037	-0.006	-0.015	0.042	-0.330	0.015	-0.273
DM	Transport equipment	1.361	-0.031	-0.219	1.111	0.603	-0.259	-0.158	0.187
DN	Manufacturing n.e.c.	0.037	0.008	0.004	0.049	-0.151	0.343	-0.006	0.186

CA	Mining and quarrying of energy producing materials	-0.136	-0.139	0.015	-0.260	-0.914	-1.209	0.239	-1.883
CB	Mining and quarrying except energy producing materials	-0.124	-0.015	0.010	-0.130	-0.205	-0.120	0.014	-0.311
E	Electricity, gas and water supply	-0.932	2.235	-1.413	-0.110	-1.642	6.765	-2.254	2.869
All sectors – sum for period 1990-1999		**1.814**	**1.836**	**-1.741**	**1.909**	**-7.956**	**2.264**	**-2.153**	**-7.845**

ANNEX 9: CHANGES IN INTRA-INDUSTRY, STRUCTURAL AND SPECIALISATION COMPONENTS AND TOTAL COSTS IN THE PERIOD 1999/1990 BY INDUSTRIES – DATA FOR SLOVAK REPUBLIC

Code	SECTOR	Material costs				Wages & Salaries			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	0.034	0.014	0.000	0.048	0.147	0.001	0.000	0.148
DB	Textiles and textile products	-0.145	-0.408	0.031	-0.521	0.110	-0.076	-0.024	0.010
DC	Leather and leather products	…	…	…	…	…	…	…	…
DD	Wood and wood products	…	…	…	…	…	…	…	…
DE	Pulp, paper &paper products; publishing &printing	-0.007	0.342	-0.001	0.334	0.072	0.027	0.011	0.109
DF	Coke, refined petroleum products & nuclear fuel	-0.458	-1.215	0.133	-1.539	0.040	-0.025	-0.011	0.003
DG	Chemicals, chemical products and man-made fibres	-0.293	-0.208	0.019	-0.482	0.059	-0.018	-0.004	0.037
DH	Rubber and plastic products	…	…	…	…	…	…	…	…
DI	Other non-metallic mineral products	…	…	…	…	…	…	…	…
DJ	Basic metals and fabricated metal products	-0.613	0.907	-0.060	0.233	0.231	0.048	0.023	0.302
DK	Machinery and equipment n.e.c.	-0.189	-0.771	0.036	-0.924	0.178	-0.139	-0.035	0.005
DL	Electrical and optical equipment	…	…	…	…	…	…	…	…
DM	Transport equipment	0.256	3.962	0.659	4.877	-0.152	0.638	-0.392	0.094
DN	Manufacturing n.e.c.	…	…	…	…	…	…	…	…
CA	Mining and quarrying of energy producing materials	…	…	…	…	…	…	…	…
CB	Mining and quarrying except energy producing materials	…	…	…	…	…	…	…	…
E	Electricity, gas and water supply	-0.244	-2.357	0.055	-2.547	0.528	-0.086	-0.118	0.324
All sectors – sum for period 1990-1999		**-1.659**	**0.265**	**0.872**	**-0.522**	**1.212**	**0.368**	**-0.549**	**1.031**

Code	SECTOR	Investments				All costs			
		Intra S	Inter S	Mixed	Total	Intra S	Inter S	Mixed	Total
DA	Food products; beverages and tobacco	0.114	-0.008	-0.006	0.099	0.294	0.007	-0.006	0.296
DB	Textiles and textile products	…	…	…	…	…	…	…	…
DC	Leather and leather products	…	…	…	…	…	…	…	…
DD	Wood and wood products	…	…	…	…	…	…	…	…
DE	Pulp, paper &paper products; publishing &printing	…	…	…	…	…	…	…	…
DF	Coke, refined petroleum products & nuclear fuel	0.078	0.000	0.000	0.078	-0.340	-1.240	0.122	-1.458
DG	Chemicals, chemical products and man-made fibres	0.005	-0.019	-0.001	-0.015	-0.230	-0.246	0.014	-0.461
DH	Rubber and plastic products	…	…	…	…	…	…	…	…
DI	Other non-metallic mineral products	…	…	…	…	…	…	…	…
DJ	Basic metals and fabricated metal products	-0.135	-0.013	0.005	-0.143	-0.517	0.942	-0.033	0.393
DK	Machinery and equipment n.e.c.	…	…	…	…	…	…	…	…
DL	Electrical and optical equipment	…	…	…	…	…	…	…	…
DM	Transport equipment	-0.180	0.022	-0.013	-0.171	-0.077	4.622	0.254	4.799
DN	Manufacturing n.e.c.	…	…	…	…	…	…	…	…

CA	Mining and quarrying of energy producing materials	…	…	…	…	…	…	…	…
CB	Mining and quarrying except energy producing materials	…	…	…	…	…	…	…	…
E	Electricity, gas and water supply	0.170	0.064	0.012	0.247	0.454	-2.380	-0.051	-1.976
All sectors – sum for period 1990-1999		**0.052**	**0.046**	**-0.002**	**0.096**	**-0.395**	**0.680**	**0.321**	**0.605**

ANNEX 10: MULTI-CRITERIA ANALYSIS AND AGGREGATION USING IDEAL POINT MULTI-CRITERIA DECISION MAKING (MCDM) METHOD

In multiple criteria analysis, the Ideal Point Method (IPM) is applied as follows (Zeleny, 1976): a set **A** of **n** objects is compared with respect to **m** criteria. All objects are compared with an object that has ideal values for all **m** criteria, a so-called ideal (a reference object). A point in **m**-dimensional space represents each object from the set **A**. The point representing the ideal object is referred to as the **ideal point**. The distance **d** (usually geometrical, as recommended by the author) of each point from the ideal one is calculated (see formula 1). The object that is the nearest to the ideal, i.e., that whose distance from ideal point is the shortest, is the best object. Calculated distances may be corrected by specifying different weights of criteria. The calculated distance could be used for forming a ranking list of objects.

In this method, single indicators of macroeconomic regime for objects i.e. observed countries are analysed in a coordinate system whose axes are just these indicators. The values of a single indicator of the macroeconomic regime of one country are the coordinates of the observed country in the space of macroeconomic regime indicators.

The ideal point in this coordinate system is a country with specially defined values of a single macroeconomic indicator, so it can be referred to as an ideal country, or, more appropriate for this analysis, a 'reference country'. The value of a single macroeconomic regime indicator for a reference country may be defined in several ways, for example: (a) an unachievable, practically unrealisable value, (b) an imagined target value that is hard to realize, (c) a desired, realizable value for a particular macroeconomic regime indicator, etc.

Formula 1: $$d_i = \sqrt[1/L_p]{\sum_j k_j \times \left(\frac{IC_j - C_{ij}}{(C_{ij})_{max}} \right)^{L_p}} \quad ; \quad j = 1,...,m \; ; \quad i = 1,...,n$$

where: IC_j - a j^{th} single indicator of macroeconomic regime for 'reference country', $C_{i,j}$ - a j^{th} single indicator of an i^{th} observed country, k_j - a weighting factor of a j^{th} single indicator of macroeconomic regime; j – number of single indicators; i – number of observed countries; L_p - used metrics, d_i – calculated distance for i^{th} country from reference country.

Sensitivity analysis of this formula for the change of metrics L_p gives the following (Kutlaca, 2001):

1. Case L_p=1. The formula calculates the arithmetical difference between single indicators for the observed and 'reference country'. It may happen that an equal aggregate distance could be calculated for a country with big differences among single indicators as well as for a

country with rather homogenous values for all single indicators, but the average values for distances for both countries are equal. This cannot happen for L_p>=2.

2. Case L_p=2. The formula becomes a calculation of Euclidean distance between the observed and 'reference country' (see formula 2).

   Formula 2: $$d_i = \sqrt{\sum_j k_j \times \left(\frac{IC_j - C_{ij}}{(C_{ij})_{max}} \right)^2} \quad ; \quad j = 1,...,m \; ; \quad i = 1,...,n$$

   Note that weighting factors (k) are not under the L_p-degree (L_p=2). This is to avoid dependence of the aggregate distance on the number of indicators. If we had multiplied the weighting factor by L_p then with the increasing number of indicators the aggregate distance would shrink. This represents the correction of the original formula by Zeleny (1976) proposed by Chankong and Haimes (1983).

3. Case $L_p \rightarrow \infty$. The formula becomes more dependent on a single indicator with great distance, i.e. increasing L_p-metrics. In this case, only values for indicators that are much different from reference values affect aggregate distance; other indicators do not have great effect on aggregate distance.

ANNEX 11: Numerical values of the composite indicator of macroeconomic stability for all CEECs, including Russia (based on actual and estimated values)

Country	1990	1991	1992	1993	1994
Bulgaria	0.46424	2.71793	2.12451	1.74090	2.05046
Croatia	2.80616	0.78069	3.19696	6.84701	0.84797
Czech Republic	1.41896	1.76509	1.57524	1.39653	1.24258
Hungary	1.08127	1.05514	0.96297	0.96028	0.94305
Macedonia	2.88872	0.92504	7.77884	2.49772	1.17193
Poland	2.97833	1.09014	1.04273	1.09206	1.08872
Romania	1.53452	1.97275	2.75452	2.38432	2.00205
Russia	0.68645	0.83636	10.05115	5.00157	2.25538
Slovak Republic	0.58778	1.71700	0.71781	0.76256	0.72059
Slovenia	2.75491	1.61632	1.67133	1.36565	1.27476
Ukraine	1.47870	1.51203	7.60373	24.29901	4.79760

Country	1995	1996	1997	1998	1999
Bulgaria	1.58038	2.48220	5.13992	1.49569	1.52940
Croatia	0.62508	0.64105	0.68747	0.65367	0.71144
Czech Republic	1.07815	1.04079	1.15070	1.06674	1.12798
Hungary	0.93424	0.95155	0.99278	1.01576	1.04767
Macedonia	0.80690	0.83936	1.02621	1.12357	1.19205
Poland	0.93656	0.89362	0.96495	0.92017	0.98700
Romania	1.79339	1.91333	1.95113	1.49394	1.76594
Russia	1.72454	1.08098	1.04765	1.55764	2.44833
Slovak Republic	0.59578	0.62746	0.68916	0.66845	0.69465
Slovenia	1.11533	1.12544	1.17518	1.17726	1.31189
Ukraine	2.83689	1.75203	1.50086	1.79175	2.42640

ANNEX 12: Codes: 2-digit industry level based on the NACE classification

NACE code	NACE title	Codes used in figure 3
D	Manufacturing total	
DA	Food products; beverages and tobacco	1
DB	Textiles and textile products	2
DC	Leather and leather products	3
DD	Wood and wood products	4
DE	Pulp, paper & paper products, publishing & printing	5
DF	Coke, refined petroleum products & nuclear fuel	6
DG	Chemicals, chemical products and man-made fibres	7
DH	Rubber and plastic products	8
DI	Other non-metallic mineral products	9
DJ	Basic metals and fabricated metal products	10
DK	Machinery and equipment n.e.c.	11
DL	Electrical and optical equipment	12
DM	Transport Equipment	13
DN	Manufacturing n.e.c.	14
C	Mining and quarrying	
CA	Mining and quarrying of energy producing materials	15
CB	Mining and quarrying except energy producing materials	16
E	Electricity, gas and water supply	17