

Models of capitalism in the Central and Eastern European countries in the area of product market competition. Robustness of the results¹

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Abstract

A new measure of similarity was proposed to compare the model of capitalism in the 11 Central and Eastern European (CEE) countries with the models of capitalism prevailing in four reference Western European economies (UK, Germany, Sweden, Spain). In this study, our new measure of similarity is compared with the already existing in the economic literature alternative measures of the distance between objects. Testing the robustness of the results is conducted for the institutional area of product market competition. The analysis covers the 2005–2018 period.

Keywords: Varieties of capitalism, institutions, CEE countries, post-communist capitalism

JEL Classification: O17, P16, P51

1. Introduction

In the studies on the models of capitalism, a new measure of similarity was proposed to compare the institutional environment of the countries (Próchniak et al., 2016). On the basis of it, we compared the model of capitalism in the 11 Central and Eastern European (CEE) countries with the models of capitalism prevailing in four reference Western European economies (the Anglo-Saxon or liberal model – UK; the continental model – Germany; the Nordic or Scandinavian model – Sweden; and the Mediterranean model – Italy or Spain). The approach adopted by Amable (2003) with some extensions was used – the countries were compared on the basis of six institutional domains: product market competition, labor market and industrial relations, social protection system, knowledge sector, financial system, and the housing market. Each are was represented by a number of indicators. To compare the countries, our own measure, called the coefficient of similarity, was built and used to draw conclusions.

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The aim of this study is to compare the results obtained on the basis of our own coefficient of similarity with alternative measures of similarity or distance, commonly used in the literature. Walesiak (2016) presents many variants of normalizing the variables and calculating the distance between objects. Another type of similarity measures is provided by Bernardelli (2018). We choose our own measure of similarity and six alternative measures of distance (described e.g. by Walesiak, 2016) to compare the model of capitalism in the CEE countries with benchmark Western European economies in the area of product market competition on the basis of 24 variables.

2. Data

The analysis is based on 24 variables which characterize the institutional environment of product market competition (see Próchniak, 2018 for details) and the 2005–2018 period. The study includes three variables from Heritage Foundation: (1) Fiscal freedom; (2) Freedom from government spending; and (3) Business freedom. Thirteen indicators are taken from the World Economic Forum – Global Competitiveness Report: (4) Institutions; (5) Intensity of local competition; (6) Extent of market dominance; (7) Effectiveness of antimonopoly policy; (8) Total tax rate (% of profits); (9) Domestic competition; (10) Prevalence of trade barriers; (11) Prevalence of foreign ownership; (12) Business impact of rules on FDI; (13) Foreign competition; (14) Competition; (15) Market size; and (16) Global Competitiveness Index (GCI). Another six variables come from the World Bank’s World Development Indicators database: (17) Cost of business start-up procedures (% of GNI per capita); (18) Tax payments (number); (19) Time required to enforce a contract (days); (20) Time required to register property (days); (21) Time required to start a business (days); and (22) Time to prepare and pay taxes (hours). Finally, two variables are taken from Eurostat (the transformation to ‘per million people’ was conducted by the author): (23) Number of enterprises in manufacturing (per million people) and (24) Number of enterprises in business economy except financial and insurance activities (per million people).

For the sake of conciseness, we do not describe the detailed meaning and method of calculations of individual indicators. In many cases, these are qualitative indicators composed of many sub-indices (the reader interested in the exact method of compiling a given variable should look at quoted sources). Especially the variables provided by Heritage Foundation and World Economic Forum sound very general and it is very difficult to extract the scope of a given indicator on the basis of only its name.

3. Method of the analysis

Except our own method, we choose six alternative measures of calculating the distance between the objects and on the basis of them aggregated coefficients of similarity (expressed in percentage terms) are calculated. The study by Walesiak (2016) is used to select the measures that can be applied to our time series. Five measures require the normalization of the variables. The following methods of normalization are used:

$$\begin{aligned} n1_{mit} &= \frac{x_{mit}}{\text{st. dev.}(x_{mt})}, \quad n2_{mit} = \frac{x_{mit}}{\text{range}(x_{mt})}, \quad n3_{mit} = \frac{x_{mit}}{\max(x_{mt})}, \\ n4_{mit} &= \frac{x_{mit}}{\text{mean}(x_{mt})}, \quad n5_{mit} = \frac{x_{mit}}{\sum_{i=1}^{15} x_{mit}^2}, \end{aligned} \quad (1)$$

where:

$n1, \dots, n5$ are the normalized values of the variable x_m for the i -th country and the period t ($m = 1, \dots, 24; i = 1, \dots, 15; t = 2005, \dots, 2018$), st. dev. is the standard deviation, and range is the difference between the maximum and minimum value. For five normalized variables ($n1, \dots, n5$), distances ($d1, \dots, d5$) between country l and k are calculated according to the following formula ($y = 1, \dots, 5$ indicates the method of normalization; in the case of missing data, the number of variables is less than 24):

$$dy_{klt} = \frac{\sum_{m=1}^{24} |ny_{mkt} - ny_{mkt}|}{\sum_{m=1}^{24} (ny_{mkt} + ny_{mkt})}. \quad (2)$$

On the basis of them, aggregated similarity coefficients ($asc1, \dots, asc5$) are estimated:

$$ascy_{klt} = (1 - dy_{klt}) \times 100. \quad (3)$$

The sixth variant does not require the normalization of the variables. The distance and the aggregated similarity coefficient are calculated as follows:

$$d6_{klt} = \frac{1}{24} \sum_{m=1}^{24} \frac{|x_{mkt} - x_{mkt}|}{(x_{mkt} + x_{mkt})}, \quad asc6_{klt} = (1 - d6_{klt}) \times 100. \quad (4)$$

Hence, we have obtained six aggregated similarity coefficients used in the literature, denoted as $asc1, \dots, asc6$ (they range between 0 and 100; the higher the value, the more similar the countries). They are compared with the aggregated similarity coefficient developed by us in an earlier study.

Our aggregated similarity coefficient (denoted here as asc_7) is described by Próchniak et al. (2016). It is the arithmetic average of the coefficients calculated for the individual variables. Such a coefficient equals 100 if the value of a given variable for the CEE country matches exactly the value of the same indicator for the reference economy. It equals zero if the difference exceeds (upwards or downwards) three standard deviations of the differentiation of a given variable in the whole EU15 group in a given year. If the difference equals less than 3 standard deviations (regardless of the direction), the coefficient is calculated proportionally.

4. Interpretation of the results and main conclusions

The year 2016 is the last available year for which all the 24 indicators for the whole sample of countries are available. The values of aggregated similarity coefficients for this year for Poland are presented in Figure 1.

The data in Figure 1 indicate that – in terms of product market competition – Poland is the most similar to Spain, that is to the Mediterranean model of capitalism. This conclusion is robust to all aggregated similarity coefficients: regardless of the coefficient, the highest value takes that for Spain.

Germany ranks second as regards the similarity with Poland in the area of product market competition. The distance between Poland and the remaining two countries (UK and Sweden) is higher. The UK ranks third and Sweden ranks fourth meaning that the institutional frameworks in the Anglo-Saxon and Nordic models are very distant from that in Poland. These outcomes are also robust to all the variants of the coefficients.

Regardless of the adopted measure, the distance between Poland and Germany is – of course – greater than that between Poland and Spain, but the difference is not so large as in the case between Poland and both the UK and Sweden. It means that the product market competition area in Poland possesses many features not only from the Mediterranean model of capitalism, but also from the continental model represented by Germany. Our earlier studies (e.g. Próchniak, 2016) indicate that most CEE countries are the most similar to the Mediterranean model in terms of output variables (or performance) but they are closer to the continental model of capitalism in terms of institutional arrangements (input variables). The calculations for individual 24 variables (for the sake of conciseness, not presented here) partly confirm the above finding although the conclusions are limited because the majority of variables refers to institutional architecture (input variables).

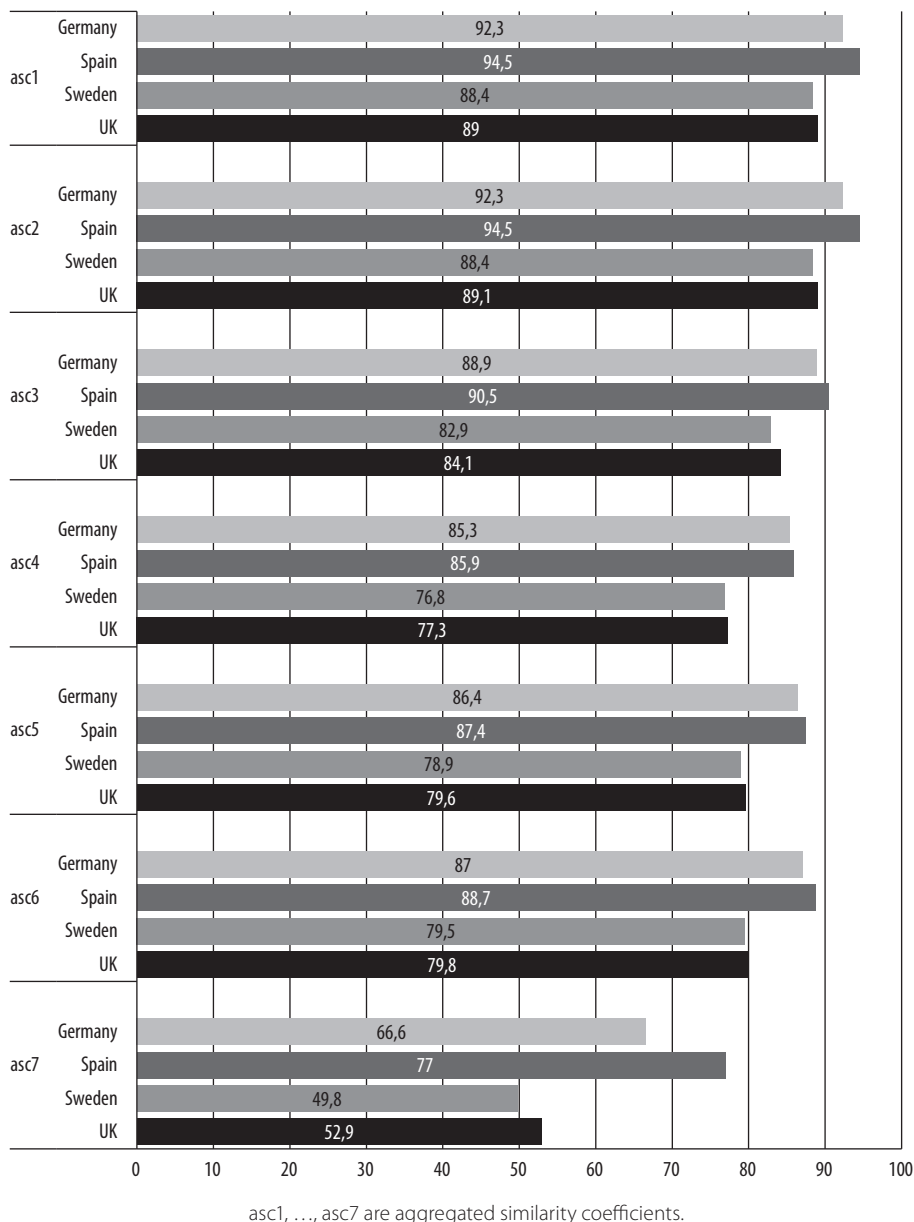


Figure 1. The similarity between Poland and the four reference Western European economies in the area of product market competition on the basis of different aggregated similarity coefficients, 2016

Source: own calculations.

The results presented in Figure 1 indicate that our measure of similarity (asc7), invented by us to compare the models of capitalism of different countries, does not yield contradictory results as compared with the other commonly used measures

of distance (asc1 – asc6). However, unlike them, our measure performs better in emphasizing the differences between countries and classifying them in terms of the level of similarity. On the basis of data in Figure 1, it can be seen that the values of the aggregated similarity coefficients asc1 – asc6 range between 75% and 95%. At the first view, it could be interpreted that the differences between Poland and the remaining countries are not very high and Poland is quite similar to all the four reference Western European economies. Such a finding, perhaps justified from the mathematical point of view, is not best from the economic point of view. Small differences in institutional indicators are very important and suggest much greater distance between the countries than the mathematical difference in the numbers indicates. The coefficient asc7, calculated according to our own formula, takes values much more dispersed. Hence, it allows us to extract better the differences between the countries.

Table 1. The most similar Western European economies for individual CEE countries according to different aggregated similarity coefficients in the area of product market competition, 2016

CEE country	The most similar reference economy for a given aggregated similarity coefficient						
	asc1	asc2	asc3	asc4	asc5	asc6	asc7
Bulgaria	Spain (91.5)	Spain (91.7)	Spain (87.1)	Spain (84.0)	Spain (84.8)	Spain (84.9)	Spain (66.5)
Croatia	Spain (88.9)	Spain (89.2)	Spain (84.0)	Germany (81.3)	Germany (81.5)	Spain (82.8)	Spain (57.3)
Czechia	Spain (92.9)	Spain (92.9)	Spain (89.9)	Spain (86.6)	Spain (87.4)	Spain (88.4)	Spain (69.6)
Estonia	Sweden (94.0)	Sweden (94.0)	Sweden (91.3)	Sweden (90.1)	Sweden (90.4)	Sweden (87.4)	Sweden (73.6)
Hungary	Spain (92.8)	Spain (92.9)	Spain (91.1)	Spain (89.4)	Spain (89.9)	Spain (89.2)	Spain (71.3)
Latvia	Spain (94.3)	Spain (94.3)	Spain (91.6)	Spain (89.6)	Spain (90.2)	Spain (89.0)	Spain (76.9)
Lithuania	Spain (93.7)	Spain (93.8)	Spain (90.1)	Spain (86.7)	Spain (87.8)	Sweden (84.5)	Spain (74.3)
Poland	Spain (94.5)	Spain (94.5)	Spain (90.5)	Spain (85.9)	Spain (87.4)	Spain (88.7)	Spain (77.0)
Romania	Spain (93.0)	Spain (93.1)	Spain (89.8)	Spain (87.5)	Spain (88.1)	Spain (87.3)	Spain (72.1)
Slovakia	Spain (93.1)	Spain (93.1)	Spain (90.5)	Spain (87.5)	Spain (88.4)	Spain (88.0)	Spain (71.5)
Slovenia	Spain (91.6)	Spain (91.7)	Spain (85.7)	Spain (80.9)	Spain (82.4)	Spain (78.8)	Spain (66.0)

The values of the aggregated similarity coefficients are given in brackets.

Source: own calculations.

Let us extend the analysis for all the CEE countries. We are going to check to what model of capitalism the individual new EU member states converged in the area of product market competition. We also want to test whether the results are robust to different aggregated similarity coefficients. The respective data are given in Tables 1 and 2. Table 1 shows for each CEE country the most similar reference economy from Western Europe along with the value of the given similarity coefficient. Table 2 is analogous to Table 1 but it indicates the least similar Western European economy, that is the country against which divergence tendencies were observed. All the data refer to 2016.

Table 2. The least similar Western European economies for individual CEE countries according to different aggregated similarity coefficients in the area of product market competition, 2016

CEE country	The least similar reference economy for a given aggregated similarity coefficient						
	asc1	asc2	asc3	asc4	asc5	asc6	asc7
Bulgaria	Sweden (84.7)	Sweden (84.9)	Sweden (79.9)	Sweden (77.0)	Sweden (77.7)	UK (76.4)	Sweden (38.0)
Croatia	Sweden (82.3)	Sweden (82.4)	Sweden (75.7)	Sweden (69.2)	Sweden (71.0)	Sweden (71.8)	Sweden (29.2)
Czechia	UK (89.3)	UK (89.4)	UK (83.5)	UK (77.3)	UK (79.0)	UK (77.7)	UK (53.2)
Estonia	Germany (91.7)	Germany (91.7)	Germany (87.8)	Germany (83.5)	Germany (84.8)	Germany (82.4)	Germany (63.6)
Hungary	UK (85.6)	UK (86.0)	UK (82.0)	UK (78.1)	UK (79.3)	UK (77.6)	UK (41.8)
Latvia	UK (90.4)	UK (90.4)	Germany (86.4)	Germany (82.8)	Germany (83.9)	UK (82.2)	UK (59.0)
Lithuania	UK (89.1)	UK (89.2)	Germany (85.3)	Germany (80.5)	Germany (82.0)	UK (79.4)	UK (53.5)
Poland	Sweden (88.4)	Sweden (88.4)	Sweden (82.9)	Sweden (76.8)	Sweden (78.9)	Sweden (79.5)	Sweden (49.8)
Romania	Sweden (87.2)	Sweden (87.3)	Sweden (83.8)	Sweden (81.9)	Sweden (82.3)	Sweden (80.7)	Sweden (47.7)
Slovakia	UK (87.9)	UK (88.0)	Germany (83.3)	Germany (78.2)	Germany (79.7)	UK (77.4)	UK (47.6)
Slovenia	UK (87.3)	UK (87.5)	UK (81.9)	UK (77.8)	UK (78.6)	UK (73.8)	UK (48.3)

Notes as in Table 1.

Source: own calculations.

Table 1 indicates that all the CEE countries except Estonia achieved the institutional framework in product market competition domain similar to that existing in the Mediterranean model of capitalism. In the other words, Spain turns out to be the least distant country on the average basis in terms of our product market competition variables for all the CEE countries except Estonia. Estonia behaved slightly differently and followed the path of the Scandinavian model of capitalism. The latter can be justified by very strong historical, social, economic, and political links between Estonia and the Nordic countries, mainly Finland.

The results are quite robust to different variants of the aggregated similarity coefficient. Only in the case of two countries, Croatia and Lithuania, there are minor differences in the indications of the most similar Western European benchmark country. For Croatia, two similarity coefficients (asc4 and asc5) suggest Germany instead of Spain as the benchmark model of capitalism whereas for Lithuania there is only one outlier (the coefficient asc6 which indicates Sweden, not Spain, as the most similar country). Despite these minor deviations, all the adopted measures point to the same model of capitalism: the Mediterranean model for 10 CEE countries and the Scandinavian model for Estonia.

As regards the most distant countries in the product market competition domain, the data in Table 2 suggest that they are Sweden and the UK. The CEE group as a whole turns out to be the least similar to the Anglo-Saxon model of capitalism, represented by the UK, and the Scandinavian model, represented by Sweden. The only exception is Estonia which behaves in the opposite direction and reveals the lowest similarity to the continental model. Differences in indications of the aggregated similarity coefficients given in Table 2 are not large, but bigger as compared with data in Table 1.

For three CEE countries (Latvia, Lithuania, and Slovakia), the results are ambiguous as regards the least similar model of capitalism. For another CEE country (Bulgaria) there is one different outcome. In the case of Latvia, Lithuania and Slovakia, three aggregated similarity coefficients indicate Germany as the most distant country while four other coefficients suggest that it is the UK.

Table 3. The most similar Western European economies for individual CEE countries in the area of product market competition between 2005 and 2018

Year	No. of variables	Bulgaria		Croatia		Czechia		Estonia		Hungary	
		asc1	asc7	asc1	asc7	asc1	asc7	asc1	asc7	asc1	asc7
2005	7	DE	DE	DE	DE	DE	DE	UK	UK	DE	DE
2006	8	ES	ES	DE	DE	ES	ES	DE	DE	ES	ES
2007	21	ES	ES	ES	ES	ES	ES	UK	UK	ES	ES
2008	23	ES	ES	ES	ES	ES	ES	UK	UK	ES	ES
2009	23	ES	ES	ES	ES	ES	UK	UK	UK	ES	ES
2010	23	ES	ES	ES	ES	ES	ES	UK	UK	ES	ES
2011	23	ES	ES	ES	ES	ES	ES	UK	ES	ES	ES
2012	24	ES	ES	ES	ES	ES	ES	SE	SE	ES	ES
2013	24	ES	ES	ES	ES	ES	ES	SE	SE	ES	ES
2014	24	ES	ES	ES	ES	ES	ES	SE	SE	ES	ES
2015	24	ES	ES	ES	ES	ES	ES	SE	SE	ES	ES
2016	24	ES	ES	ES	ES	ES	ES	SE	SE	ES	ES
2017	22	ES	ES	ES	ES	ES	ES	UK	UK	ES	ES
2018	9	ES	ES	DE	ES	ES	ES	UK	UK	ES	ES

Year	Latvia		Lithuania		Poland		Romania		Slovakia		Slovenia	
	asc1	asc7	asc1	asc7	asc1	asc7	asc1	asc7	asc1	asc7	asc1	asc7
2005	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE	UK	UK
2006	UK	UK	DE	DE	ES	ES	DE	UK	ES	DE	ES	ES
2007	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2008	UK	UK	ES	ES	ES	ES	ES	ES	UK	UK	ES	ES
2009	ES	ES	ES	ES	ES	ES	ES	ES	UK	UK	ES	ES
2010	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2011	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2012	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2013	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2014	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2015	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2016	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2017	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
2018	UK	UK	UK	UK	ES	ES	ES	ES	ES	ES	DE	DE

DE – Germany, ES – Spain, SE – Sweden, UK – United Kingdom.

Source: own calculations.

Nevertheless, despite these minor differences, all the variants of the coefficients yield relatively similar results. Moreover, there is no case when the coefficient calculated according to our own formula (asc7) gives outcomes non-existent compared to the remaining ones. In this view, our proposition of the new measure of the similarity coefficient seems to be proper and economically justified. Moreover, greater dispersion of the values between the most and least similar country, obtained on the basis of the coefficient asc7, implies that this coefficient is better to draw conclusions when comparing the institutional environment of the countries.

Table 3 shows time stability of the outcomes on the basis of the asc1 and asc7 coefficients between 2005 and 2018. During the 2007–2016 period, i.e. when data for most variables are available, the results are quite stable over time except Estonia. 10 CEE countries converged to the model of capitalism similar to that prevailing in Spain. The only exception is Estonia which was quite akin to the UK till around 2010 and later to Sweden (till 2016). Except Estonia, these findings indicate that institutions in product market competition domain did not record radical changes to switch a given CEE country to another benchmark economy.

Moreover, the results indicate that our own concept of similarity coefficient, devoted to compare the models of capitalism, has good economic and statistical properties and can be widely used in such studies. Due to greater range in observed values, its application is superior to that of the existing measures of distance.

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Modele kapitalizmu w krajach Europy Środkowo-Wschodniej w obszarze konkurencji na rynku produktów. Analiza odporności wyników

W badaniu zaproponowano nową miarę podobieństwa w celu porównania modeli kapitalizmu w jedenaście krajach Europy Środkowo-Wschodniej z modelami kapitalizmu występującymi w czterech referencyjnych gospodarkach Europy Zachodniej (Wielka Brytania, Niemcy, Szwecja, Hiszpania). W niniejszym artykule porównano nową miarę podobieństwa z istniejącymi już w literaturze ekonomicznej alternatywnymi miarami odległości między obiektami. Analiza odporności wyników została przeprowadzona dla instytucjonalnego obszaru konkurencji na rynku produktów. Badanie obejmuje lata 2005–2018.

Słowa kluczowe: odmiany kapitalizmu, instytucje, kraje Europy Środkowo-Wschodniej, kapitalizm postkomunistyczny

JEL: O17, P16, P51