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## Article

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## Empirical Paper

Bożena Horbaczewska\*

# Comparative empirical analysis of financial intermediation systems in Central and Eastern Europe<sup>1</sup>

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**Abstract:** The purpose of this paper is to evaluate the level of similarity between financial systems in selected Central and Eastern European countries (CEE11) and four models of capitalism in Western Europe identified by B. Amable [*The diversity of modern capitalism*, 2003]. A comparative analysis in this institutional area was done on the basis of six variables. Three of them represent inputs, that is, institutional determinants, and other three variables describe outputs of institutional regulations. For each of them coefficients of similarity between a CEE11 country and a selected Western European country were calculated, and based on it the similarity hexagons were created. In this paper, two pictures of the institutional arrangements were taken: for 2005 and for 2014. Additionally, an analysis of changes that took place in institutional solutions in the CEE11 countries, based on the variables and the coefficients of similarity, was carried out.

The analyses showed that in the area of financial intermediation, the group of CEE11 countries in 2005 was characterized by the greatest similarity to the Continental model of capitalism. The same investigations carried out for 2014 indicate a significant shift in the analyzed area toward solutions typical of the Mediterranean model.

**Keywords:** financial systems, comparative empirical study, Central and Eastern Europe

**JEL Classification:** P51

## 1 Introduction

The main task of the financial intermediation system indicated by Amable [2003] is to provide enterprises with funds to finance their economic activity. The financial intermediation system is an institutional area, also distinguished in many other studies on the models of capitalism [Mykhnenko, 2005, Zielenkiewicz, 2013, Bohle and Greskovits, 2012, Hall and Soskice, 2001, Coates, 2000, Hall and Gingerich, 2009]. These systems are defined as centralized, if the banking system plays the most important role in them (as financial intermediaries), or decentralized, when this function is primarily performed by the capital market. The analyses relate to the size, significance and share of both these segments in the national financial intermediation systems. The study also included financing from abroad in the form of direct investments.

Central and Eastern European (CEE) countries, moving from a centrally planned economy to a market economy, faced the necessity to build a financial intermediation system from the basis (or rebuilt an

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existing one), so they could choose a model, which they considered to be the most appropriate [Babos, 2010, Bohle and Greskovits, 2012]. It is worth mentioning that an in-depth discussion on this subject was rather not conducted. The CEE countries simply implemented a set of recommendations prepared by experts from Western Europe and the United States [Rapacki, 2009]. This group of countries differs in this respect from the countries that have previously joined the European Union, because the financial systems functioning there is the result of long-term development and evolution.

## 2 Research method

This study rejects the idea of creating a separate category for the economies of CEE countries, that is, Dependent Market Economies, proposed by Nölke and Vliegenthart [2009]. In order to identify models of capitalism in selected 11 countries from CEE (CEE11; Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Romania, Slovakia and Slovenia), four countries of Western Europe were selected, representing four European models of capitalism identified by Amable [2003]: Anglo-Saxon model—the United Kingdom; Mediterranean model—Spain; Continental model—Germany and Scandinavian/Nordic model—Sweden. The reference countries were selected arbitrarily on the basis of the author's expert knowledge and researches presented by Amable [2003] and Próchniak et al. [2016]. Literature review, expert knowledge and analysis of information available in databases allowed to select six variables to conduct the analysis:

- a) [DCPS]—domestic credit to private sector (% gross domestic product [GDP], World Bank, 2017)
- b) [FDI]—foreign direct investments, calculated as the difference between average direct investment inflows and average direct investment outflows from 2004 to 2006 and 2013 to 2015, respectively (% of GDP; own calculations based on World Bank, 2017)
- c) [MIPFA]—the sum of mutual fund assets, insurance company assets and pension fund assets (all of them in % GDP, own calculations based on World Bank, 2017)
- d) [GPEA]—gross portfolio equity assets (% GDP, World Bank 2017)
- e) [SMC]—stock market capitalization (% GDP, World Bank 2017)
- f) [BAC-5]—assets of the five largest banks to the assets of all banks (World Bank 2017).

The first three indicators, that is, [DCPS], [FDI] and [MIPFA] are treated as input variables, and the remaining three, that is, [GPEA], [SMC] and [BAC-5] are output variables. They represent both resources and financial flows appearing in the analyzed economies.

For each variable, a partitive coefficient of similarity was calculated. It shows the similarity between the CEE11 country and the selected country from Western Europe. If its value is 100, it means that the CEE11 country has the same value of variable as the reference country. Hence there is a complete resemblance. However, if the value of the partitive similarity coefficient is equal to 0, it should be understood that these countries show a complete lack of similarity, because the value of the variable for the CEE11 country is outside the following range (regardless of the direction of disparity):

$$(X_{refC} - 3 \times SD(X_1, \dots, X_{15}); X_{refC} + 3 \times SD(X_1, \dots, X_{15})),$$

where  $X_{refC}$  is the value of the  $X$  variable for the reference country (representing a given model of capitalism) and st. dev.  $(X_1, \dots, X_{15})$  is the standard deviation of the  $X$  variable in the entire analyzed group.

If the value for a given variable is between 0 and 100, then the partitive similarity coefficient is calculated in proportion to the distance between the value of the variable for the reference country and the limit value in this range.

Based on the calculated partitive similarity coefficients, similarity hexagons are constructed. They are used to compare the CEE11 countries to the reference countries of Western Europe. The tops of hexagons represent variables describing the area of financial system. The greater the hexagon area (field), the greater the similarity of countries in a given area. From the six partial similarity coefficients obtained for each

CEE11 country in relation to four reference countries, the arithmetic mean is calculated. It is treated as a synthetic similarity coefficient.

### 3 Results of the analysis

#### 3.1 Year 2005

It can be stated, in general, that financial intermediation system in the CEE11 countries in 2005 was the most similar to the Continental model, represented by Germany (Table 1). The Mediterranean model was the second most similar to these economies. But it should be emphasized that the differences between values of similarity coefficients for these two models are low for all CEE11 countries (usually 0.8–1.6 pp, regardless of the direction). The similarity in this respect to other countries/models is much lower.

*Bulgaria* is the only exception in this general calculation. The financial system of the country was characterized by the highest similarity to Spain, that is, the Mediterranean model, although the similarity to the Continental one was almost high, but the lowest among all CEE11 countries. Bulgaria was far from the model of capitalism operating in Sweden and the United Kingdom. The highest similarity to Spain was recorded for the GPEA and MIPFA variables, describing the importance of the capital market. On the other hand, DCPS and BAC-5 were similar to Spain to a small extent. The similarity to Germany is high for SMC and moderately high for GPEA and DCPS. Bulgaria was different from any other Western European countries in terms of FDI. Almost the entire area of hexagons of similarity to Germany and to Spain remained on the output side (Figure A1 in Appendix).

*Croatia's* financial system was one of the most similar to West European countries. It showed the greatest similarity to the Continental model and only slightly lower to the Mediterranean one. This was mainly due to the very high resemblance to the German economy in terms of SMC. Compliance was also high for BAC-5, FDI and DCPS. In case of Spain, the highest similarity concerned BAC-5, GPEA and MIPFA. The values of similarity coefficients for the other two models of capitalism were almost half lower. In terms of FDI, Croatia was the closest to the British economy and, in terms of DCPS, to the Swedish one. The high degree of similarity to the United Kingdom in case of BAC-5 was also noteworthy. Most of the area of hexagons of similarity to Germany and Spain occurred on the output side (Figure A3 in Appendix).

**Table 1.** Coefficients of similarity—financial system (2005)

Country (2005)	Reference country			
	Germany	Spain	Sweden	The United Kingdom
Bulgaria	36.0	37.6	14.4	13.6
Croatia	60.8	59.9	35.7	32.1
Czech Republic	56.4	55.4	31.1	26.4
Estonia	56.7	51.1	42.7	20.4
Hungary	57.4	56.4	32.1	35.4
Latvia	56.8	55.9	31.7	33.3
Lithuania	62.9	57.2	39.0	27.2
Poland	49.7	48.8	27.0	28.0
Romania	46.5	45.7	21.7	24.5
Slovakia	50.3	49.4	25.2	26.2
Slovenia	62.0	61.1	36.8	37.3

Own calculations.

The *Czech* financial system was to a small extent similar to the Western European ones, but it was characterized by the highest similarity to Germany, and thus to the Continental model, and only slightly lower to Spain. Compliance with the Scandinavian and Anglo-Saxon model was already significantly lower. The high similarity coefficient to Germany seemed to be the result of a comparable SMC and, to a lesser extent, GPEA values. GPEA was very high in Spain and very low for other reference countries. Also noteworthy is MIPFA, which in the analysis of similarity to Spain achieved a high value. In terms of FDI the discussed country was the closest to the United Kingdom, mainly due to the direction of flows. The value of DCPS, although different from the values observed in the reference countries, was the most similar to that of Sweden and Germany. The major parts of the both hexagons of similarity (to Germany and to Spain) were located on the output side (Figure A5 in Appendix).

*Estonia's* financial system was characterized by the highest similarity to Germany, that is, the Continental model, and secondly to Spain. The similarity coefficient to Sweden was quite great, mainly due to the high value of BAC-5 in both countries. Substantial resemblance to Germany resulted from the importance of the stock exchange—SMC reached here the highest value among all CEE11 countries. High likeness to the United Kingdom in FDI resulted mainly from the same direction of capital flows, because the values were not comparable. In turn, high similarity factors to Spain for MIPFA and GPEA were a consequence of the relatively weak development of financial markets in both Spain and other CEE11 countries. However, the value of GPEA was the highest among all analyzed CEE11 countries. Both, the hexagons of similarity to Germany and Spain, were mostly on the output side (Figure A7 in Appendix).

As a result of the analyses it can be concluded that *Hungary's* financial intermediation system was characterized by the highest similarity to Germany, that is, the Continental model. The likeness to the Mediterranean model was only slightly lower. The similarity to the Anglo-Saxon model was one of the highest in the whole group of CEE11. Hungary was similar to Germany primarily in terms of SMC and FDI. The DCPS variable showed the greatest similarity to Sweden. MIPFA and GPEA displayed the largest compliance to Spain and, secondly, to Germany. For BAC-5 and FDI, there was a high resemblance to the United Kingdom. The hexagon of similarity to Germany was evenly on half on the input and output sides. In case of Spain, the hexagon was shifted slightly to the output side (Figure A9 in Appendix).

*Latvia* showed the greatest resemblance to Germany, that is, the Continental model, and not much lower to Mediterranean one. The similarity to the United Kingdom was low, but one of the highest among CEE11 countries. In terms of BAC-5, Latvia was comparable with the United Kingdom and Spain. The value of the similarity coefficient in the area described by the FDI variable was quite high for the United Kingdom. The resemblance to Spain as defined by MIPFA and GPEA was the highest. The second in this respect was the German economy. The shallow capital market of Latvia put the country closest to the Germany. DCPS, higher than the average for CEE11 countries, placed it next to the Scandinavian and near Continental model. The analysis of the hexagon of similarity showed that in both Germany and Spain, roughly half of the figure was on the side of inputs and half on the side of outputs (Figure A11 in Appendix).

The *Lithuanian* financial system was also characterized by the highest similarity to Germany, that is, the Continental model and it was the highest similarity to Germany among all the analyzed countries. Out of six analyzed areas, the greatest similarity to this country concerns the BAC-5. This was the effect of the above-average value of this variable among the CEE11 countries. Lithuania has developed a relatively large capital market, similar in relative size to the German one. The second in this respect was the Spanish financial system. Similarity coefficients for MIPFA and GPEA were the highest for Spain, whereas FDI was the highest for the United Kingdom. The greater part of the hexagons of similarity to Germany and to Spain was on the output side (Figure A13 in Appendix).

The *Polish* financial intermediation system—as in most CEE11 countries—showed the greatest similarity to Germany, that is, the Continental model. The second was Spain, with only the small difference between similarity coefficients. The value of DCPS in Poland, one of the lowest among CEE11 group of countries, gave the greatest similarity to Sweden and Germany. The same was true for the BAC-5, but this gave the highest resemblance to the United Kingdom this time. SMC, one of the highest in the region, brought Poland closer to Germany. MIPFA and GPEA turned out to be the most similar to Spain, whereas FDI gave the position closest to the United Kingdom. More or less half the area of the hexagon of similarity to Germany and Spain was on the side of inputs and on the side of the outputs (Figure A15 in Appendix).

*Romania* was characterized by a small similarity to the financial intermediation system of all the reference countries. The ratio of similarity to Germany, that is, the Continental model, turned out to be the highest. Spain was in the second place. DCPS value, lowest among the CEE11 countries, brought a position far from all reference countries. BAC-5 gave a rather high resemblance to the United Kingdom and Sweden. FDI, in turn, brought the country closest to the United Kingdom. MIPFA and GPEA achieved the highest similarity to Spain, and SMC turned out to be relatively the closest to Germany. The greater part of the hexagon of similarity to this country was on the side of the results, as in the case of Spain (Figure A17 in Appendix).

In the area of financial intermediation, *Slovakia* reached the highest resemblance to Germany, that is, the Continental model. It was only slightly lower to Spain and definitely lower to the other two reference countries. Slovakia was characterized by a relatively small SMC value, which gave it the highest similarity to Germany in this respect. MIPFA and GPEA were the closest to Spain, and DCPS to Sweden and Spain. As for FDI, the shortest distance was (and therefore the largest similarity) to the United Kingdom. BAC-5 brought the highest resemblance to Spain and the United Kingdom. The hexagon of similarity to Germany and Spain was to a greater extent on the side of the outputs (Figure A19 in Appendix).

The similarity coefficients for *Slovenia* in the area of financial intermediation occupied one of the highest positions for all reference countries. However, the highest was the similarity coefficient to Germany, that is, to the Continental model and then to Spain. In terms of BAC-5, Slovenia was closest to the United Kingdom. DCPS was higher than the average for the region, hence quite high resemblance to Germany and Sweden in this aspect. FDI reached a value lying exactly between the United Kingdom and Germany, which resulted in a very high similarity in both cases. MIPFA and GPEA were the closest to Spain, and SMC to Germany. The hexagon of similarity to this country was more or less on the side of inputs and outputs. The same could be said about the hexagon of similarity to Spain (Figure A21 in Appendix).

### 3.2 Year 2014

After 9 years, the situation in the CEE11 countries had changed significantly. In almost all cases, the similarity coefficient to Germany increased. However, changes completed in the financial intermediation brought most countries even closer to the institutional architecture characterizing Spain, hence the Mediterranean model. These were: the Czech Republic, Hungary, Latvia, Poland, Romania and Slovenia. Only four countries—Croatia, Estonia, Lithuania and Slovakia—still showed the greatest similarity to Germany. The differences between similarity coefficients for these two reference countries were usually small, but the shift toward the Mediterranean model was clearly visible. The smallest similarity—just like in 2005—could be seen in case of the Anglo-Saxon and Scandinavian models (Table 2).

*Bulgaria* invariably showed the greatest resemblance to Spain, that is, to the Mediterranean model and high degree of compliance with the Continental model. The likeness to the Scandinavian and Anglo-Saxon models remained low. The similarity to Spain has increased in five dimensions: GPEA, MIPFA, DCPS, FDI and SMC. In the case of BAC-5 Bulgaria moved away from Germany, which was the result of a significant increase in the value of the variable for Germany. The similarity to the United Kingdom and Spain in terms of FDI had significantly increased mainly due to the lowering of this variable for Bulgaria and, to a lesser extent, FDI changes in the reference countries. High similarity to Germany in the areas described by DCPS, GPEA and SMC persisted. The greater part of the area of hexagons of similarity to Spain and Germany remained on the output side; however, in comparison with 2005, it looks clear that there has been a shift to the input side of the figure (Figure A2 in Appendix).

*Croatia's* financial system remained relatively close to the Continental model, although compliance with the Mediterranean one was also high. The similarity to the other models remained at a low level. High likeness was noticeable in the area of BAC-5, in particular to Germany and Sweden. This was the result of a significant increase in the concentration of banking sector assets in Croatia. The country had become very similar to Germany in terms of SMC, and also DCPS, GPEA and MIPFA. However, these last two variables were the closest to Spain. FDI, in turn, remained at the level most similar to the British one. Compared with 2005, the shift of the hexagon of similarity to Spain to the side of inputs was visible, whereas it was not the same for the hexagon of similarity to Germany (Figure A4 in Appendix).



**Table 2.** Coefficients of similarity—financial system (2014)

Country (2014)	Reference country			
	Germany	Spain	Sweden	The United Kingdom
Bulgaria	45.2	48.4	12.7	24.1
Croatia	72.8	66.9	36.5	33.8
Czech Republic	61.0	64.2	24.4	23.0
Estonia	72.4	66.5	35.0	28.1
Hungary	61.6	63.8	25.2	29.1
Latvia	61.0	64.3	24.6	34.9
Lithuania	59.9	56.6	25.7	21.8
Poland	59.7	62.9	24.0	30.4
Romania	47.5	50.7	12.3	21.0
Slovakia	67.5	67.4	31.9	22.6
Slovenia	52.3	55.5	15.3	22.2

Own calculations.

The *Czech* system of financial intermediation has departed on the scale of similarity from the Scandinavian and Anglo-Saxon models. However, it became similar to the Continental model and above all to the Mediterranean one—it was characterized by the greatest similarity to Spain. It was the result of the high likeness in GPEA and MIPFA. Due to the very low but positive value of FDI, the Czech Republic was the closest to Spain and Germany. Only in terms of DCPS and SMC, the resemblance was higher in relation to Germany than to Spain. The analysis of the hexagons of similarity confirmed that in the Czech Republic there has also been a shift in similarity to these two reference countries toward inputs (Figure A6 in Appendix).

*Estonia* had impressively approached the Continental model represented by Germany. Spain was in second place. High resemblance to these countries resulted from similar DCPS (increased in Estonia and decreased in these reference countries) and FDI. In terms of MIPFA and GPEA Estonia moved toward Spain, whereas in the SMC it was the closest to Germany. The BAC-5 increased (similarly as in the reference countries), which most closely resembled the country to Germany and Sweden. The hexagon of similarity to Germany compared with 2005 changed its shape slightly and moved to the side of inputs. It was different in the case of Spain and it was more or less by half on the side of inputs and outputs. There had also been a shift in similarity from the area of outputs to the area of inputs (Figure A8 in Appendix).

In the field of financial intermediation, the similarity of *Hungary* to Germany and Spain had increased, but resemblance to the United Kingdom and Sweden had decreased. The greatest likeness to the Mediterranean model occurred, which was different from the one in the previous analyzed year. This was primarily the effect of very high similarity to Spain and also to the United Kingdom in the BAC-5 area. It is worth noting that the resemblance in this respect increased in relation to all reference countries. Similarity to Spain for MIPFA, GPEA and FDI was high. In terms of DCPS, Hungary was the closest to Germany. The similarity hexagon to Germany as compared with 2005 shifted toward the outputs, which was quite unusual compared with the previously presented analyses of CEE11 countries. The shape of the hexagon of similarity to Spain was quite akin to that of 2005, so the relation between similarity in the sphere of inputs and outputs remained very similar (Figure A10 in Appendix).

On the scale of similarity, *Latvia* approached Germany and Spain (to a much greater extent), hence the Mediterranean model. It was relatively farthest away from the Anglo-Saxon and Scandinavian models. The value of BAC-5 increased significantly, bringing Latvia closer to Spain and the United Kingdom. Similar changes, though on a smaller scale, also concerned FDI. DCPS significantly increased, which resulted in a high level of similarity to Germany in this respect. The likeness in the other three areas was comparable with that of the whole group of CEE11 countries: high for MIPFA and GPEA in relation to Spain and high for

SMC in relation to Germany. The shape of the hexagon of similarity to Spain did not change much compared with 2005. Approximately half was still on the side of inputs and half on the side of outputs. In the case of the figure of similarity to Germany, the larger part of the field was still on the output side (Figure A12 in Appendix).

The resemblance of financial system of *Lithuania* decreased in relation to all reference countries. It remained the most alike German, that is, the Continental model, but the similarity to the Mediterranean one was only slightly smaller. The DCPS value, much lower than the average for the CEE11 countries, placed this country also far from the reference countries. This also applies to SMC, because the capitalization of the Lithuanian stock market has dropped significantly. The high resemblance to Spain in terms of MIPFA and GPEA was understandable due to the limited development of capital market. The value of FDI turned out to be closest to Spanish. The highest similarity to the reference countries concerned BAC-5. It was the result of a significant increase in the concentration of banking assets in Lithuania. The shape of the hexagon of similarity to Spain has changed only slightly compared with 2005, and the shift toward the inputs side was visible. The greater part of the hexagon of similarity to Germany was on the side of the outputs, likewise in 2005 (Figure A14 in Appendix).

The similarity coefficient for *Poland* increased in relation to all reference countries except Sweden. The highest was the coefficient of similarity to Spain, hence the Mediterranean model, but the resemblance to Germany was not much smaller. The DCPS increased and brought Poland closer to the reference countries, the closest to Germany. FDI set Poland near the United Kingdom. MIPFA and GPEA showed the greatest resemblance to Spain, and SMC to Germany. The concentration level described by BAC-5 increased, but it was still below the average for CEE11 countries. In this respect, the similarity was the greatest for Spain and the United Kingdom. Both the hexagon of similarity to Germany and the figure of similarity to Spain were mostly on the left side, in the sphere of outputs (Figure A16 in Appendix).

*Romania* occupied the last or penultimate place among CEE11 on the scale of similarity to the reference countries. Similarity coefficients increased to Germany and Spain, and made the financial system the most similar to the Mediterranean model. With regard to the other two reference countries, these coefficients decreased. In terms of BAC-5, the largest similarity affected Spain and the United Kingdom, although the level of concentration itself changed slightly in Romania. The SMC indicated the greatest similarity to Germany, but MIPFA and GPEA showed the highest resemblance to Spain. DCPS, one of the lowest in the region, allowed to estimate the resemblance to Germany as moderate. The greater part of the hexagon of similarity to Germany was situated on the outputs side, but one could see a shift toward the inputs. The similarity to Spain spread more or less equally to the input and the output sides (Figure A18 in Appendix).

*Slovakia* was characterized by a high similarity to all the reference countries, the highest to Germany and thus the Continental model. The similarity to Spain was almost as high and it reached the highest value among all the CEE11 countries. Due to the negative FDI, it showed high resemblance to the reference countries (except the United Kingdom). DCPS gave a high likeness to Germany, whereas the relatively high BAC-5 brought a high resemblance to Spain and the United Kingdom. In terms of MIPFA and GPEA, Slovakia was the closest to Spain, and SMC to Germany. The hexagon of similarity to Germany was a fairly regular figure—in all dimensions the similarity was high, and the sides of inputs and outputs were almost equal. In turn, the hexagon for Spain was mostly on outputs side and there was some shift toward inputs as compared with 2005 (Figure A20 in Appendix).

The similarity of *Slovenia* to all reference countries has decreased. This is the second such case among analyzed countries. The values of coefficients of similarity belonged to the lowest among the CEE11. The coefficient of similarity to Spain, and hence to the Mediterranean model, had the highest value. The second in order was Germany. The resemblance in terms of MIPFA and GPEA was the highest in relation to Spain. The SMC was the most similar to Germany. The BAC-5 decreased, which resulted in a decrease in similarity to each of the reference countries, while similarity to Spain and the United Kingdom turned out to be the largest. FDI placed Slovenia at a similar distance from both the United Kingdom and Spain. When it comes to DCPS, the country was the closest to Germany. The greater part of the hexagon of similarity to Spain, and also to Germany, was on the side of outputs (Figure A22 in Appendix).



## 4 Comparison for 2005 and 2014

In Table 3, the changes that took place between 2005 and 2014 in percentage points of the coefficients of similarity of CEE11 to the reference countries representing four models of capitalism are presented.

The greatest change was observed in case of Slovenia. The country moved away from Sweden (Nordic model) by 21.5 pp. In fact, it drifted away from all the reference countries likewise. Similar direction of changes, although smaller differences, can be observed in Lithuania. The country moved the farthest away from Nordic model (13.3 pp) than from Anglo-Saxon one (5.4 pp). The resemblance to the Anglo-Saxon and Nordic models in the area of financial system decreased in case of Czech Republic, Hungary and Romania, and at the same time increased in relation to the Mediterranean and Continental models. Bulgaria, Estonia, Latvia and Poland, in terms of similarity, approached to all the reference countries except Sweden. Slovakia took a step back in resemblance to the United Kingdom, but approached the Scandinavian model the most from the whole group of CEE11 countries. Croatia was the only state that increased the coefficient of similarity to all of the reference countries. Bulgaria noticed highest increase in likeness to the United Kingdom, which—although in a smaller scale—was also observed for Estonia, Poland, Latvia and already mentioned Croatia.

The highest increase in similarity to the reference countries was recorded by Slovakia (18.0 pp to Spain; 17.2 pp to Germany) and Estonia (15.4 and 15.7 pp, respectively). A remarkable step in the same direction was taken by Poland (14.1 and 10.0 pp, respectively) and Bulgaria (10.8 and 9.2 pp, respectively). Czech Republic, Hungary, Latvia were also closer to the Continental model (range from 4 to 5) and the Mediterranean one (range from 7 to 9). Finally, Romania made the least step toward institutional solutions existing in Continental and Mediterranean models.

Looking at the results of the research, several overall conclusions can be formulated. First of all, changes in institutional architecture of financial intermediation system in analyzed group of countries moved them away from Anglo-Saxon and (the most) from Scandinavian models of capitalism. At the same time, they approached the Continental and Mediterranean ones. The greatest step forward was taken toward Mediterranean model, represented by Spain.

CEE11 countries were characterized by the greatest resemblance to Spain in GPEA and MIPFA. As far as GPEA is concerned, the similarity was high both in 2005 and in 2014 (the partitive coefficients of similarity values were close to 80). In case of MIPFA, an increase in similarity can be observed (approximately from 70 to 80). The average similarity in BAC-5 was high in the beginning and in the end of analyzed period

**Table 3.** Change of the coefficients of similarity between 2005 and 2014—financial system (percentage points)

Country	Reference country			
	Germany	Spain	Sweden	The United Kingdom
Bulgaria	9.2	10.8	−1.7	10.5
Croatia	12.0	7.0	0.8	1.7
Czech Republic	4.6	8.8	−6.7	−3.4
Estonia	15.7	15.4	−7.7	7.7
Hungary	4.2	7.4	−6.9	−6.3
Latvia	4.2	8.4	−7.1	1.6
Lithuania	−3.0	−0.6	−13.3	−5.4
Poland	10.0	14.1	−3.0	2.4
Romania	1.0	5.0	−9.4	−3.5
Slovakia	17.2	18.0	6.7	−3.6
Slovenia	−9.7	−5.6	−21.5	−15.1

Own calculations.

(around 70), but in case of FDI it grew up (to over 60 from 40). In terms of SMC the likeness was quite low, and during the reviewed period it increased slightly. The smallest values were assumed by partitive coefficients of similarity for DCPS, but they were also increased (from 20 to 30). The similarity of the CEE11 countries to Spain remained at a high level or increased in the analyzed scope and time interval. The resemblance is clearly more concerned on the outputs side (approximately 60) than on inputs side (50), both in 2005 and 2014. This general conclusion for the entire group of CEE11 countries coincides with the analyses made earlier, for each country separately.

Resemblance to Germany also results from the high values of partitive coefficients of similarity for GPEA and MIPFA. In case of the first variable, it increased from around 50 to 70 and for the second variable from 40 to 55. Although the partitive coefficient of similarity for the SMC was high, it fell in the analyzed period (approximately from 80 to 70). The decrease in the value of this coefficient was also recorded in the case of BAC-5 (by a few points, from around 60) and FDI (from about 45, by some 10 points) variables. However, a significant increase of similarity for the DCPS (from 50 points by half) was noticed. The analysis of the source data indicates that this is primarily the effect of a drop in the DCPS value in Germany. Also in this case, the majority of the similarity is concentrated on the outputs side (over 60) than on inputs (around 50). This also coincides with previous analyses.

## 5 Discussion and conclusions

After these detailed analyses, several observations and conclusions can be made:

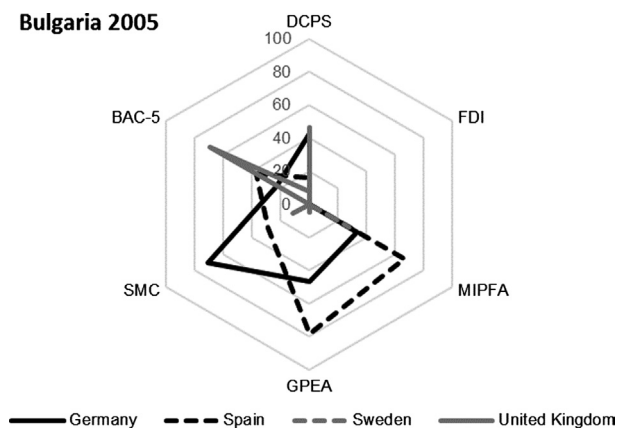
- a) In 2005 in the area of financial intermediation, CEE11 countries were most similar to the Continental model of capitalism, represented by Germany. Bulgaria was the only exception.
- b) The second one in these classifications was the Mediterranean model, represented by Spain. Bulgaria was the exception.
- c) The difference in the average values of the coefficient of similarity between the Continental and the Mediterranean models was insignificant;
- d) In all countries of the region, the variables MIPFA and GPEA reached the values closest to the Spanish ones, and in the case of the variable SMC to the German ones.
- e) The values of the other variables were not in clear order.
- f) Hexagons of similarity were located by half in the inputs and outputs sides; in many cases, the shift of the hexagon to the output side was detected.
- g) The shapes of some similarity hexagons for different CEE11 countries were alike, but it is difficult to indicate any regularity.
- h) The institutional changes that took place between 2005 and 2014 in both the CEE11 and reference countries led to a change of the model to which the region's countries showed the highest similarity. The CEE11 countries had become the most similar to Spain, that is, the Mediterranean model. There were four exceptions: Croatia, Estonia, Lithuania and Slovakia.
- i) In the second place, in terms of similarity in 2014, there was a Continental model represented by Germany. The four countries mentioned earlier showed up the greatest similarity to it.
- j) The difference in average values of coefficients of similarity for these two models remained insignificant.
- k) For Continental and Mediterranean models of capitalism, the similarity increased from 2005 to 2014, and for the other two models they decreased.
- l) The CEE11 countries moved away the most from the Scandinavian model.
- m) As in 2005, in all countries of the region the variables MIPFA and GPEA reached the values closest to the Spanish ones, and in the case of the variable SMC to the German ones.
- n) The values of other variables were organized without any clear order.
- o) The hexagons of similarity were arranged by half on the inputs and half on the outputs sides, or mostly on the inputs side, either to a large extent on the outputs side. However, it seems that more often than in 2005 there was a shift toward outputs side of figures.
- p) Some hexagons of similarity were alike each other, but it is hard to indicate any regularity.

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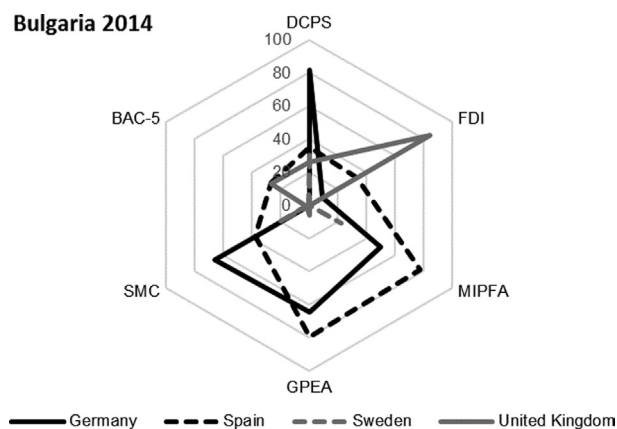
## Appendix

**Bulgaria 2005**



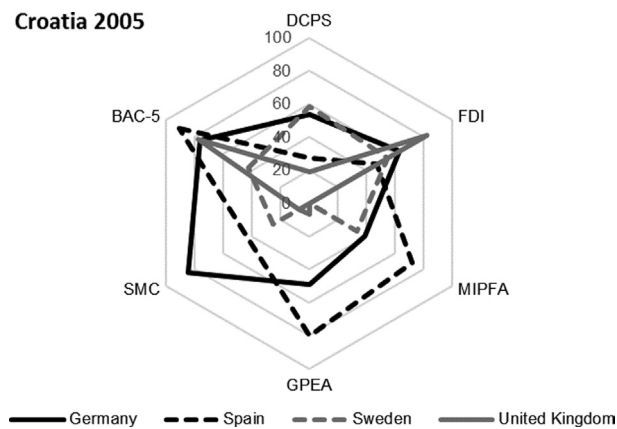
**Figure A1.** The hexagon for Bulgaria (year 2005).

**Bulgaria 2014**

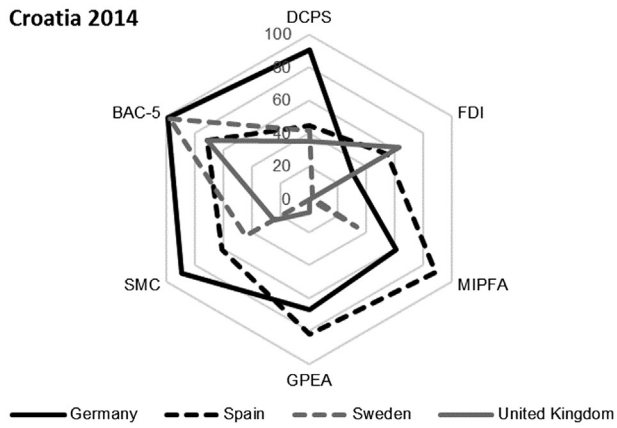
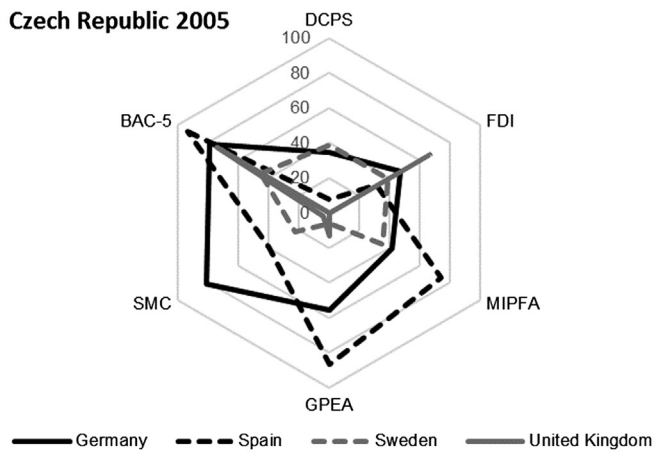
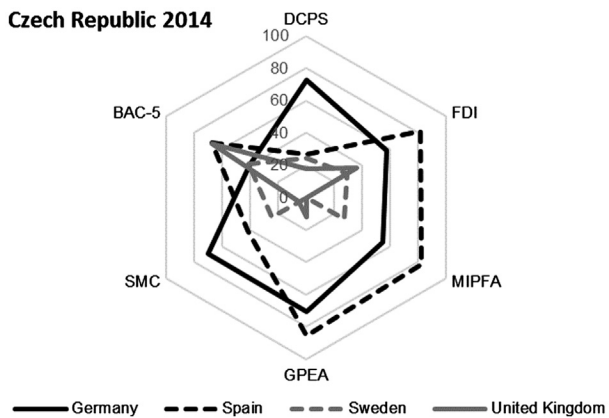


**Figure A2.** The hexagon for Bulgaria (year 2014).

**Croatia 2005**



**Figure A3.** The hexagon for Croatia (year 2005).

**Croatia 2014****Figure A4.** The hexagon for Croatia (year 2014).**Czech Republic 2005****Figure A5.** The hexagon for Czech Republic (year 2005).**Czech Republic 2014****Figure A6.** The hexagon for Czech Republic (year 2014).

### Estonia 2005

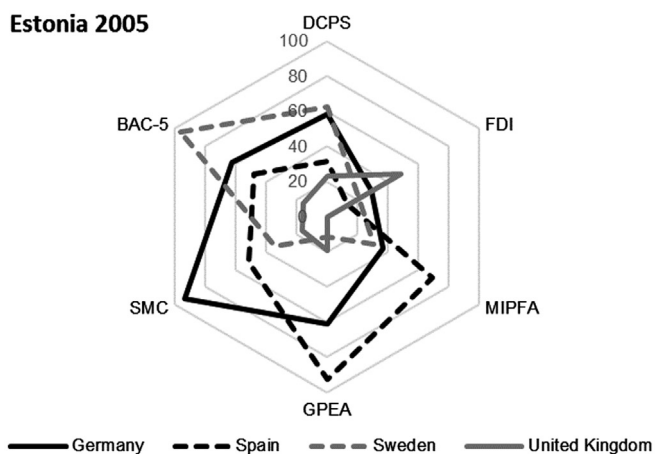


Figure A7. The hexagon for Estonia (year 2005).

### Estonia 2014

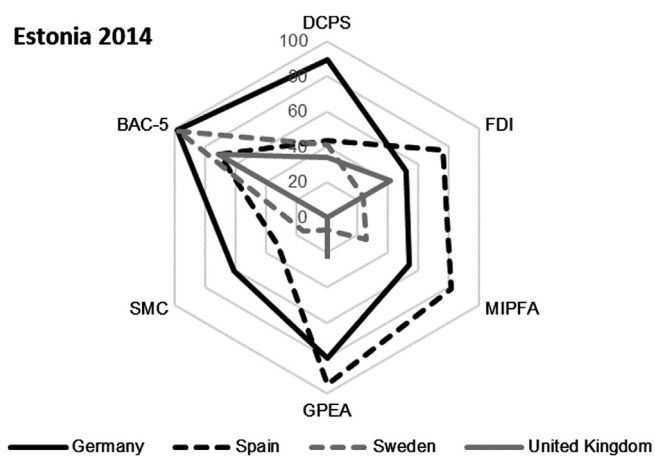


Figure A8. The hexagon for Estonia (year 2014).

### Hungary 2005

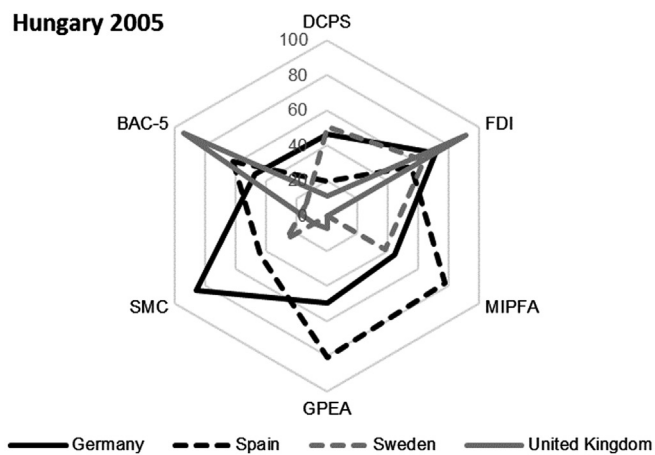


Figure A9. The hexagon for Hungary (year 2005).



### Hungary 2014

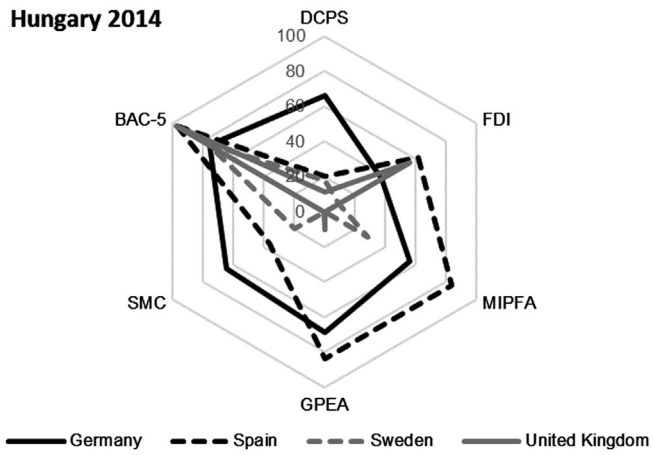


Figure A10. The hexagon for Hungary (year 2014).

### Latvia 2005

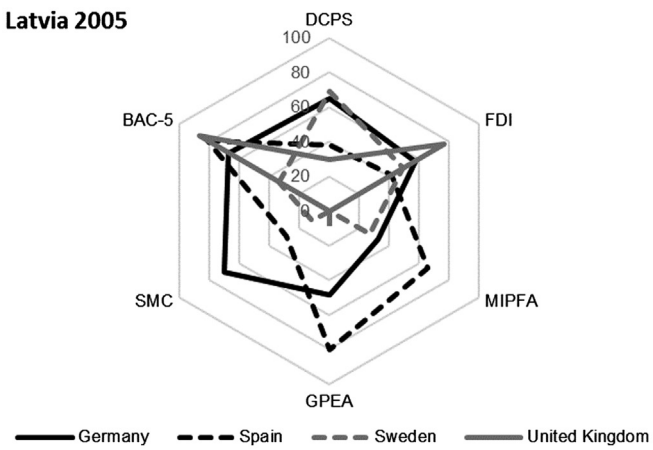


Figure A11. The hexagon for Latvia (year 2005).

### Latvia 2014

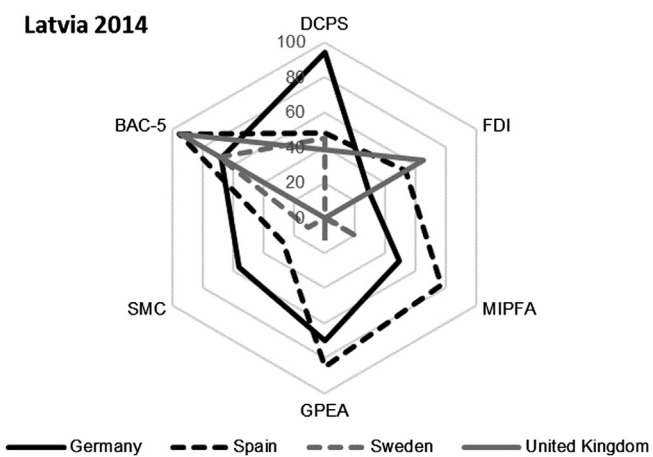


Figure A12. The hexagon for Latvia (year 2014).

### Lithuania 2005

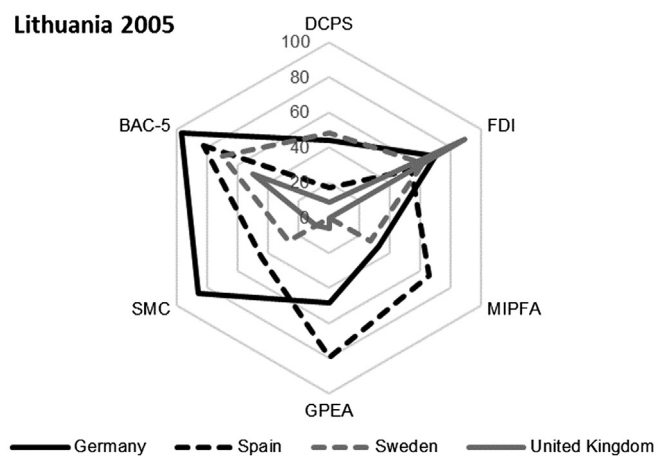


Figure A13. The hexagon for Lithuania (year 2005).

### Lithuania 2014

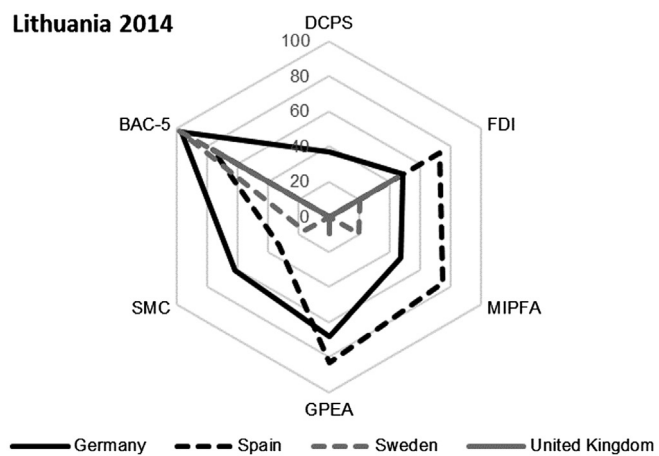


Figure A14. The hexagon for Lithuania (year 2014).

### Poland 2005

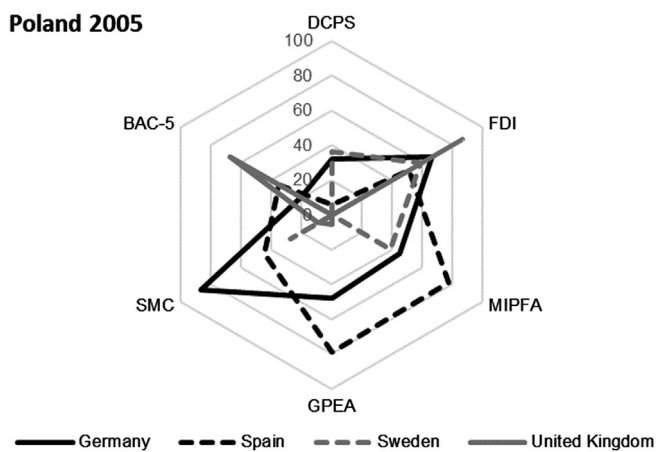
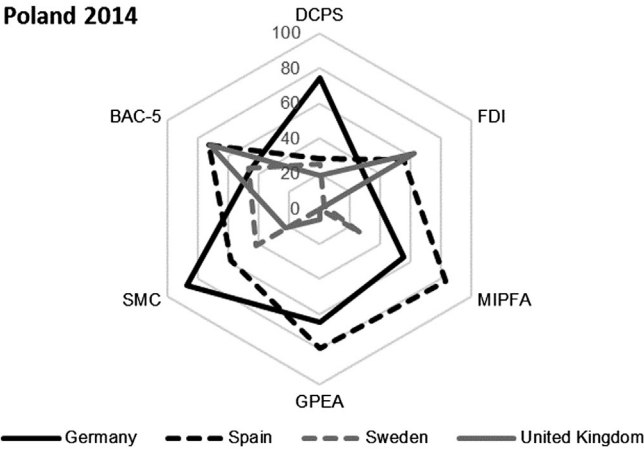


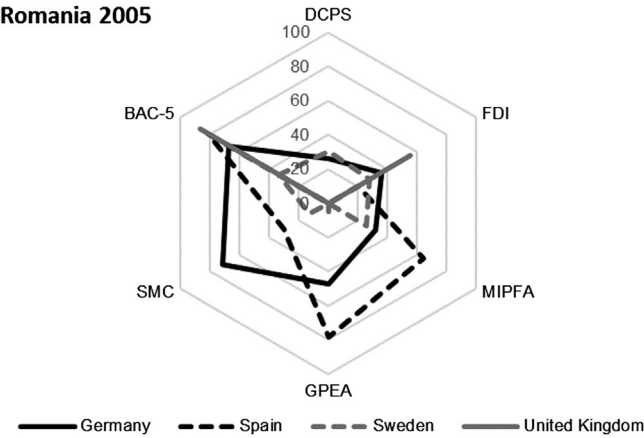
Figure A15. The hexagon for Poland (year 2005).

**Poland 2014**



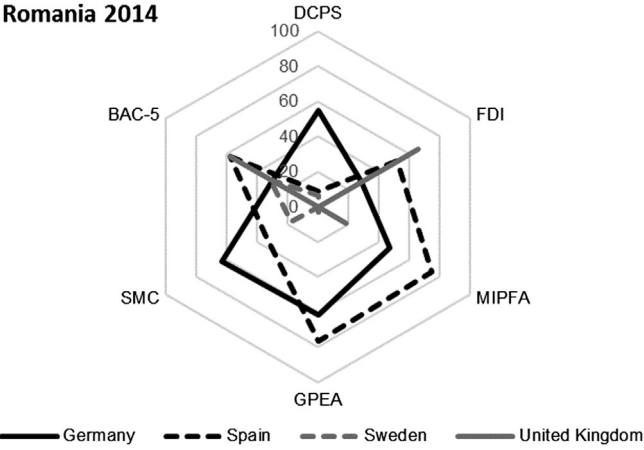
**Figure A16.** The hexagon for Poland (year 2014).

**Romania 2005**



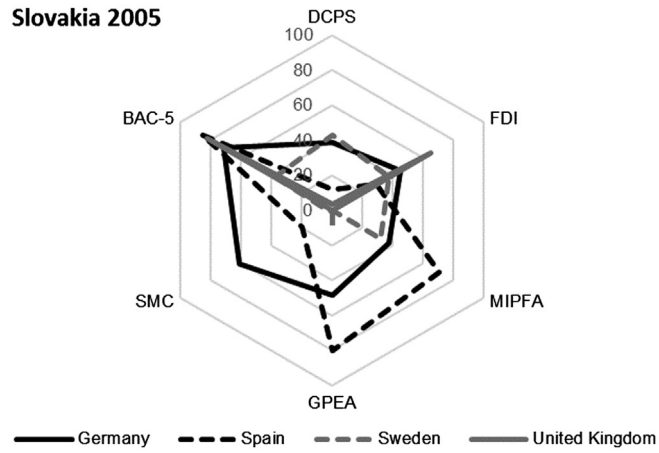
**Figure A17.** The hexagon for Romania (year 2005).

**Romania 2014**



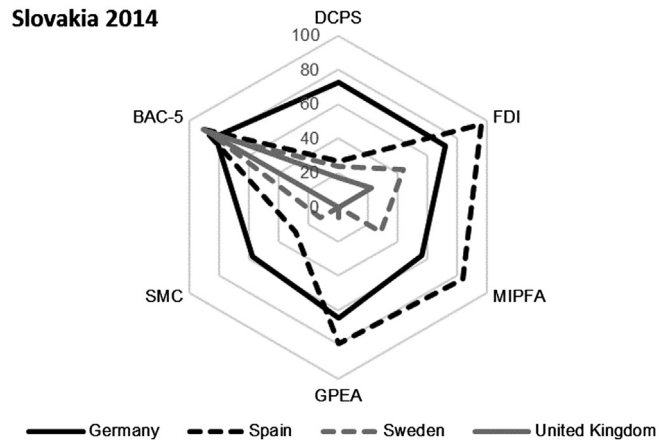
**Figure A18.** The hexagon for Romania (year 2014).

**Slovakia 2005**



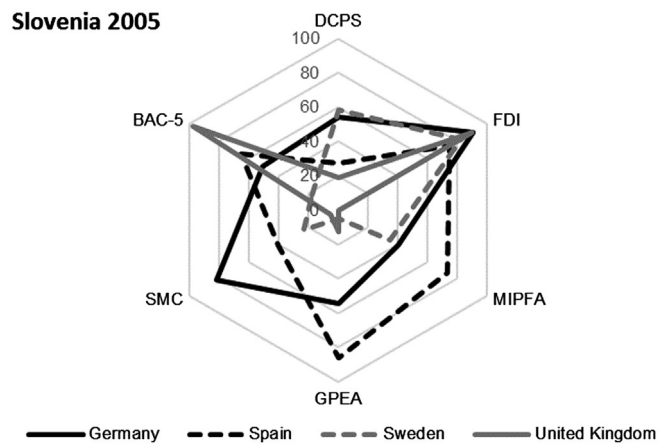
**Figure A19.** The hexagon for Slovakia (year 2005).

**Slovakia 2014**



**Figure A20.** The hexagon for Slovakia (year 2014).

**Slovenia 2005**



**Figure A21.** The hexagon for Slovenia (year 2005).

Slovenia 2014

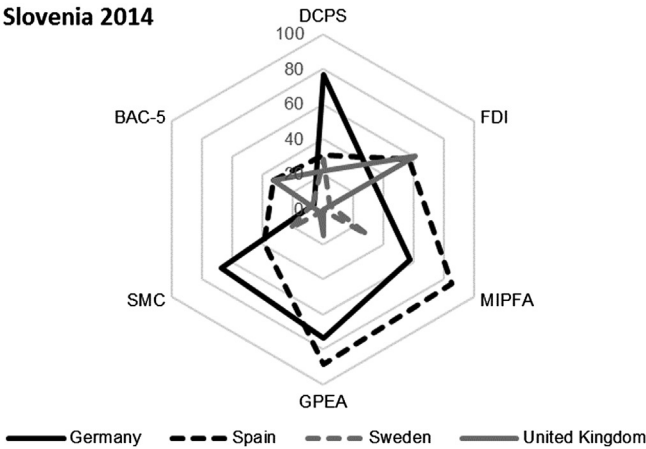


Figure A22. The hexagon for Slovenia (year 2014)