

## Research Article

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# Emerging models of patchwork capitalism in Central and Eastern Europe: empirical results of subspace clustering

<https://doi.org/10.2478/ijme-2018-0025>

Received June 3, 2018; accepted October 17, 2018

**Abstract:** The main aim of this paper was to shed a new empirical light on the nature and most salient features of the evolving postcommunist capitalism in 11 Central and Eastern European (CEE11) countries against the backdrop of Western European models of capitalism. The research approach capitalizes on the conceptual framework put forward by Amable [2003, *The diversity of modern capitalism*, Oxford University Press, Oxford] , i.e., it seeks to identify the current clusters or models of capitalism in 25 European Union (EU) countries in six institutional areas. However, in contrast to the original Amable's methodology, the subspace clustering method was used, what allowed to take into account a vast set of 132 institutional measures and to analyze their change between 2005 and 2014. The main finding is that CEE11 countries developed their own distinct model of capitalism dubbed "patchwork capitalism." In all but two areas, i.e., product market competition and financial intermediation, postcommunist countries form their own institutional clusters that are substantially different from those observed in Western EU countries. In addition, the paper shows that each CEE11 country followed its own distinct vector of change, which eventually led to a unique patchwork of institutions. Yet, the institutional variance within the region is smaller than the difference between CEE11 countries and other country clusters in the EU.

**Keywords:** Comparative Capitalism, Models of Capitalism, Institutions, Institutional Complementarity, Patchwork Capitalism, Subspace Clustering

**JEL:** O17, P16, P51, C38

## 1 Introduction

As the mushrooming literature on the subject has clearly shown, one of the key challenges encountered in the ongoing research on comparative capitalism boils down to tackle the problem of a limited applicability of the existing standard conceptual and methodological frameworks (in particular, those developed by Hall and Soskice [2001] and Amable [2003]) as a tool capable of fully explaining the nature and intricacies of postcommunist capitalism emerging in transition economies.

The main aim of the present paper was to bridge these two worlds and shed a new empirical light on the nature and most salient features of the evolving postcommunist capitalism in 11 Central and Eastern European (CEE11) countries which joined the European Union (EU) between 2004 and 2013 against the backdrop of Western European models of capitalism. Simultaneously, the paper pursues three specific objectives. First, it strives to verify authors' hypothesis that CEE11 countries have formed their own model(s) of postcommunist capitalism, which is distinct from the patterns established in Western Europe. Second, it seeks to explain the evolution of postcommunist capitalism in CEE11 economies between 2005 and 2014

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and to check whether their institutional architectures were subject to convergence or divergence trends vis-à-vis Western European patterns. Third, in the paper, an endeavor has also been made to identify the current models of Western European capitalism coexisting in the EU and to confront the results with the original typology developed by Amable 15 years earlier.

The research approach adopted in this study capitalizes on the conceptual framework and typology put forward by Amable [2003] and originally designed for Western market economies. With a view to account for transition-specific characteristics of the evolving institutional setups in CEE11 countries and the peculiarities rooted in their command economy legacy, we extended and modified the original Amablean analytical framework. Departing from this approach, we applied a new advanced analytical tool, i.e., the subspace clustering machine-learning method that enables quantification of the results of our comparisons.

The paper has been structured as follows. Theoretical and empirical benchmarks for this study are provided in Section 2. Data and methodology applied are explained in Section 3. The empirical results of our exercise broken down into six institutional areas singled out for the purpose of this research are detailed in Section 4. Major findings aggregated for the whole sample are discussed and interpreted in Section 5. Main conclusions stemming from the paper are provided in Section 6.

## 2 Research benchmarks

As can be seen from a historical perspective, the very idea of “comparative capitalism” was initially confined solely to the coexisting varieties of capitalism in Western industrialized countries. As a derivative, the methodological and conceptual frameworks designed toward this end were targeted at developed market economies alone. This was in particular true for one of the major contributions to the field made by Amable [2003]. His proposition, which will be further on dubbed the diversity of capitalism (DoC) approach, has triggered a new offspring of research geared toward a direct application of the original framework<sup>1</sup> to the former socialist countries undergoing systemic transformation from a centrally planned economy toward a market-driven economy, with an end to explain and better understand the nature of the emerging postcommunist capitalism there. Simultaneously, based on the original methodology, some attempts have also been made to take account of institutional peculiarities inherent in the postcommunist transition and to extend the existing standard classifications with derivative categories that would accommodate transition countries too as the emerging types of postcommunist capitalism (e.g., Nölke and Vliegenthart [2009] or Farkas [2011]). These trends have become particularly pronounced since the enlargement of the EU in 2004 and 2007 encompassing 10 Central and Eastern European (CEE) new member states (followed by Croatia in 2013).

In his book, Amable raised two important questions, even more so if seen from the angle of transition economies, which experienced fundamental institutional change. First, what mechanisms ensure the efficiency of emerging institutions? Second, how institutional efficiency should be understood and on what ground institutions should be assessed as efficient? Making use of a neo-Marxist research framework, Amable claimed that the development of specific institutions represents “the political compromise” between the power of vested interests in the society. Each institutional reform alters the existing balance of power and hence violates interests of institution setters who are on the top of the social ladder. As a result, any change in the institutional setting requires a strong social support for its implementation.

The core element in Amable’s approach is the concept of institutional complementarities, examined earlier by Aoki [1994]. He defined complementarity as a relationship between institutions where the presence of one institution increases the efficiency of another. Amable concluded that the models of capitalism should be studied not only as a set of separate institutions but also in a broader perspective, including the relationships among institutions with special emphasis on their complementarities [Amable, 2003, p. 6].

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<sup>1</sup> This also applies to another important contribution, made 2 years earlier by Hall and Soskice [2001]. For more details, see Rapacki et al. [2016].

As a first step in his methodology, the French scholar singled out five major institutional areas or key pillars of the overall institutional architecture of a country, i.e., (i) product market competition, (ii) wage labor nexus and labor market institutions, (iii) financial intermediation sector and corporate governance, (iv) social protection sector, and (v) education and knowledge sector. Next, for each of these five areas, he selected a set of indicators that best describe the most salient features of the institutional setup. Finally, based on the application of principal components and cluster analyses, Amable identified five models of capitalism coexisting in the Western hemisphere:

- The Anglo-Saxon model (UK, USA, Australia, New Zealand, Ireland)
- The social democratic model (also dubbed the Nordic or Scandinavian model: Sweden, Norway, Denmark, Finland)
- The Continental European model (France, Germany, the Netherlands, Austria)
- South European (or Mediterranean) capitalism (Greece, Italy, Spain, Portugal)
- The Asian model (Japan, South Korea)

The proposition put forward by Amable inspired other researchers to apply and extend the original DoC framework by incorporating countries undergoing systemic transformation. Two such attempts in particular are worth mentioning here.

The first insightful empirical study on postcommunist capitalism emerging in CEE, based on the DoC methodology and encompassing two transition economies, Poland and Ukraine, was conducted by Mykhnenko [2005]. The most important results of his study seem to support the claim that postcommunist countries have not evolved into any of the four pure models of Western European capitalism described by Amable. The findings established by Mykhnenko imply that while in some respects either of the two countries examined resembles one particular model of capitalism, in some other respects they tend to converge to quite a different model. Furthermore, specifically, whereas in Poland the mix of institutional characteristics in most areas point to a similarity of the emerging type of capitalism to the Mediterranean pattern, the dominant features of the social protection system area are more akin to the Continental European model. In turn in Ukraine, while the nascent capitalism appears to resemble in most respects the Continental European model, the most salient properties of its social protection sector exhibit much more similarity to the Anglo-Saxon model of capitalism [Mykhnenko, 2005].

Another conclusion to be drawn from Mykhnenko's research is that – at least in the case of Poland and Ukraine – as a consequence of systemic transformation, and then the EU membership (Poland), the convergence process toward the institutional patterns prevailing in Western Europe has taken place. However, the two countries have apparently been heading for quite distinct benchmarks exhibiting significant differences in their emerging models of capitalism. Equally interesting is the downward trend in institutional complementarities in both countries (“institutional ambiguity” in Mykhnenko's terminology) which tends to adversely affect the efficiency of all institutions involved.

The most plausible explanation of the possible reasons underlying the “institutional ambiguity” in Poland and Ukraine, and more generally in the whole group of CEE economies, may be synthesized under two headings. First, this is the uncompleted process of building the “postcommunist capitalism” in transition economies which makes their institutional infrastructure still a “work in progress” [Rapacki, 2012]. The second reason is due to the fact that at least a part of the institutional environment analyzed by Amable has been formatted under a strong impact of exogenous factors, such as foreign investors, multinational corporations, or international organizations (EU, IMF, EBRD, or the World Bank). Still another part (first of all, the social protection sector) has been determined mostly by endogenous drivers and path dependence, such as politics, history, and values represented by the majority of the society or the funds available in this area. As a consequence, some parts of the institutional environment predominating in CEE countries are not consistent with other parts, as is usually the case in developed countries representing four models of Western-type capitalism [Rapacki et al., 2016].

The second research that capitalizes on the DoC approach with a view to extend its coverage and to delve into the intricacies of the emerging postcommunist capitalism was carried out by Farkas [2011, 2013]. The author sought to answer the question how the institutions in the new CEE members of the EU (CEE11)

match the institutional order of the old EU countries and whether they resemble any of the four models of Western European capitalism singled out by Amable [2003] or rather form a new one. Following Amable's conceptual structure and using data from Organization for Economic Cooperation and Development (OECD), Eurostat, European Central Bank (ECB), the World Bank, Fraser Institute, and United Nations Conference on Trade and Development (UNCTAD), Farkas made an attempt at a modified DoC typology incorporating the CEE countries. To this end, she applied the cluster analysis and multidimensional scaling based on measurable data (whenever available) and 2-year average values.

The empirical analysis conducted by Farkas implies that CEE countries evolved into their own new model of postcommunist capitalism. This author, in a sharp contrast to the prevailing consensus in the literature, claimed that the institutional disparities between these countries and the old EU member states representing Amable's four models of European capitalism are more pronounced than the differences between postcommunist economies alone. Only one country, Slovenia, seems to approach the Continental European model.

According to Farkas, there are three main reasons that may explain a new institutional development path of the CEE11 economies: all postcommunist countries suffered from (i) the lack of capital and (ii) featured a weak civic society; parallel to that (iii) the EU institutions exerted a strong impact on their economies [Farkas, 2011]. The lack of capital made foreign investment necessary. Most of the foreign direct investment (FDI) went to the financial sector, and in particular to the banking industry, which was conducive to the development of bank-based financial systems [Farkas, 2013]. There was no domestic, internationally competitive business-led R&D system. The levels of social protection and welfare distribution in those countries were closely correlated with the strength of civil society or traditions of social institutions [Farkas, 2013].

Based on her results, Farkas came to the conclusion that CEE11 countries are subject to path dependence. As a derivative, they developed their own pattern of institutional architecture, being a response to their historical legacy and consistent with the initial conditions of systemic transformation. In her view, there is no reason to believe that the emerging model of postcommunist capitalism in these countries is just a temporary phenomenon, which will one day converge into any of the Western European varieties or models of capitalism [Farkas, 2011].

### 3 Data and methodology

As already mentioned in Section 1, the starting point for the present study was the approach adopted by Amable [2003], which was subsequently subject to substantial modifications and extensions. The most essential extensions and modifications comprise in particular the following. First, we added the housing market as the sixth institutional area in the set of basic research categories. The global financial and economic crisis has vividly shown that there exists a very strong link between general economic conditions and the state of the housing market as well as between the housing market condition and its institutional surrounding [Czerniak and Rubaszek, 2018]. It may be argued therefore that the organization of the residential market should be explicitly included in the research agenda as the sixth institutional area for discriminating between different types of capitalism in CEE11 countries. In this regard, we suggest to mainly draw on the concept of varieties of residential capitalism developed by Schwartz and Seabrooke [2009]. Both authors proposed a two-dimensional classification of institutions. In line with the first dimension, they classified countries' housing policies according to their impact on commodification of the residential market. Within the second dimension, they classified policies based on their influence on the households' propensity to take mortgage credits. In the present study, we decomposed their method further into five groups of institutions: (i) regulations that influence the financial availability of residential estates; (ii) regulations of housing equity withdrawal instruments; (iii) regulations of the rental market influencing the tenant–landlord relationships; (iv) social housing availability; and (v) regulations affecting the elasticity of housing supply.

Second, unlike in the original Amable's study which provided a static picture of different models of capitalism prevailing in the Western developed world in the turn of 1990s and 2000s, we adopted a more dynamic perspective of institutional architecture in CEE11 countries which should enable capturing the evolution of the emerging capitalism in this region. To this end, we made two snapshots based on the time series of relevant statistical indicators covering the period between 2005 and 2014. Such an extension of the pertinent methodology is essential for the study of postcommunist capitalism in Central and Eastern Europe, as it is still in a state of flux – systemic transformation that started in the early 1990s and accelerated again on the eve of the EU accession remains unfinished. The institutional arrangements transplanted from the Western models of capitalism are in many respects incoherent, both within and between different parts of the institutional matrix concerned, what creates a patchwork of formal and informal institutions. Hence, employing a path-dependency analysis is crucial for a proper assessment of the evolving models of capitalism in CEE11 countries.

Third, the dataset employed in this study encompasses consistently both input and output variables as measures of institutional architecture. Whereas the former represent key features/components of a pertinent institutional architecture, the latter shows the outcomes of institutional determination or performance in a given institutional area.<sup>2</sup>

Fourth, the empirical part of our study is based on the application of an advanced and more complex, compared to the exercise carried out by Amable in 2003, analytical tool, that is the subspace clustering machine-learning method (ORCLUS algorithm), developed by Parsons et al. [2004]. The method in question enables the identification of both clusters of countries as a derivative of their institutional similarity and most salient features of each cluster described by different measures of institutions. Thus, the ORCLUS algorithm combines the virtues of two separate statistical methods used by Amable, i.e., cluster analysis and the principal component method. Moreover, in contrast to a typical cluster analysis (e.g., k-mean), it can be applied to cope with a large set of data as subspace clusters are not subject to the curse of dimensionality. Hence, the method employed in this research allows for more institutional indicators in each area, compared to the set Amable used. Finally, the subspace dimensions obtained with the ORCLUS algorithm for each cluster are suitable for assessing how models of postcommunist capitalism have evolved in time. It allows to measure whether the institutional setting in each CEE11 country converged or diverged from Western European models of capitalism, understood as clusters of countries identified for 2014 with the ORCLUS algorithm, by examining the standardized joint changes in institutional measures in the subspace dimension that defines each of those clusters.<sup>3</sup>

Finally, as a general methodological premise for the present research, it has to be emphasized that – while embarking on our empirical comparative exercise – we did not adopt any a priori assumption on the preexisting benchmarks for CEE11 countries or models of Western European capitalism, identified by Amable in his 2003 book.

The research sample comprised 25 member countries of the EU including 14 incumbent EU members (further on referred to as EU14) and 11 newcomers from the CEE region. Three remaining EU countries, i.e., Luxembourg, Cyprus, and Malta, were excluded from the sample, as not being representative for the research sample. In the case of Luxembourg, this was due to country's "tax heaven" status, while Cyprus and Malta did not fit either the EU14 group or the CEE11 category.

The time frame of the study was 2005 and 2014. With a view to add a more dynamic perspective to our comparative exercise, we made two snapshots of the pertinent institutional architectures in the sample countries for two different years. As a result, our database comprised two datasets – one for the initial year (2005 or in case of missing or incomplete data the closest year on record) and one for the end year (most recent available data, usually 2014 or 2015).

<sup>2</sup> The distinction between input and output variables has been a derivative of a tacit, simplifying assumption that institutions are the only (or at least predominant) determinant of economic performance. See also Almond and Verba [1989] for a discussion on the difference between inputs and outputs of a social system.

<sup>3</sup> For a more detailed description of the subspace clustering machine-learning method, see Czerniak and Maszczyk [2018].

For the purpose of the present study, we selected six sets of indicators corresponding to each of the institutional areas involved, covering between 10 and 42 institutional measures per area:

- Product market competition (23)
- Labor market and industrial relations (17)
- Financial intermediation (10)
- Social protection system (17)
- Knowledge creation sector (42)
- Housing market (23)

Altogether, a complete dataset comprised 132 institutional measures for each country.

The choice of pertinent variables was based on the results of earlier studies on the subject [Amable, 2003; Schwartz and Seabrooke, 2009; Farkas, 2011, 2016; Ahlborn et al., 2016; Próchniak et al., 2016; Rapacki et al., 2016], the economic significance of a particular variable, data availability, cross-country variance, and the range of values assumed by a variable as well as on its theoretical justification. At the same time, the list of indicators selected for this study reflected to some extent authors' own judgment on their relevance.

We completed the database with data from various sources, mostly international statistics warehouses (e.g., Eurostat, ECB, International Labor Organization [ILO], World Bank, Fraser Institute, Heritage Foundation, Transparency International, OECD, UNDP, and other UN databases). On several occasions – in the case of incomplete or missing data – we also used the results of previous quantitative research on a given institutional measure and carried out own compilations and calculations.

## 4 Empirical results

This section provides the results of our empirical study based on the application of subspace clustering machine-learning method with the ORCLUS algorithm. Each of the six institutional areas is briefly described in terms of the number and composition of clusters identified in line with the methodology introduced in Section 3. Major findings at a more aggregate level are discussed and interpreted in Section 5.

### 4.1 Product market competition

The subspace clustering analysis in this area was based on 23 institutional indicators. They come from three sources: Heritage Foundation, World Economic Forum (Global Competitiveness Index), and the World Bank (World Development Indicators). The indicators concerned represented determinants of competition (firm-level data and industry-level data were excluded) that is input variables.<sup>4</sup>

The analysis carried out for 2014 allowed to distinguish four clusters among the 25 EU countries. Cluster 1 includes the majority of Western European economies (except four peripheral states: Greece, Italy, Portugal, and Ireland) and five (out of 11) CEE countries: the Baltic states, Hungary, and Romania. Six other CEE economies were dispersed among three remaining clusters. Cluster 2 embraces three neighboring South European states: Greece, Italy, and Slovenia. Cluster 3 in turn encompasses Portugal, Bulgaria, and the Czech Republic, while Ireland, Croatia, Poland, and Slovakia make up cluster 4.

Two indices, in particular, time required to enforce a contract and time to prepare and pay taxes rank among the most important variables responsible for clusters' identification. It turns out that there are large between-cluster discrepancies as regards the judicial efficiency and the efficiency of the tax system. The best performer in terms of these two yardsticks is cluster 1. Clusters 2, 3, and 4 record worse outcomes. Indeed, in the countries making up cluster 1, enforcing a contract lasts 424 days on average, whereas in cluster 2 it takes 1,287 days, in cluster 3 it takes 574 days, and in cluster 4 it takes 653 days. Similarly, in

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<sup>4</sup> A detailed description of the dataset, coupled with an in-depth discussion of the results of subspace clustering in this area, may be found in Próchniak (2018).

cluster 1, time to prepare and pay taxes equals 151 hours on average, while in the remaining three clusters it is higher and amounts to 236 hours (cluster 2), 368 hours (cluster 3), and 187 hours (cluster 4), respectively. These outcomes (confirmed by many other indicators) show that cluster 1 exhibits the best institutional environment (on average) of the product market.

As can be seen, the CEE region does not constitute its own cluster in the institutional area of product market competition. The results for the CEE countries are mixed. Clusters 3 and 4 include a variety of economies without a plausible justification. Namely, it is quite difficult to explain for example why the institutional architectures in the Czech Republic and Bulgaria are similar to that in Portugal, while Croatia, Poland, and Slovakia show the institutional characteristics making them akin to Ireland. Such outcomes may be seen as an empirical evidence supporting the idea of a patchwork nature of the newly born capitalism in Central and Eastern Europe.

As can be seen in a dynamic perspective, i.e., taking account of the changes witnessed between 2005 and 2014, the CEE11 countries generally tended to converge toward the main cluster (cluster 1). This result confirms that after their EU accession, the new EU member states were on a converging path toward the institutional benchmarks prevailing in Western Europe.

## 4.2 Labor market and industrial relations

The empirical analysis in this part of the study was based on 17 measures of institutional architecture in the labor market and industrial relation area, including both input and output variables. The main data sources comprised ICTWSS (database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts), Eurostat, and ILO.<sup>5</sup>

As a result of subspace clustering, four distinct groups among the EU25 countries were identified. Cluster 1 embraces almost all EU14 countries, exceptions being UK, Ireland, Greece, and Portugal. It is characterized by a relatively low share of long-term unemployed among all jobless persons. Another distinctive feature of this model is a small percentage of young people who neither study nor work (NEET's). The “solidaristic,” to some extent, face of the labor market becomes even more pronounced if we take into account a high proportion of employees with the lowest qualifications and a small share of precarious workers in total employment, which are characteristic for this model.

Cluster 2 includes UK and Ireland. In this cluster, pro-competitive and pro-quality factors in the workplace play a dominant role. The highest labor productivity compared to other clusters is accompanied by a high employment rate, relatively high labor costs, a small share of workforce employed for a definite period in total employment, and a relatively high proportion of low-skilled workers among employees. This pattern has been to a large extent a derivative of extensive human resource management practices at a company level accompanied by informal relations with employee representations. Relations between management and employees are mostly confined to information sharing and consultations, thus bypassing the collective bargaining mechanisms, which is conducive to a decentralized and voluntary nature of industrial relations.

Cluster 3, which can be labeled statist, is made up of Greece and Portugal and four CEE countries that is Croatia, the Czech Republic, Poland, and Slovenia. First of all, this cluster is characterized by a low employment rate, which may stem from the difficulties faced by low-skilled workers in finding a job. Another salient feature of this cluster is low quality of employment. The rationale behind such outcomes should be sought in a relatively high employment rate among precarious workers, a relatively large share of people working on fixed-term contracts in total employment, and in labor costs that are lower than in other clusters. Among other important traits that characterize the statist model, weak mechanisms of “industrial democracy” ought to be mentioned. Low unionization and undeveloped forms of employee representation are accompanied by a slightly lower coverage of collective agreements than in the cluster 1. The key to understand why four CEE economies joined Greece and Portugal in Cluster 3 seems to be the “state.” If one

<sup>5</sup> A detailed description of the dataset involved and a comprehensive discussion of the results of subspace clustering in this area are found in Gardawski and Towalski [2018].

wants to put these countries in a coherent picture, a growing importance of government (socioeconomic) policies should be stressed. There are multiple examples of unilateral government decisions in particular countries, which led to unfavorable changes in the labor market and to the weakening of industrial democracy mechanisms.

Cluster 4 is made up of Bulgaria, Estonia, Hungary, Latvia, Lithuania, Romania, and Slovakia, i.e., most of the CEE economies. The most characteristic institutional properties of this cluster comprise undeveloped “industrial democracy” mechanisms, coupled with a limited scope of employee representation and limited coverage of collective agreements. In turn, among the most salient characteristics of the labor market, variables that testify to a low work quality come to the fore. They embrace in particular a low employment rate and a small proportion of low-skilled workers in total employment as well as a high share of precarious workers. Hence, this cluster can be dubbed the Eastern European liberalism cluster. What distinguishes this cluster from the statist one is a larger significance of limited state intervention in labor relations and a smaller share of people working on own account.

### 4.3 Financial intermediation

This part of the empirical study was based on 10 indicators describing the institutional architecture in the financial intermediation area, including both input and output variables. The primary data sources comprised the World Bank and Fraser Institute.<sup>6</sup>

The subspace clustering exercise carried out for the institutional area of financial intermediation allowed to detect only two asymmetric clusters among 25 EU member states. Cluster 1 embraces 20 countries including nine incumbent EU members and all CEE11 economies. The main factor that makes all countries in this cluster similar is the role of banks as a major provider of capital to the corporate sector. For the sake of brevity, we may call this cluster a bank-based system. In turn, Denmark, the Netherlands, Spain, Sweden, and UK were classified in cluster 2, in which the capital market is the most important source of funds. It may be dubbed a market-based system.

In most general terms, the institutional architecture of the financial systems considered differs significantly between the two clusters. The differences relate primarily to the characteristics of the capital market. In cluster 1, the indicators describing capital market institutions reached on average only a quarter of the level found in countries representing the market-based system. In the case of a relative value of capitalization, the mean for cluster 1 amounted to 34% of the average for cluster 2. An even greater discrepancy arises when a relative turnover on capital market is taken into account – the respective value for cluster 1 recorded only about a quarter of the level found in countries with a market-based system. The role of pension funds in the former is even smaller – the respective indicator represents merely 15% of the level noted in cluster 2.

For the banking sector institutions, the values of pertinent variables in cluster 1 reached on average two-thirds of cluster 2 levels. The level of financing with bank loans is lower by half in cluster 1, similar to the relative value of banking sector assets (57%). However, the degree of concentration of these assets is comparable in both clusters. The competition in the banking sector and protection of property rights tend to be higher in market-based economies (by 40% and 20%, respectively). Mean values of indicators reflecting the role of state in both clusters are close to each other. Yet, it should be emphasized that countries making up cluster 2 have in fact more developed institutions of both the capital market and the banking sector vis-à-vis cluster 1. Nonetheless, it is the capital market that plays a leading role in these countries.

Compared to cluster 1, the market-based cluster is much more homogeneous. In contrast, the bank-based cluster does not form a coherent category in terms of the prevailing patterns of institutional architecture. It can be even claimed that what makes the countries to be classified in this cluster is mainly their dissimilarity to cluster 1. As a result, it appears reasonable to further disaggregate this category and to distinguish three subclusters: 1A (Ireland, Belgium, France, Portugal, and Greece), in which the

<sup>6</sup> A detailed description of the dataset and a comprehensive discussion of the results of subspace clustering in this area are found in Horbaczewska [2018].



institutional distance from cluster 2 is relatively small, 1B (Finland, Germany, Italy, and Austria as well as Croatia), displaying a moderate distance, and 1C (all CEE11 countries except Croatia).

Against this background, it should be noted that CEE countries do not form a coherent group either, as they differ in the degree of development of both segments of their financial intermediation systems and institutional arrangements adopted. Relative similarities among them occur in the field of property rights protection and concentration of banking sector assets. Another significant factor of similarity is the important role of the state as owner of enterprises. Overall, they do not embody any single institutional pattern, which would be distinct from Western European benchmarks.

It may be concluded that the financial systems of the CEE countries compared to the old EU members tend to lag behind. The largest gap can be traced in the development of capital market institutions. Such institutions have been established in every CEE country, but their significance largely differs across the region – from noticeable and even significant (as in Poland and Croatia) to quite symbolic (Slovakia). The banking sector, whose level of development and significance used to be much higher in these countries, is also underdeveloped compared to Western European economies. The institutional distance however in the latter area is not so large, and the diversity within the CEE11 group in this regard is much smaller.

#### 4.4 Social protection system

The empirical analysis in this part of the study relied on a dataset comprising 17 measures of institutional architecture in the area of social protection, including mostly input variables. All data come from the Eurostat database.<sup>7</sup>

As a result of subspace clustering in the social protection system, three distinct groups of countries among the EU old member states featuring similar sets of institutions were identified: cluster 1 found in Denmark and Sweden, cluster 2 prevalent in the rest of the incumbent EU member states as well as in Slovenia and Croatia, and cluster 3 predominant in CEE countries.

In the case of cluster 1, the differences – compared to cluster 2 – are concentrated mostly in the architecture of the tax system. High taxation, in both relative and absolute terms, distinguishes Denmark and Sweden from the rest of the incumbent EU members. Their top income tax rate exceeds by 8 p.p., the average for cluster 2. It is interesting to note that in Sweden and Denmark the ratio of benefits to total public expenditure is lower compared to not only the old European cluster but also the new European one. Simultaneously, the ratio of benefits to gross domestic product (GDP) is only slightly higher than in the new EU member states and still lower compared to cluster 2. Thus, the protection from different risks in the Nordic cluster is assured through collective consumption rather than by means of direct financial help.

Cluster 2 is represented in the Anglo-Saxon countries (UK, Ireland), a Nordic country (Finland), a number of Continental economies (Germany, Austria, Belgium, and the Netherlands), all Mediterranean countries (Spain, Portugal, Greece, and Italy), and in Croatia and Slovenia. It is characterized mostly by up-close ratio of public expenditures on old-age people to both total public expenditures and GDP, coupled with moderate values for total tax revenue to GDP and income tax revenue to total tax revenue ratios. Simultaneously, the ratio of public expenditures directed to families to both total public expenditures and GDP is relatively low. Moreover, characteristic for this cluster is the highest ratio of benefits to both total expenditures and GDP, compared to two other clusters. Last but not least, the average ratio of public expenditure on sick and disabled people to both total public expenditure and GDP is visibly lower in comparison to the Nordic cluster 1.

The most distinctive feature of the social protection system in cluster 2 is a high ratio of benefits to both total public expenditure and GDP. This system is based mostly on distributing public funds among members of the society rather than collectively buying goods and services needed by particular social groups. Nevertheless, public resources are directed mostly to old-age people and only in limited amount to families and sick and disabled persons. The relative tax burden in this model is substantially lower,

<sup>7</sup> A full description of institutional indicators used as well as a comprehensive discussion of the results of subspace clustering in this area may be found in Maszczyk [2018].

compared to cluster 1, yet higher than in cluster 3. The ratio of personal income tax to total tax revenues is also substantially lower. The major sources of general government revenue are indirect taxes, mostly the value-added tax.

Cluster 3 differs considerably from both models described earlier. This is due to a number of factors – in the first place to a much lower benefit to GDP ratio. Similarly, the ratio of almost all particular expenditure items (except old-age people) to total public expenditure in average tends to be significantly lower too. Second, the average ratio of total tax revenue to GDP is by 6 p.p. lower than in cluster 2 and by 25 p.p. lower compared to the Nordic cluster. Not only the “new European” countries have on average less money to spend on social protection but also most of the tax revenues come from consumption taxes, which puts the tax burden on households with relatively lower incomes. This pattern can be to some extent explained by underdevelopment of the tax system. Yet, one can easily recognize the imprints of path dependence too. A low relative importance of the income tax, combined with a very low top personal income tax rate (20% in average compared to 56% in the Nordic and 48% in the old European clusters) may be interpreted as a derivative of the power of vested interests of the most wealthy taxpayers.

The model of social protection prevailing in most CEE11 countries reveals in many respects a patchwork nature and hence is highly unstable. The institutional architecture in this area lacks necessary complementarities, and the existing mechanisms do not protect the society from major risks and – what is more important in the long run – do not provide enough positive externalities to the economy. Moreover, between 2005 and 2014, the institutional architecture involved was subject only to limited changes. This shows its resistance to the effects of both the EU membership and the global economic crisis.

## 4.5 Knowledge sector

The set of indicators employed in this part of the research included 42 measures of the institutional infrastructure in the knowledge sector. They represented both input and output variables and were taken from OECD, Eurostat, ECB, and the World Bank.<sup>8</sup>

Based on the application of the subspace clustering, four groups of countries have been identified in this area. Cluster 1 includes six countries: Germany, Austria, Denmark, the Netherlands, Sweden, and Finland. In turn, cluster 2 is made up of four EU14 economies –UK, Ireland, France, and Belgium. Cluster 3 embraces two countries – Slovenia and Italy. The remaining 13 EU members (Bulgaria, Estonia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Croatia, Greece, Spain, and Portugal) form cluster 4. Worth noting is the fact that all but one CEE11 country (Slovenia) are classified in the same cluster 4. Another interesting result of subspace clustering in the area of knowledge creation is that the CEE countries share similar institutional patterns with three Mediterranean economies, i.e., Greece, Spain, and Portugal.

The most salient institutional characteristics of cluster 1 include a relatively high level of patent applications to the European Patent Office by priority year (per million inhabitants), a comparatively high level of patents granted by the US Patent and Trademark Office, high turnover (of enterprises) from innovation (% of total turnover) in the industry sector, medium–high turnover from innovation in the services sector, a relatively low share of women researchers in business enterprise sector and medium-to-high share of women researchers in private nonprofit sector, high share of households with broadband (Internet) access, and very high individuals’ level of Internet skills.

Cluster 2 in turn features a medium–high level of employment in knowledge-intensive services, medium share of women researchers in R&D employment, a very high turnover of enterprises from innovation in the industry sector, medium level of patents granted by the US Patent and Trademark Office, low or medium share of female pupils in upper secondary education enrolled in vocational stream, medium level of patent applications to the European Patent Office, high turnover of enterprises from innovation in all sectors, and a relatively low share of 15-year-old pupils who are at level 1 or below of the PISA combined reading literacy scale.

<sup>8</sup> A detailed description of the dataset and a comprehensive discussion of the results of subspace clustering in this area are provided in Karbowski [2018].

Cluster 3 is, in contrast to other identified models of capitalism in this area, characterized by a medium level of patents granted by the US Patent and Trademark Office, medium level of patent applications to the European Patent Office, medium level of employment in knowledge-intensive services, medium share of female pupils in upper secondary education enrolled in vocational stream, medium share of women researchers in business enterprise sector, private nonprofit sector, and in all sectors, medium turnover of enterprises from innovation in the industry sector, as well as a relatively high share of early leavers from education and training (especially for Italy).

Cluster 4 can be best described by a relatively low level of patent applications to the European Patent Office, low level of patents granted by the US Patent and Trademark Office, low or very low level of hi-tech patent applications to the European Patent Office, medium–high level of tertiary educational attainment (age group: 30–34 years), medium–high share of women researchers in business enterprise sector, a relatively low share of households with broadband (Internet) access, and a comparatively low individuals' level of Internet skills.

Between 2005 and 2014, the CEE economies reduced the most their institutional distance in the area of knowledge creation toward cluster 2. At the same time, some institutional convergence in this area took place toward cluster 3, while the distance to cluster 1 remained roughly constant. The institutional convergence of CEE11 countries toward Western European benchmarks occurred mainly due to: (1) a rapid increase in the share of households with broadband Internet access in CEE countries, (2) a significant rise in the level of tertiary educational attainment, (3) a growing number of science and technology graduates per 1,000 inhabitants, (4) an upward trend in the share of human resources in science and technology sector, and (5) a sizeable growth of patent applications and patents granted to entities from CEE countries.

The current state of the knowledge system in CEE11 countries is most likely transitory. The transformation that started in the early 1990s led to a liberalization of the system and strong dependence on transnational corporations and foreign capital (Slovenia remained an exception). In the years to come, a movement to more coordinated arrangements in the field of knowledge creation can be expected. Stronger focus on vocational training, development of company-specific skills, science and technology education, and higher patent activity of CEE firms should be provided. Most likely, tighter industrial cooperation between countries of the region will also take place.

## 4.6 Housing market

The subspace clustering analysis in this area relied on 23 institutional measures divided into six groups as described in Section 3. The data were obtained from various sources: Eurostat, World Bank, Hypostat, numbeo.com, ESRB, TenLaw, OECD, and several research papers. The indicators concerned comprised both input and output variables.<sup>9</sup>

While, examining the data with the subspace clustering algorithm, four distinct groups of countries that share a similar set of institutions have been identified. In line with earlier research, especially the classification of Schwartz and Seabrooke (2009), the three clusters comprising mainly old EU member states were dubbed as follows: cluster 1 or liberal corporatist model found among Northern European countries (Ireland, UK, Belgium, the Netherlands, Denmark, Sweden, and Finland), cluster 2 or statist model that is prevalent in most core euro area member states (France, Germany, Austria), and cluster 3 or commodified familial model in the south of Europe (Portugal, Spain, Greece, and Estonia from the CEE region). Apart from these three models, that were already described in the literature, a new distinct model, predominant in all CEE countries but Estonia was identified and named the non-commodified model of residential capitalism (cluster 4). Only one incumbent EU member state, Italy, exhibits a similar set of institutions.

The liberal corporatist model is characterized by high indebtedness of the population, reflected by the highest average share of households living in an owned dwelling with a mortgage (46.8% in comparison to around 25% in other old EU countries). This is closely connected to high financial affordability of housing

<sup>9</sup> A full description of institutional measures used and an in-depth discussion of the results of subspace clustering in this area may be found in Czerniak [2017].

driven by financial market deregulation, which manifests itself in high levels of LTVs and a large market for securitization instruments as well as by the lowest levels of house prices relative to income. These characteristics reflect a market-based (or liberal) system of housing allocation. However, at the same time, countries with a liberal corporatist model of institutions feature a wide margin of state interventions in the housing market – the share of social housing is the highest among all EU members, rent controls are relatively rigid, and the government spends the biggest sums on housing policies.

The most salient feature of the statist model is the lowest share of owner-occupied houses in the dwelling stock among all EU member states (58.2% on average in comparison to three-quarters in other European countries). This is an outcome of a high provision of cheap rental dwellings and high availability of social housing. Another distinctive property of this model is a low rate of household indebtedness, which comes despite a very deregulated financial market as households do not desire to buy residential dwellings for themselves. On the contrary, a deregulated financial market is favorable for corporate market actors which finance rental housing investments with cheap capital borrowed from banks or trusts. State interventions in the statist model are visible in an extended control of tenant–landlord relations with restrictive eviction procedures, high rent controls, and several subsidies and allowance schemes for private investments in cheap rental housing. As a result, the share of households that occupy a rented dwelling and pay for it a below-market price is the highest among all EU countries and totals on average 13.1%.

The commodified familial model features a large share of owner-occupied dwellings (on average 77% in contrast to below 70% in other old EU member states). That is a result of the ownership myth prevalent in countries with this set of institutions, i.e., a pervasive belief that owning a dwelling is by far the best way to satisfy one's housing needs and the safest asset in a household portfolio. Buying a home is also seen as the main constituent of establishing a family and is usually treated as a necessary condition for having children. Another important trait of this model is a very low occupation rate that coexists with a twice as high as in other old EU member states' overcrowding rate (14.3%). Moreover, residential estates are already to a large extent commodified, especially regarding new dwellings, what is reflected in a high level of residential loans. All the abovementioned characteristics indicate that the market-based system of dwelling allocation is present but not working effectively and in many aspects it is complemented by a family-based system, as parents are expected to satisfy housing needs of their children. Hence, the share of young adults living with parents is the highest among all incumbent EU member states (39.7%) and the private rental market is just slightly more than half the size of its counterparts in other old EU countries. Government refrains from market interventions. The state does not provide any social housing or subsidies for private provision of dwellings for rent and usually also does not subsidize housing purchases for first-time buyers.

The CEE region differs largely from the rest of the EU in terms of housing market institutions. Despite many between-country discrepancies, the governments across the region developed a distinct model of residential capitalism that can be found nowhere else in Europe but Italy. We dubbed this model the non-commodified model of residential capitalism as low commodification of dwellings is the common thread to all highly diversified institutional setups in CEE countries. According to the subspace clustering results, the three most important characteristics of the institutional setting that constitute this model of residential capitalism are: (1) low supply of social housing, (2) small private rental market, and (3) large proportion of young adults living with parents. This translates into the highest share of owner-occupied houses in the dwelling stock among all EU countries. Another distinctive feature of this model is a very low indebtedness of households – outstanding residential loans amount on average to only 16.6% of GDP, which is less than a quarter of the levels inherent to liberal corporatist countries. The foregoing characteristics of the non-commodified model coincide with the prevailing perception of dwellings, which are seen as family goods – their worth was never appraised and is usually not included in the subjectively assessed wealth of households. Dwellings are passed on from generation to generation, and people are not very eager to sell them or withdraw equity allocated in housing. As a result, the secondary market for houses is shallow, the prices of dwellings are the highest relative to incomes among all EU members and, hence, housing financial affordability is much lower than in the rest of Europe. Furthermore, the market for reasonably priced rented dwellings of average standard is almost nonexistent as is the rental market in small towns and rural areas. This leads to the conclusion that the market-based system of dwelling allocation is present only in big

cities but largely ineffective and almost nonexistent in rural areas. Hence, the prevailing system of dwelling allocation is family based and is even more widely spread than in the commodified familial model. As a derivative, the non-commodified model is characterized by a very high overcrowding rate, low occupation rate, and a large share of deprived dwellings. This indicates that the equity allocated in housing is used ineffectively in this system, which brings about large housing shortages in CEE countries.

Between 2005 and 2014, the institutions encompassing the housing market in CEE countries evolved in the direction of residential capitalism models typical for incumbent EU member states, especially the liberal corporatist one. This can be explained mainly by a housing policy common across the region before the global financial crisis that was aimed at increasing financial affordability of owner-occupied houses, especially through providing cheap mortgage credit and government subsidies for first-time buyers which led to an increase in household indebtedness – the level of outstanding residential loans grew from 9.0% to 17.4% of GDP. This policy helped to tackle some of the problems in the housing market, i.e., it reduced the overcrowding rate by almost one-third and halved the share of deprived houses in the occupied dwelling stock. As a result, housing shortages diminished and the general quality of residential estates across the region improved. However, at the same time, even more people, especially young couples, became excluded from the housing market, what is reflected in a 10% rise of the share of young adults living with parents. Moreover, the shift in CEE governments' priorities from satisfying housing needs of citizens to support first-time buyers reduced the amount of available social dwellings by a quarter.

The abovementioned evolution path of residential capitalism across the CEE region resembles the one taken one decade earlier by Southern European countries which ended up with a boom–bust episode that hampered their long-term economic growth and brought social unrest after the global financial crisis. This is indicated by the change in institutional similarity between the CEE region and those incumbent EU states that host the commodified familial model – between 2005 and 2014 institutional measures for nine out of 11 CEE countries became more similar to those in the South of Europe and in some cases (Romania, Bulgaria, and Poland) the change exceeded even two standard deviations. This was mainly caused by mass privatization of social dwellings, abolition of cooperatives, and the slowest reduction in housing shortages in these countries, due to a high cost of taking up mortgage credits.

Another evidence that the CEE countries have in general followed the evolution path of Greece, Spain, or Portugal is the case of Estonia. This Baltic state is the only one in the region that in 2014 had a largely commodified housing market with no dwelling shortages, i.e., it exhibited the features of the commodified familial model. However, if one analyzes the institutional environment in this country right after the EU enlargement, it was much more similar to the non-commodified model than to any other model identified in our study. In the following years, Estonia followed the evolution path of many Mediterranean housing markets and joined the group of countries that host the commodified familial model of residential capitalism.

## 5 Discussion

As a summary of the foregoing descriptive characteristics of empirical results broken down into six institutional areas, in this section we embark on a more general discussion of major findings of the present study. Table 1 provides a stylized comparative picture of the number and composition of clusters identified among the 25 EU member countries in the end year of our empirical exercise. The picture involved is further sharpened in Tables 2–5 which are shown in the subsequent parts of this section.

A more in-depth analysis of the data given in Table 1, as well as in Tables 2–5, allows a number of interesting observations. They may be synthesized under the following headings.

1. The number of clusters identified across the six institutional domains ranges between 2 and 4, including the new EU members from CEE11 countries. This result may be interpreted as a confirmation – at the most aggregate level – of the general conclusion made by Amable, i.e., the coexistence of diverse models of capitalism in the EU.

**Table 1.** Clusters identified in the EU25 countries in six institutional areas, 2014

Institutional area	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Product market competition	DE, ES, SE, UK, AT, BE, DK, FI, FR, NL, EE, HU, LV, LT, RO	IT, GR, SI	IE, SK, PL, HR	PT, CZ, BG
Labor market and industrial relations	DE, BE, IT, SE, DK, ES, FR, NL, AT, FI	UK, IE	GR, PT, HR, CZ, PL, SI	BG, EE, HU, LV, LT, RO, SK
Financial intermediation	DE, AT, BE, FI, FR, GR, IE, IT, PT, BG, HR, CZ, EE, HU, LV, LT, PL, RO, SK, SI	UK, ES, SE, DK, NL		
Social protection	DE, IT, UK, BE, IE, GR, ES, FR, NL, AT, PT, FI, HR, SI	SE, DK	BG, CZ, EE, HU, LV, LT, PL, RO, SK	
Knowledge sector	DE, SE, AT, DK, FI, NL	UK, BE, FR, IE	IT, SI	BG, CZ, EE, HR, LV, LT, HU, PL, RO, SK, GR, ES, PT
Housing market	DE, AT, FR	UK, SE, BE, DK, IE, NL, FI	ES, GR, PT, EE	BG, HR, CZ, HU, IT, LV, LT, PL, RO, SK, SI

**Source:** Authors' elaboration.

2. Notwithstanding this fundamental similarity, our findings point to a number of essential differences compared to the results established by Amable [2003]. The key differences to be emphasized include in particular the following:
  - i. The clusters identified in this study (let alone for Western European EU members) differ depending on the institutional domain involved, in terms of both their number and makeup. Hence, the claim made by Amable that the diversity of Western European capitalism in each institutional area is the same among the EU countries seems ungrounded on the basis of up-to-date data.
  - ii. The composition of particular clusters identified in our study differs from the Amablean benchmarks dubbed the Anglo-Saxon, Continental European, Nordic, and Mediterranean models of capitalism:
    - In some areas (product market competition and financial intermediation), the ongoing Europeanization of markets and their institutional unification caused some clusters to disappear,
    - In almost all institutional areas, the Continental and Nordic models tended to merge (except the social protection system).
    - Moreover, the makeup of clusters identified differs considerably from one institutional area to another (a country may be classified into distinct clusters depending on the area involved) which makes the overall picture quite ambiguous and impedes the task of coming up with a viable general typology of the coexisting models of contemporary capitalism in the EU.

A more detailed comparative breakdown of our results is provided in Table 2. The main message they convey is that by 2014 the original typology developed by Amable did not hold for almost a half of the cells specified in the table (nine out of 20). This was particularly the case of the Nordic model of capitalism. On the other hand, the opposite was true for the Continental model and – to a lesser degree – the Anglo-Saxon model.

3. Given the results of the subspace clustering exercise, it can be contended that CEE11 countries developed their own distinct model of capitalism. This outcome corroborates – at least at the most aggregate level – the findings of a recent study on comparative capitalism in the EU by Farkas [2016]. The only two institutional areas in which these countries do not significantly differ from their Western European peers are those that are highly unified across the EU – the product market competition and

**Table 2.** Status of the Amablean models of capitalism in the light of subspace clustering results

<b>Institutional area</b>	<b>Anglo-Saxon cluster (with UK)</b>	<b>Nordic cluster (with Sweden)</b>	<b>Mediterranean cluster (with Italy)</b>	<b>Continental European cluster (not internally coherent)</b>
Product market competition	No	No	Yes	Yes
Labor market and industrial relations	Yes	No	No	Yes
Financial intermediation	Yes	No	No	Yes
Social protection	No	Yes	No	Yes
Knowledge sector	Yes	No	Yes	Yes
Housing market	Not applicable			

Source: Authors' elaboration.

**Table 3.** Stylized picture of CEE11 capitalism, 2014

<b>Institutional area</b>	<b>Distinct cluster for CEE11 countries</b>	<b>Number of outliers</b>	<b>Number of EU14 countries in the CEE11 cluster</b>
Product market competition	No	N/A	N/A
Labor market and industrial relations	<b>Yes</b>	<b>4 (HR, CZ, PL, SI)</b>	<b>2 (GR, PT)</b>
Financial intermediation	No	N/A	N/A
Social protection	<b>Yes</b>	<b>2 (HR, SI)</b>	<b>0</b>
Knowledge sector	<b>Yes</b>	<b>1 (SI)</b>	<b>3 (GR, PT, ES)</b>
Housing market	<b>Yes</b>	<b>1 (EE)</b>	<b>1 (IT)</b>

Source: Authors' elaboration.

financial intermediation. Interestingly, the results of the present study have also confirmed our earlier findings [Próchniak et al., 2016] that postcommunist EU member states exhibit many similarities with Mediterranean countries. As summarized in Table 3, only these incumbent EU members are sometimes classified as a part of the CEE11 cluster.

4. The model of postcommunist capitalism identified in CEE11 countries exhibits in many respects a patchwork nature. This is due to the institutional ambiguity<sup>10</sup> inherent to its design. The notion of patchwork capitalism prevalent in CEE11 countries can be best described as an institutional matrix incorporating components or building block from various institutional orders and making the whole matrix incoherent. In particular, the patchwork nature of the evolving capitalism in CEE11 economies manifests itself in two aspects:
  - i. Inter-area patchwork

In each country, the elements of the institutional matrix which were adopted and amended in the course of systemic transformation have a different heritage for particular areas, i.e., they are derived from various established Western European models of capitalism. The majority of these elements has been transplanted from countries such as Germany, which resemble the most common Continental model as dubbed by Amable, but some parts are of Mediterranean origin (mostly from Spain or Italy), some of Nordic (mostly Sweden), and some of the Anglo-Saxon heritage (Table 4). This makes different institutional areas very often not complementary to each other hampering economic development and generating social tensions among different groups of interest in particular CEE countries.

- ii. Intra-area patchwork

There exists also a systemic mismatch between input and output characteristics, which has been clearly shown in one of our earlier empirical studies [XXX]. It originates from a clear deficit of institutional

<sup>10</sup> We use this term, which was originally coined by Mykhnenko [2005], in a broader sense which incorporates, i.e., the notions of inconsistency, incoherence, and deficit of institutional complementarities at various levels of institutional architecture.

complementarities within particular institutional areas, especially between formal and informal institutions. Such a patchwork can be traced back to the systemic transformation period when CEE countries adopted policies and elements of the institutional systems that proved to be efficient in incumbent EU member states without taking into account the peculiarity of their own ecosystem (its economic, political, social, and cultural characteristics) in which these elements of Western-type capitalism would be embedded. This was conducive to a lack of complementarities between the path-dependent institutional system existing in a country (measured mainly by output variables) and the newly adopted policies (measured mostly by input variables). These effects can be most vividly seen in such institutional areas as the social protection system and the housing market, where the current ecosystem is subject to a strong path dependence.

**Table 4.** Closest models of Western European capitalism for CEE11 countries

Institutional area	Bulgaria	Croatia	Czechia	Estonia	Hungary	Latvia	Lithuania	Poland	Romania	Slovakia	Slovenia
Product market competition	DE	DE	DE	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	DE	<b>DE</b>	DE	<b>IT</b>
Labor market and industrial relations	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE
Financial intermediation	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>	<b>DE</b>
Social protection	DE	<b>DE</b>	DE	SE	SE	SE	DE	DE	SE	DE	DE
Knowledge sector	UK	IT	IT	IT	DE	IT	IT	IT	IT	IT	<b>IT</b>
Housing market	IT	IT	IT	<b>IT</b>	UK	IT	IT	IT	IT	IT	IT

DE, Continental European cluster (with Germany) identified with the ORCLUS algorithm; IT, Mediterranean cluster (with Italy or Spain but not Germany) identified with the ORCLUS algorithm; UK, Anglo-Saxon cluster (with UK but not Germany) identified with the ORCLUS algorithm; SE, Nordic cluster (with Sweden but not Germany and UK) identified with the ORCLUS algorithm; cluster acronyms for countries that are actually classified into that cluster are given in bold.

Source: Authors' elaboration.

5. Notwithstanding the fact that we identified one single model of postcommunist capitalism prevalent in CEE11 countries, our subspace clustering exercise has also shown that the CEE group is quite heterogeneous. This is due to three factors in particular.
  - i. The empirical evidence points to a considerable differentiation of institutional characteristics or institutional architectures among CEE11 countries.
  - ii. In all but two institutional areas concerned (product market competition and financial intermediation), some CEE11 economies have been outlying from the CEE cluster (Table 3). The number of outliers ranges between 1 and 4 depending on the area involved.
  - iii. Capitalism in Central and Eastern Europe has evolved over time as the CEE11 countries experienced both convergence and divergence trends of their institutional architectures vis-à-vis their Western European peers between 2005 and 2014. Moreover, each of the countries followed its own distinct vector of institutional changes (Table 5).

From the abovementioned findings, it may be inferred that the CEE region hosts a diversity of patchwork capitalism. In other words, each of the CEE11 countries followed its own distinct vector of changes, which eventually led to a unique patchwork of institutions in each of these countries. Yet, the institutional variance within the CEE11 region is smaller than the differences between those countries and other models of capitalism identified among EU members.



**Table 5.** Convergence to Western European models of CEE11 countries across six institutional areas, 2005–2014

Clusters as identified with the ORCLUS algorithm	Continental cluster (with Germany)	Mediterranean cluster (with Italy or Spain but not Germany)	Anglo-Saxon cluster (with UK but not Germany)	Nordic cluster (with Sweden but not Germany and UK)
Institutional area				
Product market competition	Convergence: 10 Divergence: 1	Convergence: 7 Divergence: 4		
Labor market and industrial relations	Convergence: 6 Divergence: 5		Convergence: 5 Divergence: 6	
Financial intermediation	Convergence: 9 Divergence: 2		Convergence: 7 Divergence: 4	
Social protection	Convergence: 5 Divergence: 6			Convergence: 5 Divergence: 6
Knowledge sector	Convergence: 5 Divergence: 6	Convergence: 11 Divergence: 0	Convergence: 11 Divergence: 0	
Housing market	Convergence: 10 Divergence: 1	Convergence: 9 Divergence: 2	Convergence: 11 Divergence: 0	

Source: Authors' elaboration.

## 6 Concluding remarks

As a wrap-up of the foregoing discussion, it may be argued that the results of our subspace clustering exercise corroborate a substantial part of our starting conjectures and allow a positive verification of our hypotheses. In particular, they seem to support four of our claims.

1. The present study provides a new empirical evidence confirming the coexistence of diverse models of capitalism in the EU, even more so if the new EU member countries from East Central Europe are included in the research sample.
2. The number and composition of particular clusters identified in this research differ from the Amablean benchmarks dubbed the Anglo-Saxon, Continental European, Nordic, and Mediterranean models of capitalism.
3. The CEE11 countries developed their own distinct model of capitalism compared to Western European benchmarks.
4. The model of postcommunist capitalism identified in CEE11 countries exhibits in many respects a patchwork nature. This is due to the institutional ambiguity inherent to its design including a clear deficit of complementarities in their institutional architectures, both within particular areas and between them.

Yet, the empirical results of the present study do not yield an unequivocal picture of the diversity of contemporary capitalism coexisting in the EU. Despite some common patterns, the variance of institutional architecture across the EU member states reveals many faces depending on the institutional area analyzed. Moreover, in a number of areas, institutional disparities between some countries ceased to exist in the last decade as the European integration has moved onward.

Hence, a further in-depth and interdisciplinary research on comparative postcommunist capitalism is required including more refined applications of the subspace clustering method coupled with a comprehensive case study analysis in different institutional areas.

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