

EXAMINING EUROPEAN BUSINESS ENVIRONMENTS AND LABOUR MARKETS. A COUNTRY-CLUSTERING PROPOSAL

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Abstract

In 2010 the European Commission presented the Europe 2020 strategy with a focus on smart, sustainable and inclusive growth. Linking one of the agenda's main targets, i.e. increasing the employment rate among the European Union's countries, with the current policy liberalization debate, the present study analyses the business environment and labour market policies for 30 European countries and provides an empirical classification of the two based on 2013 indicators. The most commonly approached labour market output is the unemployment rate. Thus a first section of this paper introduces the reader into the previous researches conducted on its evolution in the liberalization policy context, i.e. the impact of the labour market and business environment factors on the unemployment rate's series. Further on, it presents a classical classification of the European labour market regimes as proposed by the literature. Grounded on a quantitative research paradigm and a positivist philosophy, the paper follows the existing literature and extends the current classification frameworks, proposing two country groupings based on business and labour market related factors. The analysis is conducted through exclusive clustering methods. As such, six clustering methodologies are applied (Ward, Exact Maximum Likelihood, Flexible-Beta Method, McQuitty's Similarity Analysis, Single Linkage and K-means). Three country-clusters are emphasized for both analyses performed (business environment and labour market). No cluster emphasized purely liberalized policies, neither purely tight ones, but rather different mixtures of the two. The clustering aims at providing a common framework for analysing different markets' outputs and assessing the strengths and weaknesses of different policy models. An exemplification of its utility is provided in the end section of the paper by analysing the cross-country differences in two highly traced outputs, i.e. unemployment rate and job vacancy rate. The regime-based cross-country comparison tests for the existence of a preferred model by searching for a model that systematically outperforms the others.

Key words: economic policy, labour market, business environment, clustering, unemployment rate, job vacancy rate

JEL classification: E24, I38, J08

1. Introduction

One of the most stringent challenges in contemporaneous policy setting is to be found in supporting a better social desideratum while accounting for the cost

pressures imposed on the one hand by the current fiscal positions and by the increasing social costs on the other. Among all, recent unemployment levels imposed new pressures on the European Union's social cohesion, emphasizing the importance of the next lustrum's policy settings in the recovery and growth of the European economy (European Commission, 2010).

Thus, one of the Europe 2020 agenda's main targets on steering the process of a successful exit from crisis is to be found in fostering a high-employment economy. Among the agenda's initiatives, there is the establishment of an environment favourable to the small and medium enterprises' development and creating new jobs, establishment of a platform aiming at supporting the labour force migration inside the European Union as well as investing in the life-long learning schemes.

Given the current policy liberalization debate context, the present paper proposes an empirical characterization of the labour market typologies, going beyond classical characterizations proposed by the literature by grounding the research into key features of the 2013 European labour markets. Moreover, it examines the existing policies in the business environment and proposes a grouping of the EU-28 countries based on the found typologies. The usefulness of the two country groupings is to be latter exemplified by analysing the differences between the created country clusters in terms of unemployment rates and job vacancy rates, respectively in search for an outperforming labour market and business environment model, respectively.

2. Literature Review

During the first years after the fall of the communism, Romania along other communist countries, have primarily focused on passive protection actions, i.e. granting financial benefits. The premise behind the unemployment policies was that, under certain limits, this represents a natural phenomenon in the context of a free market economy; the objective of the undertaken measures was that of controlling the phenomena and avoiding its large scale increasing chronicity.

The debate on the policy liberalization can be traced back to Milton Friedman, gaining an increased focus in European countries in the years following the recent financial crisis. Even in the decade prior, researchers such as Mortensen (1999) developed labour market models calibrated to the US and European markets in order to assess the effects of policy differences in explaining the differences in unemployment rates.

Firstly, considering the business environment reforms, Blanchard et al. (2013) claim that lowering barriers to entry of new firms is likely to produce a larger growth payoff than reform in labour markets by leading to an increased competition which in turn leads to an increase in total factor productivity and a decline in the average rate of unemployment. In this regard, Nicoletti and Scarpetta (2004) suggest a negative effect of the high tax wedges on the employment opportunities of the low-skilled by increasing the minimum cost of labour and depressing the labour demand in these sectors.

Secondly, considering the job market reforms, Bouvet (2012) has showcased that

stricter employment protection legislation and higher union density are associated with lower unemployment rates; more generous unemployment benefits are weekly associated with an increased inefficiency in the labour market matching mechanism, while the enforcement of a minimum wage policy has a positive impact on the increasing efficiency in the matching mechanism.

Blanchard et al. (2013) argue that a rigid regime generally leads to high unemployment rates in sectors in which there is high competition between companies and/or low labour skills are required. In analysing the impact of the minimum wage policy, they showcase that a minimum wage set above 40% of the median wage has a negative impact on the unemployment rate for the low skilled workers. Further on, regarding the unemployment benefits, they argue that in the long-run, it prolongs the unemployment duration due to higher labour costs.

To continue, the authors also analysed the European labour market from the perspective of a broad classification based on the state's degree of involvement in the employment protection and unemployment insurance. As such, there are described three labour market regimes, namely: the "Anglo-Saxon" model, the "Nordic" model and the "continental" model; the first one is characterized by a low degree of state protectionism and the latter one is characterized by a highly regulated labour market, whereas the "Nordic" model relies on moderate to high regulatory powers grounded on conditional, active measures (Figure 1).

Anglo-Saxon Model	Nordic model	Continental model
<ul style="list-style-type: none"> • low employment protection • low unemployment insurance 	<ul style="list-style-type: none"> • medium to high degree of employment protection • generous, but conditional unemployment insurance • strong active labour market policies 	<ul style="list-style-type: none"> • high employment protection • generous unemployment insurance • limited active market policies

Figure 1: European labour market regimes – classical classification

Source: Authors' processing based on Blanchard et al. (2013)

Last but not least, Puss et al. (2010) provide an empirical grouping of the EU-12 social models. As such, based on clustering analysis they determine five country clusters for monetary poverty and inequality and six clusters for public policy. While their work is useful in assessing the economic development in the sense of living and working conditions of the EU-12 countries, the present study makes a more focused attempt on characterizing specific areas of the socio-economic policy with direct impact in the labour market outputs.

3. Research Methodology

The data set used in the present study contains information belonging to the 28 European Union's member states plus Norway and Island, analysed over the 2013 year (the year prior to the Europe 2020's enforcement). The two non-member states of the European Union were included in the research based on their membership in the European Economic Area and due to their association in the

Europe 2020 strategy after signing the agreement from May 2014 in the European Economic Area Committee (European Commission Press Release, 2014). Dataset was compiled from doingbusiness.org and Eurostat databases and includes indicators belonging to both the business environment and the labour market.

3.1. Country Clustering – Business Environment

Business related factors are split into six broad categories as follows: starting a business, getting electricity, getting credit, paying taxes, as well as trading across borders (Table 1).

Table 1: Business environment factors

Variable	Computation/Measurement	Source
<i>Starting a business</i>		
Days/Procedure	= number of calendar days required to complete each procedure needed to legally start and operate a number of procedures needed to legally start and operate a company	Measure constructed by authors based on business indicators provided by doingbusiness.org.
Cost incurred to complete each procedure	= percentage of income per capita	Indicator provided by doingbusiness.org.
Paid-in minimum capital	= percentage of income per capita	Indicator provided by doingbusiness.org.
<i>Getting electricity</i>		
Days/Procedure	= number of days to obtain an electricity connection/number of procedures needed to file in order to obtain an electricity connection	Measure constructed by authors based on business indicators provided by doingbusiness.org.
Cost incurred to obtain a connection	= percentage of income per capita	Indicator provided by doingbusiness.org.
<i>Getting credit</i>		
Strength of legal rights index	Takes values from 0 to 10. Analyses 10 features of collateral and bankruptcy laws, assigning 1 point for each feature enforced by the legislation in place.	Indicator provided by doingbusiness.org.
Depth of credit information index	Takes values from 0 to 6. Analyses 6 features of credit bureau and credit registry, assigning 1 point for each feature that applies.	Indicator provided by doingbusiness.org.
Credit registry (bureau) coverage	= number of individuals and firms listed in a credit registry (the largest credit bureau) as percentage of adult population	Indicator provided by doingbusiness.org.
<i>Paying taxes</i>		
Hours/Payment	= number of hours to prepare, file returns and pay taxes/number of tax payments per year	Measure constructed by authors based on business

		indicators provided by doingbusiness.org.
Total tax rate	= firm tax liability as percentage of profits before all taxes borne	Indicator provided by doingbusiness.org.
<i>Trading across borders: Exports(Imports)</i>		
Days/Document	= number of days needed for documentary compliance and border compliance when exporting a product/number of documents required when exporting (importing) a product	Measure constructed by authors based on business indicators provided by doingbusiness.org.
Cost to export (import)	= deflated US\$ per container	Indicator provided by doingbusiness.org.

Source: Authors' processing based on *doingbusiness.org* data

In order to construct the country grouping, it was employed the methodology of exclusive clustering. Considering the optimum clustering method, Hamalainen et al. (2013) recommend the usage of methods which require only pair-wise distances between data points such as hierarchical methods in case of data which contains both numerical and categorical variables, the easiest choice is using. Moreover, Puss et al. (2010) use the k-means clustering method along with Ward in developing their European social models. As such, six clustering methods were used, namely: Ward, Exact Maximum Likelihood (EML), Flexible-Beta Method (FLE), McQuitty's Similarity Analysis (MCQ), Single Linkage (SIN) and K-means.

A first step in conducting the clustering analysis is to be found in disseminating among the optimum number of clusters. As such, three criteria were employed, i.e. the Cubic Clustering Criterion (CCC), Pseudo-F as well as Pseudo-t². The first two are maximization criteria, i.e. the larger the values of CCC or Pseudo-F, the better the solution. On the one hand, CCC is a comparative measure of the deviation of the clusters from the distribution expected if data points were obtained from a uniform distribution (Sarle, 1983):

$CCC = \ln \left[\frac{1-E[R^2]}{1-R^2} \right] * K$, where: E(R²) – expected R²; R² – observed R²; K – the variance-stabilizing transformation.

Thus, a larger value for CCC would indicate a larger difference from a uniform distribution, i.e. a “no clusters” distribution, suggesting the optimal number of clusters to be formed.

On the other hand, the Pseudo-F statistic is a ratio of the mean sum of squares between groups to the mean sum of squares within group (Lattin et. al, 2003):

$Pseudo - F = \frac{(T-P_G)/(G-1)}{P_G/(N-G)}$, where: T – total sum of squares; P_G – within-group sum of squares; G – number of clusters; N – number of observations.

Thus, a larger value for Pseudo-F statistic would indicate a better clustering solution.

To continue, the Pseudo-t² statistic quantifies the difference between two clusters that are merged at a given step:

$$Pseudo - t^2 = \frac{B_{KL}}{((W_K + W_L) / (N_K + N_L - 2))}$$

where: B_{KL} – between-cluster sum of squares;

W_K and W_L – within cluster sum of squares of clusters K and L, respectively;

N_K and N_L – number of observations in clusters K and L, respectively.

Following, the dendrogram provides a visual tool for examining the optimum number of clusters. As such, the graph should be “cut” by a vertical line where the distance between one level and the previous one is the highest, the number of clusters being given by the number of intersection points between the drawn vertical line and the horizontal lines.

Figure 2 portrays the output of the three criteria for Ward, EML, FLE, MCQ and SIC methods. As described previously, in selecting the optimal number of clusters researchers should search for points of global maximum in case of CCC and Pseudo-F and points after which the Pseudo- t^2 distribution starts stabilizing. In the present case, except for the SIN method, the optimal number of clusters suggested by all of the three criteria is 3. On the other hand, the dendrograms (Figure 3) might suggest an optimal number of 2 clusters.

Sarle (1983) suggests that the aforementioned selection criteria have only a guidance role, the decision in selecting the optimal number of clusters remaining at the researcher’s viewpoint. The clustering was carried out considering an optimal number of three clusters based on the first three selection criteria. In the end, the results provided by McQuitty’s Similarity Analysis showcased the most homogenous groups. They are presented and discussed in the following section.

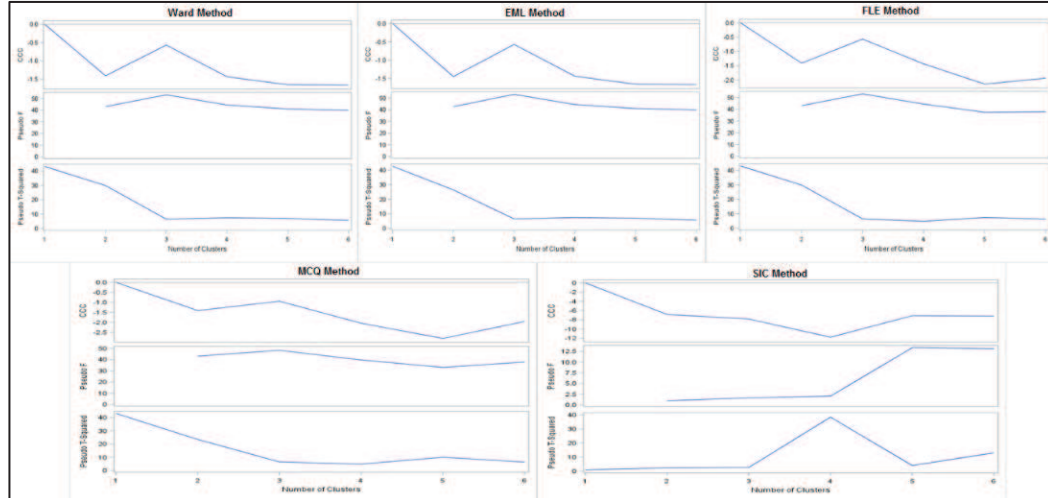


Figure 2: CCC, Pseudo-F and Pseudo- t^2 for Ward, EML, FLE, MCQ and SIC Method

Source: Authors' processing in SAS

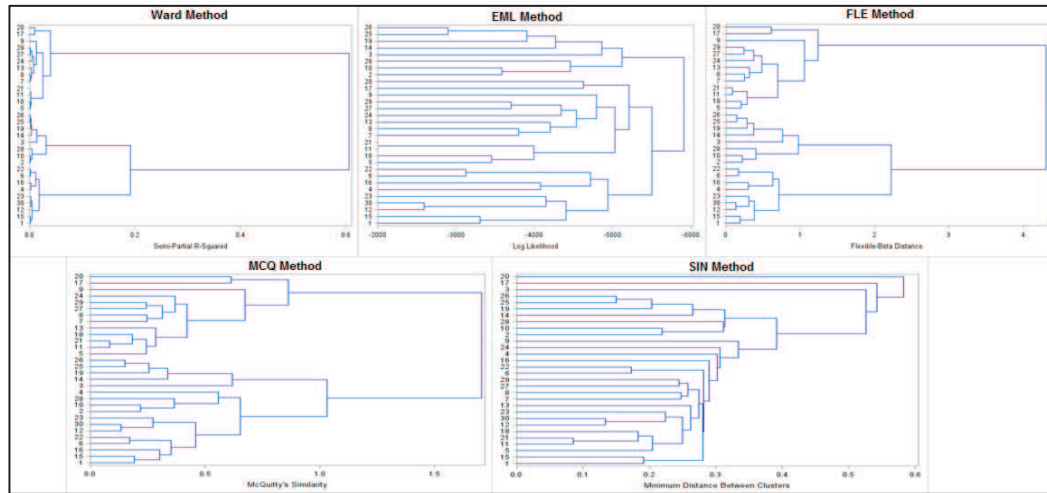


Figure 3: Dendrograms for Ward, EML, FLE, MCQ and SIC Method
Source: Authors' processing in SAS

3.2. Country Clustering-Labour Market

The labour market factors comprise the level of unemployment benefits and minimum wage and employment protection policies (Table 2).

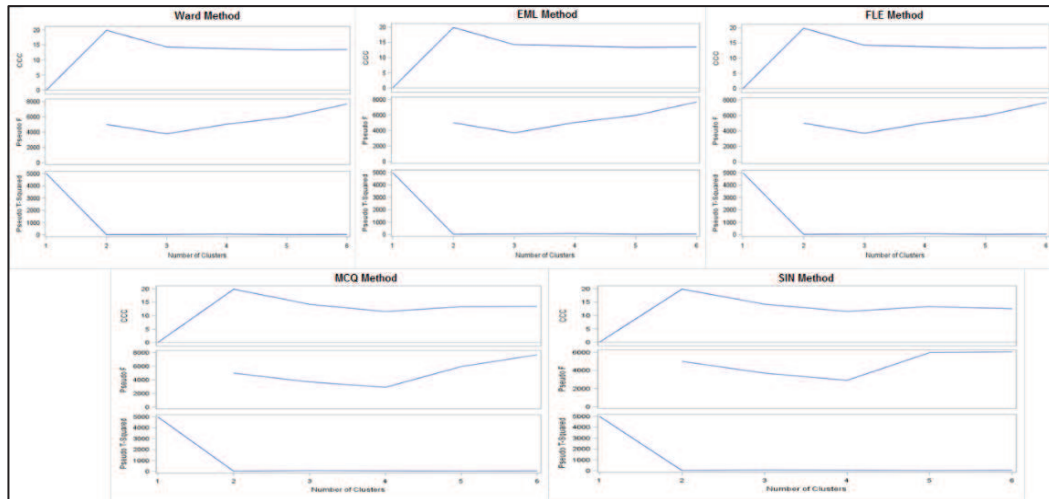
In order to construct the country grouping for the labour market factors it was followed the methodology presented in the above section. In order to discriminate the optimal number of clusters, there were analysed the CCC, Pseudo-F and Pseudo-t² criteria (Figure 4) and a dendrogram was also plotted (Figure 5).

Table 2. Labour market factors

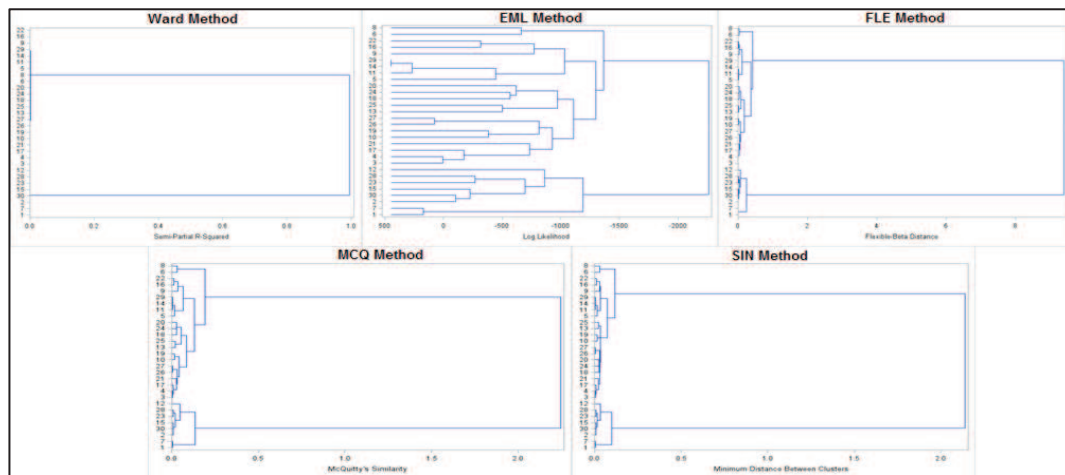
Variable	Computation/M Measurement	Source
Unemployment benefits	= percentage of GDP	Indicator provided by Eurostat.
Minimum wage	= percentage of median wage	Indicator provided by Eurostat.
<i>Employment protection legislation</i>		
Are fixed-term contracts prohibited for permanent tasks?	Binary indicator, noted as "yes" in case of prohibition and "no" otherwise.	Indicator provided by doingbusiness.org.
What is the maximum cumulative duration of a fixed-term employment relationship, including all renewals?	= maximum cumulative number of months of a fixed-term employment relationship in case such a period is defined by the regulator, and 999 otherwise	Indicator provided by doingbusiness.org.

Must the employer notify a third party before dismissing one redundant worker?	Binary indicator, noted as “yes” in case of notification requirement and “no” otherwise.	Indicator provided by doingbusiness.org.
Must the employer notify or consult a third party prior to a collective dismissal (9 employees)?	Binary indicator, noted as “yes” in case of notification requirement and “no” otherwise.	Indicator provided by doingbusiness.org.

Source: Authors’ processing based on *Eurostat* and *doingbusiness.org* data
Figure 4: CCC, Pseudo-F and Pseudo-t² for Ward, EML, FLE, MCQ and SIC



Method



Source: Authors’ processing in SAS

Figure 5: Dendrograms for Ward, EML, FLE, MCQ and SIC Method

Source: Authors’ processing in SAS

After performing all the six clustering algorithms, the results provided by Ward method showcased the most homogenous groups. They are presented and discussed in the following section.

4. Findings and Discussions

The previous section described the clustering algorithm and the goodness-of-fit measures used for both business environment and labour market clustering. Present section shows the results obtained and showcases several regime-based cross-country comparison statistics in order to test for the existence of a systematically outperforming model.

To begin with, in respect to the business environment, three groups of countries sharing broadly similar characteristics have been identified. A first consideration drawn from Figure 6 would be that there is no country cluster which exhibits pure business environment liberalization as there is no pure rigid model either; the first and the last cluster present a mix of lighter and tighter business environment factors whereas the second cluster present moderate and high levels in all the analysed indicators. Thus, countries in Cluster 1 have low trading burdens, but increased setup costs and taxes as well as increased corporate tax rates; on the other hand, countries in Cluster 3 exhibit low corporate taxation and setup cost at increased trading across borders burdens. Countries in Cluster 2, however, present increased taxation rates as well as increased trading burdens. The more powerful indicators in forming and differentiating the clusters were those in the class of starting a business.

Further on, in respect to the labour market, three groups of countries sharing broadly similar characteristics have been identified. As in the case of business environment, a first consideration drawn from Figure 7 would be that there is no country cluster which exhibits pure labour market liberalization. As such, high minimum wages are to be found in countries with low unemployment benefits (Cluster 3) and vice-versa (Cluster 1 and 2). Similarly, high regulation on fixed term contracts are associated to moderate or no employee dismissal protection (Cluster 3) and vice-versa. The more powerful indicators in forming and differentiating the clusters were dismissal notification in case of one redundant worker, prohibition of fixed-term contracts and the size of unemployment benefits.

Cluster 1	<i>Cyprus, Denmark, Estonia, Finland, Germany, Hungary, Latvia, Lithuania, Malta, Netherlands, Portugal, Slovenia, Sweden</i>
<ul style="list-style-type: none"> Moderate starting costs and corporate tax rates High operational setup costs 	<ul style="list-style-type: none"> Low trading across borders bureaucracy Low trading across borders costs
Cluster 2	<i>Austria, Belgium, Croatia, Czech Republic, France, Greece, Ireland, Italy, Norway, Poland, Spain, United Kingdom</i>
<ul style="list-style-type: none"> High starting costs and corporate tax rates Moderate operational setup costs 	<ul style="list-style-type: none"> High trading across borders bureaucracy Moderate trading across borders costs
Cluster 3	<i>Bulgaria, Iceland, Luxembourg, Romania, Slovak Republic</i>
<ul style="list-style-type: none"> Low starting costs and corporate tax rates Low operational setup costs 	<ul style="list-style-type: none"> Moderate trading across borders bureaucracy High trading across borders costs

Figure 6: Country clusters – Business environment

Source: Authors' processing based on MCQ clustering procedure

Cluster 1	<i>Cyprus, Finland, Germany, Iceland, Italy, Norway, Sweden</i>
<ul style="list-style-type: none"> No minimum wage policy Moderate unemployment benefits 	<ul style="list-style-type: none"> Moderate regulation of fixed term contracts High employee dismissal protection
Cluster 2	<i>Austria, Belgium, Denmark, Greece, Ireland, Poland, Spain, United Kingdom</i>
<ul style="list-style-type: none"> Moderate minimum wages High unemployment benefits 	<ul style="list-style-type: none"> Low or no regulation of fixed term contracts Moderate employee dismissal protection
Cluster 3	<i>Bulgaria, Croatia, Czech Republic, Estonia, France, Hungary, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Romania, Slovakia, Slovenia</i>
<ul style="list-style-type: none"> High minimum wages Low unemployment benefits 	<ul style="list-style-type: none"> High regulation of fixed term contracts Moderate or no employee dismissal protection

Figure 7: Country clusters – Business environment

Source: Authors' processing based on Ward clustering procedure

In the end, average unemployment and job vacancy rates were computed for the created clusters along with the maximum range of the values undertaken (Table 3 and 4). The two basic statistics were considered as to account less for country specificities. Values suggest that there is no preferred model in terms of a systematically outperforming one and that there is still place for research in the area.

Table 3. Labour market outputs – business environment clusters

Cluster	Cluster 1		Cluster 2		Cluster 3	
	Unemployment	Job vacancy	Unemployment	Job vacancy	Unemployment	Job vacancy
Mean	9.77	1.21	11.7	1.12	9.12	0.84
Max. range	11.2	2	24	2.1	8.8	0.5

Source: Authors' processing based on Eurostat data

Table 4. Labour market outputs – labour market clusters

Cluster	Cluster 1		Cluster 2		Cluster 3	
Indicator	Unemployment	Job vacancy	Unemployment	Job vacancy	Unemployment	Job vacancy
Mean	8.33	1.57	13.11	1.01	10.5	0.95
Max. range	12.4	1.4	22.6	0.7	11.4	0.9

Source: Authors' processing based on *Eurostat* data

5. Conclusions

Present study followed a detailed radiography of two of the policy regulated areas impacting the labour market outputs, i.e. business environment and labour market, proposing two country groupings based on different policy indicators. The analysis was carried out based on clustering algorithms. Three country clusters resulted for both domains. Considering the policy liberalization context, no cluster emphasized purely liberalized, nor purely rigid policies, but rather different mixtures of them. When assessing for the regime-based cross-country differences in labour market outputs, i.e. unemployment and job vacancy rates, there were no evidence in favour of an outperforming model suggesting that there is still room for empirical research in attaining the better-social desideratum.

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