RESEARCH ARTICLE

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Stephan Brunow[a] iD ✉, *Natalia N. Kunitsyna[b]* iD
a) University of Applied Labour Studies, Schwerin, Germany
b) North-Caucasus Federal University, Stavropol, Russian Federation

Measuring the Efficiency of Public Employment Services in Russia: Which Regions Have Similarities?[1]

Abstract. Public Employment Services provide support for firms and individuals in finding new employment opportunities. They are important actors at the labour market, since well-functioning services reduce costs of search friction and increase matching efficiency. In this paper we adopt the regional classification scheme to identify similarities of regions and their PES on the basis of regional labour market-oriented characteristics. The purpose of the scientific search is the theoretical justification and empirical confirmation of Russian regions' similarity in terms of employment level and the formulation of areas for increasing the efficiency of public employment services. The tasks were solved using expert analytical methods, analysis of statistical rows, clustering and cartography. The clustering is based on Ward's hierarchical method, clusters are plotted on weighted standardised data. The official information from the Federal State Statistics Service of the Russian Federation (Rosstat) are analysed. We identified 7 clusters, in which PES have rather similar conditions. The heterogeneity of conditions is higher between clusters. PES within a cluster are valid for comparison and the adoption of new services and best practice examples. We show that the classification of the Russian Economic Zones does not necessarily cover similarities at local labour markets. The practical significance of the results is due to the possibility of using them to develop decisions for long – and short-term support for employment and the formation of an optimal labour market structure both at the state level and at the level of constituent entities of the Federation.

Keywords: public employment services, employees, unemployed people, job performance, regional classification, agglomerative hierarchical clustering procedure, Ward's method

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Ш. Брунов ^{а)} iD ✉, *Н. Н. Куницына* ^{б)} iD

^{а)} Университет прикладных трудовых исследований, г. Шверин, Германия

^{б)} Северо-Кавказский федеральный университет, г. Ставрополь, Российская Федерация

Измерение эффективности деятельности органов государственной службы занятости в России: поиск сходств между регионами

Аннотация. Органы государственной службы занятости (ГСЗ) оказывают поддержку фирмам и частным лицам в поиске новых возможностей трудоустройства. Они играют важную роль на рынке труда, поскольку их эффективная деятельность позволяет сократить издержки предпринимателей при подборе персонала. В данной работе для выявления сходств субъектов Федерации с точки зрения эффективности деятельности органов ГСЗ используется классификация российских экономических зон по основным характеристикам рынка труда. Цель исследования – теоретическое обоснование и эмпирическое подтверждение сходства регионов России по уровню занятости и формулировка направлений повышения эффективности деятельности органов ГСЗ. Для решения поставленных исследовательских задач применялись экспертно-аналитические методы, анализ статистических рядов, кластеризация и картография. На основе взвешенных стандартизированных данных проведена кластеризация экономических зон с помощью иерархического метода Уорда. Для этого были проанализированы официальные данные Федеральной службы государственной статистики Российской Федерации (Росстата). Авторы выделили 7 кластеров, в которых органы ГСЗ имеют довольно схожие условия и результаты деятельности. При этом неоднородность условий между кластерами достаточно высока. Органы ГСЗ в пределах каждого кластера пригодны для сравнения с точки зрения однородности, что позволяет рекомендовать аналогичные направления совершенствования оказываемых услуг с позиции передовой практики. Было выявлено, что классификация российских экономических зон не в полной мере коррелирует с границами региональных рынков труда. Практическая значимость результатов обусловлена возможностью их использования для выработки решений по долгосрочной и краткосрочной поддержке занятости и формированию оптимальной структуры рынка труда, как на государственном уровне, так и на уровне субъектов Федерации.

Ключевые слова: государственные службы занятости, работники, безработные, производительность труда, региональная классификация, метод агломеративной иерархической кластеризации, метод Уорда

Introduction

Public employment services (PES) offer services for firms to find adequate employees and for unemployed people to find a new job. The functioning of such services is important for efficiency in regional labour markets. The reduction of so-called search frictions matters for both firms and individuals. The better services operate, the more easily unemployed can find a new job, achieve income and lastly pay into instead of use benefits from the social security system. From a firm's perspective, efficient working services support employers to satisfy their labour demand in order to ensure optimal production. PES in Russia are coordinated by the Federal Service for Labour and Employment (Rostrud), which defines the services

to support individuals and firms. These services are at work Russia-wide, therefore, each individual and firm can request the same procedures. However, some labour markets work better than others and, thus, the efficiency of public employment services may differ between Russian territories. This does not necessarily mean that the people employed in PES perform better or worse in comparison between territories. Differences in efficiency are potentially caused by different initial conditions a territory faces. Dynnikova et al. (2021) provide evidence for long-lasting regional disparities and, thus, varying initial conditions in Russian regions. For instance, a territory with a higher proportion of employees in the private sector indicates a production and market-oriented industry structure with a potentially more

volatile labour demand, leading to a steady flow of firms requesting labour. In a volatile labour market, individuals may lose their jobs more frequently and therefore request for PES support, and relatively easily find a new job. This may lead to a seemingly more efficient service of PES. Contrary, if the private sector in a region is relatively less developed, labour demand is potentially rather sticky and unemployed individuals can find a new job less easily. Under such conditions, PES may face stronger difficulties to place workers into employment. Thus, initial conditions limit the options for PES, which they cannot change, and are seemingly less efficient. This potential inefficiency, however, is driven by poorer economic conditions.

This paper therefore aims to identify and measure the efficiency of public employment services based on initial conditions in Russia. The research hypothesis is the author's position, according to which regional clusters have historically formed in Russia depending on economic development in the past, characterised by the unemployment situation and other factors. The regional cluster definition contributes to the development of the stabilisation measures, both at the federal and regional levels. For this reason, we divided Russian territories into seven groups. Within these groups, territories have rather similar initial conditions. Research is built on the classification method suggested by Blien and Hirschenauer (2018). The resulting groups may present a picture of territories facing similar conditions to Rostrud and PES. Policy interventions may be designed for such rather similar territories to achieve overall efficiency. Lastly, this study is a first attempt to measure the efficiency of PES system in Russia based on initial conditions. For a broader picture, more disaggregated, city level data are needed. Unfortunately, such data are currently not available.

The structure of the paper is as follows. Section 2 reviews literature on the functioning of labour markets in Russia and refers to literature considering approaches to achieve and measure the efficiency of PES. Section 3 introduces the classification method, the data basis and variables under consideration, provides a brief descriptive overview of key performance measures and initial conditions. In Section 4 we perform the identification and grouping, as suggested by Blien and Hirschenauer (2018). Specifically, Section 4 provides the results of the regression method to identify relevant initial conditions and interpret its findings, shows the results of the cluster analysis, and derives the comparison groups of Russian territories facing

similarities. Lastly, Section 5 concludes the research.

On the functioning of the Russian labour market

The problem of assessing the effectiveness of regional employment services to ensure an active employment policy in the Russian labour market remains relevant for a fairly long time. Research in this direction has been conducted throughout the entire period of time since the creation of regional employment committees in 1991. Smirnov (1996, 1998) offers some criteria for assessing the effectiveness of employment policy in regions by means of special indicators of social performance. He proposed to evaluate the social efficiency as the ratio of the number of unemployed and all individuals removed from registration for all reasons during the calendar period to the number of unemployed at the end of the calendar period. This measure is a global indicator of the regional labour market dynamics. The higher the ratio is, the shorter the unemployment duration should be or at least, the more flexibly unemployed individuals should react and find a new job immediately. However, if the ratio is low, the unemployment period is rather long and finding a new job is more difficult.

The work of Starovoitova and Zolotareva (2001) describes the specific characteristics of unemployed citizens, who receive support by employment services. Particularly, they found that there is almost no gender differentiation in total unemployment. However, as for registered unemployed, women are more willing to apply for support from employment services, i. e. the female share of registered unemployed requesting support is higher than the female share among all unemployed. Considering the age structure, total unemployment level was the highest among young people, but there was no such peak in registered unemployment. One possible explanation is that students who are serving in the army cannot apply to public employment services due to legislation. Another explanation is that younger individuals can find a new job easier because of higher flexibility and therefore they do not apply for PES. Starovoitova and Zolotareva (2001) finally showed that the proportion of people with higher education among registered unemployed is less than the share of people without higher education. Thus, less-skilled workers are more likely to become unemployed. This literature review makes it clear that regional conditions of the labour market influence the potential efficiency of the respective PES.

Various studies assess the effectiveness of measures taken to create and preserve jobs, including an assessment of the effectiveness of training workers among the unemployed at the request of employers (Ivanova & Bezdenezhnykh, 2002; Garsiya-Iser et al., 1995, 1997; Roganov, 1995; Kyazimov, 1997). The main official criterion of PES efficiency is the degree of fulfilment of key performance indicators (KPI) in certain areas of work (including successfully passed vocational training and retraining, successful participation in public work, and temporary employment of youth). In other words, a public employment service is seen as successful if, for instance, the share of individuals who finished retraining is high. However, those KPIs do not fully consider a number of important aspects of PES activities: their financial condition, the quality of staff, the quality of employment offers for citizens, who applied for help in job search, among others. Another aspect to consider is the drop-out rate when using the share of participants, who successfully finished the retraining. Individuals may find a job during the retraining and therefore quit it. As a consequence, the share of those who finished retraining becomes lower. When comparing the efficiency of two different PES, the one PES with lower drop-out rates would seem to be more efficient. However, it might also indicate that there are less opportunities for participants to drop-out and therefore the regional labour-market conditions are different, such that efficiency cannot be measured in that way. Hence, a direct comparison of PES is invalid and misleading. Therefore, Sidorenko (2004) proposed to expand the reporting of employment services by using a more detailed analytical illustration of available statistical indicators in comparison over a number of years, highlighting the various characteristics of job seekers. Such characteristics include the length of the unemployment period and the proportion of people, who became employed with the help of PES relative to the total number of employed people.

Dmitriev et al. (2018) examine the existing approaches to assess the effectiveness of PES in recent years. Their analysis reveals significant reserves for the optimisation of regulations. They suggest to modify the list of necessary documents to apply for support. For instance, a certificate of income from the tax service instead of a certificate from the former employer would be more appropriate. With respect to hierarchy within the employment services, the decision regarding the payment of unemployment benefits should be transferred from the director of the employment service to the employees who accrue those payments. By examining the real state of the processes, they concluded that measures to improve the efficiency are different from measures leading to improved performance. According to the authors, this situation is due to the lack of a methodological base, ambiguity of wording, and unpreparedness of civil servants.

Dmitriev and Krapil' (2017) stated that achieving efficiency is possible under the condition of meaningful changes in the processes, which requires step-by-step optimisation. Kuznetsova (2019) concludes that it is important to establish uniform requirements for the development of criteria for assessing the quality of public services and their regulatory consolidation, achieved by adopting common approaches across all relevant and involved judicial acts. Vishnevskaya (2019) presented the possibilities of adapting best practice examples of the Organisation for Economic Co-operation and Development (OECD) countries and showed how to include them into the Russian Federation guidelines for effective regulation of the labour market. Such suggestions include the level and calculation of unemployment benefits and the overall system to set salaries and general institutional settings in legislation. Kalinina and Maslennikov (2015) analyse foreign employment services and draw attention to the differences from the Russian ones, especially the control and care of re-integrated individuals.

The experts of the "All-Russian National Front" (ARNF) inspected the regional employment services of the Central, Northwestern, Ural and Volga Federal Districts during 2016–2018. They concluded that changes in the activities of PES have been long overdue. First, PES use outdated forms of communication with firms and individuals. Second, unemployed request PES not for support in finding employment, but for receiving unemployment benefits. As a result, it was proposed to establish a set of KPIs for employment services. To keep it trackable, there should not be more than 10 KPIs. These KPIs should include the number of people who got a permanent job with the help of a PES; the number of people who got a job in a profession obtained as a part of additional vocational education; the quality of interaction between representatives of PES with job seekers and employers, among others. However, such KPIs do not improve the PES efficiency and the way they operate. According to Galanina (2018), the ARNF experts recommended to give employment services additional functions. First, employment services have to develop a list of popular professions in the

region and determine the demand for personnel usually requested by firms. Second, employment services have to improve the quality of interaction between representatives of employment services and job seekers and employers. Third, employment services have to search for suitable employees at the request of employers, contact not only their databases, but also recruitment agencies, as well as monitor non-state job search sites and social networks.

All the arguments introduced formed the basis of the Federal Project "Supporting Employment and Improving the Efficiency of the Labour Market to Ensure Productivity Growth" as an integral part of the National Project "Labour Productivity and Employment Support" . In 2019, 16 pilot projects were implemented aiming to improve the efficiency of PES in accordance with unified requirements for the organisation of PES activities. They target the most problematic fields of their activities identified during the audit. In particular, the following projects aim to improve the quality and efficiency of PES in the territories of the Russian Federation until the end of 2024. First, based on the success of 16 pilot projects, modernisation projects of the employment centres should be implemented in all territories. Second, the coverage rate of the Federal Project "Labour Productivity and Employment Support" should be increased to all territories, as it was only 31 % in 2019. Third, the share of satisfied job seekers and employers requesting PES support should be 90 % by 2024 (it was 60 % in 2019) in all employment centres, in which modernisation projects have been implemented. To better measure the employment service performance, various KPIs are introduced , including the shares of satisfied applicants/ individuals but also the share of satisfied employers requesting services from employment centres. These fractions measure the guidance quality. Additionally, the share of employed citizens to the total number of citizens, who applied for assistance in finding a job during the reporting period, controls for the relative size of support seekers. The number of employers who applied for assistance serves as another measure of the mass of requests for PES during the reporting period. However, not just the number of individuals and employers are recorded but also the number of requests and activities of each individual and employer is monitored in pilot employment centres.

Within the framework of the federal project in the pilot regions during 2019–2021, experience has been accumulated in reforming employment services to support employment and increase the efficiency of the labour market. Various studies (Khairov et al., 2020; Popova et al., 2020; Stuken et al., 2021; Kuznecov, 2020; Lyakh, 2021; Bogachenko et al., 2020) revealed the problems that hinder the improvement of the efficiency of employment services. Still, the existing ways of interaction between PES with both citizens and employers do not satisfy the needs of service users. Most of the services provided by employment services can be converted to a remote format. When looking for a job, the majority of citizens do not apply to the public employment service, but use informal channels (75 %) or specialised portals (70 %) instead. Therefore, employment services compete with other non-governmental and commercial companies. One of the reasons is the poor information support of PES web sites compared to well-known private job search sites.

Taking into account that more than 85 % of those who applied to the employment service are women, it is relevant to search for female-specific job offers. However, this matching does not work sufficiently. Usually, persons under the age of 36 do not applied to the employment service. Therefore, the activities of employment services are more relevant for older people, or younger people do not see the need to register as unemployed even for the period of job search, or they prefer other ways of looking for work.

The optimisation within PES may cause more trust of unemployed and support-seekers in PES services and therefore show their relevance. If such optimisation is regulated Russia-wide for all PES, there will be no regional differences of the services provided by PES. Thus, no more or less efficient PES can be identified. The literature review has shown frequently used indicators to measure PES efficiency and how improvements in efficiency can be done. Additionally, we reviewed existing policy programmes and their success for PES efficiency. Once these programmes are implemented, the comparison of PES and their relative efficiency becomes obvious and policy makers become interested in the question, which PES operate better than others. However, for some regions, efficiency is potentially easier to obtain compared to other regions caused by differences in the economic structure. For instance, in a large city it is potentially easier to find suitable labour on request by a firm whereas in a rather peripheral region the situation is worse, caused by a skewed distribution of labour in space. For instance, Brixy et al. (2022) provide evidence for selectivity of firms and available workers in Germany. Accordingly, the economic situation and the distribution of industries and skills differ

between regions and best practice approaches in one region are not necessarily transferable to another region. As a result, PES efficiency may differ from territory to territory, depending on the regional (economic) conditions, where a PES is located. This is the starting point of our research. We will therefore group regions with similar regional economic pre-conditions into clusters. As a result of that, a comparison of PES within each cluster is possible and invalid when comparing PES of different clusters. Best practice approaches of one region can be transferred to other regions within a cluster and are potentially meaningful to adopt.

For Russia, there already exists a classification of economic zones, as shown in Figure 1. These zones are based on similarities, such as common economic and social goals, similar living conditions, but also on similar climatic, ecological and geological conditions, among others. At a glance, it shows a clear East-West pattern with some variety within the European part of Russia. However, it does not necessarily reflect labour market-oriented similarities and thus, not necessarily similarities in PES efficiency.

Classification method and data basis

Introduction to the classification method

The aim of the classification is to identify regions that face some similarities in initial conditions under which PES operate. We use the method suggested by Blien and Hirschenauer (2018). Additionally, we are interested in a comparison of the efficiency of PES. The intuition of the classification is visualised in Figure 2. Both diagrams show a specific initial condition on the x-axis, for instance, gross domestic product (GDP) per capita. The y-axis shows a PES performance measure, for instance, the share of individuals that requested services provided by PES. It is hypothesised that if GDP is high, individuals might expect to easily find a new job and therefore they do not request services provided by PES. We thus expect lower proportions of individuals that register for support by PES.

Each dot in Figure 2 represents the combination of a specific initial condition and the performance measure within one region. Let's consider the left panel first. Within each horizontal bar, we see various regions that show rather similar values of the performance measure. Obviously, because these regions show similar performance measures, they might be comparable, providing similar efficiency levels. However, in Group 1 region A shows low values of GDP whereas region B shows high values of GDP. If the hypothesis mentioned above is true, then obviously, we may wonder why region B has such high numbers of people registered at PES. We would expect much lower levels. For this reason, let's consider the right panel of Figure 2. Here, regions are assigned to comparison groups according to similar initial conditions. Now, regions A and B belong to different groups. However, now regions C and B belong to the same group. We see that C shows a much lower share of registered individuals. Now, we can directly compare B and C and raise the question why C shows such low shares. Why individuals do not register at PES? Does region C perform better or worse compared to B? Thus, the classification according to initial conditions makes regions more comparable in their efficiency measures.

Because a classification as shown in the left panel of Figure 2 does not take initial conditions

Fig. 1. *Russian Economic Zones (Source: own computation, visualised by A. Dzhioev)*
Note: Cartography within the borders of the Russian Federation on the 31.12.2021
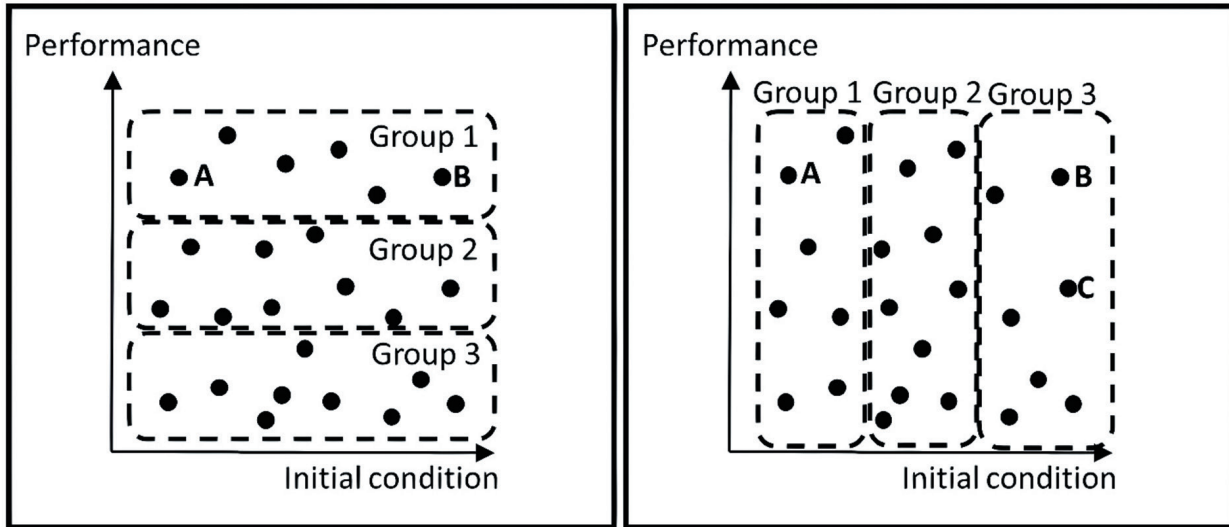
Fig. 2. *Intuition of the classification scheme (Source: own visualisation)*

into account, it comprises regions into groups that are not comparable. Policy measures may lead to misleading results when such regions are compared. For this reason, a grouping as shown in the right panel of Figure 2 is required. Regarding initial conditions, only those characteristics might explain group assignment, which reflects differences in the performance measure. Of course, using characteristics that do not explain differences in the performance measure yields space for misinterpretation and misleading policy measures. For that reason, in the first step, a regression model is performed to identify significant characteristics. Then, in the second step, significant characteristics are used in a cluster analysis. As Blien and Hirschenauer (2018) suggest, variables which better explain differences in the performance measure should be more relevant within the cluster analysis. For this reason, all significant characteristics are weighted with the t-value of the regression in the cluster analysis. Finally, the number of groups/clusters has to be chosen. The result of the cluster analysis can eventually be used for a comparison of regions with rather similar initial conditions. Policy measures can be adopted within such groups to increase the overall efficiency of PES. Finally, PES of different regions who belong to the same cluster can learn from each other to improve their individual performance.

Data basis and variables under consideration

We make use of official data from the Russian Statistical Office on Russian territories. Particularly, we have used information for monitoring the socio-economic situation of the Russian Federation individuals[1], socio-economic indicators from "Regions of Russia"[2], data included in the appendix to the "Regions of Russia. Socio-economic indicators"[3], and data from "Labour and employment in Russia"[4].

Unfortunately, there is no direct performance measures available, such as the successful integration of individuals into new employment. As the literature review reveals, the ratio of individuals who requested support from their PES relative to all registered unemployed individuals is a frequently applied KPI to measure PES efficiency. We therefore adopt this measure as a fundamental indicator. To secure robustness, we considered only Russian citizens who request support by PES relative to all registered unemployed individuals. Additionally, we use the number of employees instead of the registered unemployed individuals as an alternative basis for the computation of ratios. Of course, these KPIs are imperfect efficiency measures; however, we implicitly assume that higher values indicate that PES seem to operate more efficiently such that

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[1] Publications characterising the socio-economic situation of the constituent entities of the Russian Federation. Retrieved from: https://www.gks.ru/folder/11109 (Date of access: 29.11.2021) (In Russ.)

[2] Regions of Russia. Socio-economic indicators. Retrieved from: https://www.gks.ru/folder/210/document/13204 (Date of access: 29.11.2021) (In Russ.)

[3] Appendix to the "Regions of Russia. Socio-economic indicators". Retrieved from: https://www.gks.ru/folder/210/document/47652 (Date of access: 29.11.2021) (In Russ.)

[4] Labour and employment in Russia. Retrieved from: https://www.gks.ru/folder/210/document/13210 (Date of access: 29.11.2021) (In Russ.)

individuals look for support. Usually, this ratio is less than one, indicating that not every registered unemployed individual requests support from PES. However, in Moscow, St. Petersburg and Chechnya, this measure takes a value larger than one, indicating that more individuals request PES support although they are not registered as unemployed.

In the first step of the analysis, the performance measure is explained by differences in initial conditions. These conditions should reflect the regional performance at the labour market. We measure the strength of the labour market by GDP per capita (alternatively by wages). Unfortunately, there are no measures available on agglomeration or urbanisation economies (Brunow & Blien, 2015) to account for regional consumption and production-related externalities. The industry structure turned out to be insignificant because of little inter-regional variation. As another initial condition we include the proportion of foreign workers. It captures, to some extend, additional job opportunities and potentially a tight labour market that requests for immigration. PES in more prosperous labour markets should be requested more frequently because it is relatively easier to place individuals into work and, thus, efficiency should be higher.

The regional employment structure provides further insights into regional performance. A higher employment rate indicates a prosperous labour market offering sufficient job opportunities and potentially reflects a tighter labour market. Higher levels of the performance measure then indicate that PES provides valuable support to reduce the unemployment duration and to better place individuals into work. We further control for the proportion of employment in less skilled individuals to capture the human capital intensity of regional production. Usually, less-skilled workers look for less specific job opportunities and

therefore contact PES more frequently. Second, we control for the proportion of employees in the private sector. Specifically, smaller firms frequently face problems with new hirings because they are not as known as bigger one. As a result, they contact PES and, thus, more individuals request PES for a faster matching. Lastly, we control for the proportion of employees in informal employment. Here, the expected effect is unclear. On the one hand, informal employment may be a direct reaction when becoming unemployed and therefore less individuals request for PES support. Alternatively, trust in PES is low and therefore to avoid long-lasting unemployment, informal employment is, again, an intermediate reaction. On the other hand, higher proportions of informal employment may lead to an increase in requested support by PES to find a formal employment.

So far, we consider characteristics from employment but not from the unemployment side. Because information of, for instance, the proportion of less-skilled unemployed is already controlled for with the respective proportion of the employment site when there is a specific Russian-wide equal risk to become unemployed, we avoid using measures that are included from the employment side. Specifically, we make use of the average unemployment duration and the unemployment rate based on the working age population. The longer the average unemployment duration lasts, the less likely PES are to provide enough job offers by firms, meaning that it indicates structural regional difficulties at the labour market. It could be that a longer unemployment duration also measures less efficient operating PES. The unemployment rate measures the overall difficulty at the labour market and therefore, we expect that more people request for PES support and thus, observe higher proportions of support seekers among the unemployed. To the end,

Table 1

Descriptive Statistics of characteristics

Characteristics	Mean	Std. Dev.	Min	Max
PES efficiency	0.37	0.63	0.02	4.58
employment rate	58.81	4.64	49.5	75.4
unemployment rate	6.26	3.65	1.3	28.7
proportion of employees				
...in the private sector	44.47	11.03	9.2	62.6
...in the informal sector	5.57	3.27	0.5	20
...from foreign countries	8.92	3.45	2.6	17.6
...with lower education	22.44	6.55	7.2	56.7
Average job search duration	7.4	1.27	3.9	11.5

Source: own calculations, based on Rosstat.

this makes it more complicated for PES to place individuals into new work.

Descriptive Statistics

A descriptive overview of the characteristics under consideration is provided in Table 1. We consider the ratio of individuals requesting support from PES relative to all unemployed individuals as the performance measures that relate to the efficiency of PES. In 82 regions, the value does not exceed one and can be then interpreted as a ratio. Accordingly, about 37 % of all unemployed request support from PES. On the one hand, PES are contacted by less than 5 % of all unemployed in such regions as Karachay-Cherkessia, Nenets Autonomous okrug and Jewish Autonomous oblast. On the other hand, at least 90 % of all unemployed request PES support in Chechnya, Ingushetia, Moscow, Saint Petersburg, and Tatarstan. The regional distribution of PES efficiency measure is visualised in Figure 3. It shows especially rather high values in Siberia and lower values in border regions to the south but also to the east and west. Interestingly, the south-western territories show also higher values but the picture is slightly more mixed.

The employment rate varies between 49.5 % and 75.4 % and is on average 58.8 % high. In 2018, the unemployment rate was 6.26 % on average with hardly any unemployment in Moscow (1.3 %) and high levels of unemployment in Ingushetia (28.7 %). The proportion of employees in the private and informal sectors shows large variations over Russia. Employment opportunities for individuals from abroad and less-skilled workers vary substantially over regions, as Table 1 depicts. It takes 7.4 month on average until an unemployed individual finds a new job and usually no longer than one year.

Results and discussions

Which initial conditions matter for differences in PES efficiency?

This section aims to identify relevant characteristics that significantly explain differences in the efficiency measure. For this reason, we perform several regressions to explain the log of the efficiency measure. Table 2 presents the results. In Column 1 we present the reference model estimated using ordinary least squares (OLS) with robust standard errors. With more than 38 % of explained variance, the model shows a good fit. Additionally, all included characteristics significantly explain differences in the efficiency measure jointly. Because of GDP per capita, the employment and unemployment rates are strongly connected by theoretical arguments, resulting in some issues of multicollinearity. However, variance inflation is not a serious problem; variance inflation factors are up to 4.13. The Ramsey test does not provide concerns regarding omitted variables. Column 2 shows the regression results when the efficiency measure includes only Russian citizens requesting PES support. The results of the reference model (Column 1) confirm the expectations. In some cases, the efficiency measure exhibits values larger than one, indicating that more individuals request support

Fig. 3. *Regional distribution of PES efficiency (Source: own computation, visualised by A. Dzhioev)*
Note: Cartography within the borders of the Russian Federation on the 31.12.2021

Regression results of initial conditions on the efficiency measure

	(1)	(2)	(3)	(4)	(5)
	Reference model	Citizens only	Efficiency measures <=1	Outlier robust	Excluding Moscow
log(GDP per capita)	−0.578**	−0.560**	−0.608**	−0.595**	−0.632***
	(0.247)	(0.263)	(0.245)	(0.227)	(0.229)
employment rate	0.070*	0.071*	0.073**	0.072**	0.079**
	(0.037)	(0.039)	(0.036)	(0.034)	(0.035)
unemployment rate	0.113**	0.103**	0.141***	0.085**	0.125***
	(0.043)	(0.040)	(0.037)	(0.040)	(0.039)
proportion of employees…					
… in the private sector	0.061***	0.063***	0.069***	0.064***	0.067***
	(0.014)	(0.013)	(0.012)	(0.012)	(0.013)
… in the informal sector	0.105**	0.116**	0.048	0.076**	0.076*
	(0.051)	(0.050)	(0.044)	(0.029)	(0.042)
… from foreign countries	0.090**	0.094***	0.064**	0.042**	0.071**
	(0.036)	(0.035)	(0.028)	(0.019)	(0.030)
… with lower education	0.030	0.028	0.041**	−1.350**	0.048**
	(0.024)	(0.023)	(0.019)	(0.600)	(0.020)
Log(av. job search duration)	−1.684**	−1.794**	−0.885	0.118***	−1.235*
	(0.722)	(0.704)	(0.642)	(0.038)	(0.647)
Constant	−0.372	−0.352	−1.981	−1.099	−1.474
	(3.374)	(3.301)	(3.040)	(2.893)	(3.021)
No. of obs.	85	85	82	85	84
R2	0.445	0.472	0.429	0.473	0.476
F-Test	7.70***	8.88***	8.78***	9.31***	8.52***

Notes: OLS estimation with robust s.e. in (), Column 4 robust regression.
Source: own calculations.

from PES than are unemployed (Moscow, St. Petersburg, Chechenya). Excluding these three regions provides rather similar results, as shown in Column 3. We will discuss differences in significance later. The three mentioned regions are potential outliers and we therefore estimate an outlier-robust regression based on Cook's D (Hamilton, 1991). The weight assigned to Moscow is 0.25, indicating that Moscow as the capital is an outlier in a statistical sense. The results are shown in Column 4. Lastly, Column 5 shows OLS regression excluding Moscow.

Because all models provide rather similar results, we discuss the results more generally. Higher values of GDP are associated with lower levels of requested support from PES. This could be due to more complex labour markets and job search behaviour when requesting private employment services. The more individuals are employed relative to total population and the higher the unemployment rate is, the more often PES are requested. We expected this, because in both cases, more individuals are active at the labour market and potentially look

for support. We also provide evidence that a higher proportion of employees in the private and informal sectors lead to higher numbers of requested support from PES. Interestingly, the proportion of employees in the informal sector becomes insignificant when Moscow, St.Petersburg and Chechnya are excluded. This insignificance indicates that at least in these three regions informal employment is a strategy to avoid unemployment. Exclusion of Moscow from the sample then shows that the proportion of less-skilled workers affects the rate of PES support requests. Less-skilled individuals may look for manual, routine tasks and PES may offer such jobs more often. As a result, PES are more frequently requested by less-skilled workers and thus, we expect and show such positive relationship. The proportion of foreign employment is positively associated with PES support. Lastly, longer average unemployment duration is associated with less PES support. Here, economic conditions might be too complicated such that PES do not provide many job openings and thus unemployed may not see any need to register for PES support.

According to Blien and Hirschenauer (2018), all significant initial conditions are used within the proceeding cluster analysis. Each condition (i. e. characteristics) is weighted with its relative importance. As Blien and Hirschenauer (2018) suggest, we use the t-value of the regression as weight. The outlier robust estimation (Column 4) yields the most plausible estimates and we therefore use the t-values of this model in the proceeding analysis.

Forming clusters on the basis of initial conditions

All variables under consideration as outlined in Column 4 of Table 2 significantly explain differences in the performance measure. They are used to group regions with similar initial conditions. As Blien and Hirschenauer (2018), we employ Ward's cluster analysis which minimises the within cluster variance. Thus, regions are formed into groups in a way that they are rather homogeneous in its structure. As a result of that, they are valid comparison groups. Because the initial conditions affect the performance measure differently, they are weighted with their relative importance in the Ward's clustering. To achieve this goal, we follow Blien and Hirschenauer (2018) and first, perform a z-standardisation to all characteristics and then weighted these values with the t-value of the regression. Eventually, Ward's cluster analysis is performed using the weighted standardised data.

Ward's clustering method is a hierarchical method. Step by step, one object (or cluster) is added to another object or cluster in a way that the resulting within-group variance is the smallest relative to all other possible assignments of objects or clusters. As a result of that assignment, whenever two objects or clusters are combined, the similarity within each group decreases; or the dissimilarity increases. The procedure has an important implication. Because of the hierarchical approach, it happens that an object belongs to a specific cluster but after all the objects are assigned relatively close to another cluster. Therefore, a k-Means cluster procedure is suggested by Blien and Hirschenauer (2018) to re-assign single objects to the closest group. For this second cluster procedure, the results of the Ward-linkage are used as starting values. In doing so, the adjustment leads to a re-assignment of 3 regions, indicating an already solid Ward's clustering.

The k-Means method requests in advance the number of groups, which should be formed. We tested several groups and decided to present 7 groups as a result of the cluster analysis. The

regions that belong to one group are presented in Table 3. Finally, the seven clusters are visualised spatially in Figure 4.

There are some interesting observations worth noting. The largest Groups 1, 2 and 3 cover about two thirds of all regions. When they are grouped into one group, the dissimilarity does not increase much, indicating that the regions included have rather similar initial conditions. A consolidation of Groups 4 and 5 would also lead to a relatively low increase in dissimilarity. The same applies for Groups 6 and 7. However, Groups 6 and 7 are very different to remaining Russia. They show very distinct values of initial conditions at the labour market. Whereas an aggregation of all regions of Groups 1 to 5 would yield a moderate increase in dissimilarity, the dissimilarity increases substantially if we add the regions of Groups 6 and 7 to all regions included in Groups 1 to 5. With respect to content, policy programmes that may work in other regions may not be appropriate for the regions included in Groups 6 and 7.

Focusing on Group 5 shows that, firstly, Moscow and St. Petersburg show rather similar initial conditions and they later became combined with two Siberian states which are characterised by high employment levels, low unemployment and high GDP per capita (explained by the extraction of oil and gas). However, both subgroups (the two large cities vs high-profit gasoline industry) are very dissimilar to each other. The next step of aggregation will be to combine Group 5 with Group 4. Because Group 4 considers mainly northern, "cold" regions, they show rather a lot of similarities with the oil-regions.

Table 4 presents a descriptive summary of initial conditions reflecting labour market related indicators. As can be seen, Group 7 is characterised by low employment levels and high unemployment. Additionally, the proportion of employees within the informal sector is relatively high, associated with a higher share of less-qualified workers. Finally, GDP per capita and the proportion of foreigners are low. Group 6, in comparison, shows slightly better conditions which are still relatively poor compared to the other groups. Some differences can be seen between Group 1 and 2, but they are rather small. In contrast, the regions included in Group 3 are characterised by higher income and a higher share of foreigners. Thus, they are more attractive for immigration. Groups 4 and 5 are the most productive regions. As can be seen, for instance, active labour market policies for individuals of lower education might be more successful in regions with higher proportions of

Results of Ward's cluster analysis: similar regions

Group 1	*Moderately Developed Regions*
No of regions	27
Republic of Adygea, Amur oblast, Arkhangelsk oblast without the Nenets Autonomous okrug, Astrakhan oblast, Bryansk oblast, Republic of Buryatia, Irkutsk oblast, Kamchatka krai, Republic of Karelia, Republic of Khakassia, Komi Republic, Kostroma oblast, Krasnoyarsk krai, Kurgan oblast, Kursk oblast, Mari El Republic, Republic of Mordovia, Murmansk oblast, Omsk oblast, Orel oblast, Primorsky krai, Ryazan oblast, Saratov oblast, Smolensk oblast, Tambov oblast, Tver oblast, Volgograd oblast	
Group 2	*Central Russia*
No of regions	22
Altai krai, Republic of Bashkortostan, Belgorod oblast, Chelyabinsk oblast, Chuvash Republic, Ivanovo oblast, Kaliningrad oblast, Kemerovo oblast, Kirov oblast, Krasnodar krai, Novgorod oblast, Novosibirsk oblast, Orenburg oblast, Penza oblast, Perm krai, Pskov oblast, Rostov oblast, Stavropol krai, Tomsk oblast, Tyumen oblast, Ulyanovsk oblast, Voronezh oblast	
Group 3	*Subcentral Regions*
No of regions	14
Kaluga oblast, Khabarovsk krai, Leningrad oblast, Lipetsk oblast, Moscow oblast, Nizhny Novgorod oblast, Samara oblast, Sverdlovsk oblast, Republic of Tatarstan, Tula oblast, Udmurt Republic, Vladimir oblast, Vologda oblast, Yaroslavl oblast	
Group 4	*Cold Regions*
No of regions	5
Chukotka Autonomous Okrug, Magadan oblast, Nenets Autonomous okrug, Sakhalin oblast, Yakutia	
Group 5	*Metropolitan Cities and Oil*
No of regions	4
Moscow, Saint Petersburg, Khanty-Mansi Autonomous okrug – Yugra, Yamalo-Nenets Autonomous okrug	
Group 6	*Periphery*
No of regions	9
Jewish Autonomous oblast, Republic of Kalmykia, Karachay-Cherkess Republic, Republic of North Ossetia–Alania, Altai Republic, Republic of Tuva, Zabaykalsky krai, Kabardino-Balkarian Republic, Republic of Crimea	
Group 7	*Caucasian States*
No of regions	3
Chechen Republic, Republic of Dagestan, Republic of Ingushetia	

Source: own results.

Fig. 4. *The typology of Russian labour market regions (Source: own computation, visualised by A. Dzhioev)*
Note: Cartography within the borders of the Russian Federation on the 31.12.2021

Average initial conditions (within clusters)

Group	Employment rate	Unemployment rate	GDP per capita in 1000	Proportion of employees:			
				in the private sector	In the informal sector	from foreign countries	with lower education
1	57.32	6.05	411.7	43.65	4.8	8.43	21.31
2	57.97	5.23	399.2	53.37	5.48	7.49	22.59
3	60.55	4.33	487.9	49.76	4.16	13.66	20.62
4	66.94	5.74	2651.3	36.66	3.72	12.28	23.72
5	69.53	1.88	2648.8	57.4	2.2	12.1	12.48
6	54.91	11.48	235.6	24.31	8.81	5.84	25.92
7	54.7	18.23	149.8	16.13	18.1	3.73	44.43

Source: own calculations.

less-skilled workers. Insofar, the metropolitan-oil Group 5 does not need that much support.

The labour market-oriented classification (considering 7 groups) differs from the classification of Economic Zones. Most importantly, the dissimilarity between Groups 1 to 5 is not so large. Apparently, when comparing Figure 1 with Figure 4 we cannot see a clear East-West division for our classification. There is additionally a North-South difference in labour market characteristics and fewer dissimilarities in the European part of Russia. With respect to content, using the Russian Economic Zones as a reference to adopt best practice examples and to apply labour market-oriented PES improvements would be less efficient. Therefore, the economic zones show some similarities with the labour market-oriented classification, but not entirely; especially when the focus is set on improving PES.

The main limitation of our analysis is the rough classification of regions and therefore, within each region the heterogeneity in initial conditions may still differ substantially. We have shown that such first classification provides evidence that labour market-oriented classification schemes do not necessarily reflect the Russian Economic zones. However, more disaggregated data is needed to provide further insights into similarities and differences between regions in labour market characteristics, which lead to better/worse performing PES.

Conclusion

Public Employment Services (PES) provide support for firms and individuals in finding new employment opportunities. Therefore, they are important actors at the labour market, since well-functioning services reduce costs of search friction and increase matching efficiency. In Russia, several suggestions and implementations have been done to improve PES efficiency in recent years, starting in 1991. From a governmental perspective, measuring and evaluating PES efficiency is important not at least to implement good practice examples. However, the main questions come up: what is the best practice example and where should it be implemented? Regions with similar efficiency might differ substantially in labour market-related indicators, making the assignment of projects into similar regions having similar PES efficiency useless. However, regions with similarities in labour market-related characteristics may show dissimilarities in PES efficiency. Thus, PES may perform differently in two regions almost identical in terms of initial conditions; then, the worse performing PES may learn from the better performing one. For this reason, we classified Russian regions into comparison groups following the classification method proposed by Blien and Hirschenauer (2018). We described seven different clusters of regions. Within each cluster, there are many similarities in labour market characteristics and thus similar efficiency may be expected. Between the clusters, initial labour market characteristics differ, such that a comparison is invalid. Our hypothesis is thus confirmed that regions with different historical stages of (economic) development exist and territories should be classified into groups that show similarities. In comparison to the Russian Economic Zones, we show that the labour market-oriented classification provides a distinct picture. For this reason, improvements in PES efficiency and the adoption of best practice examples should be considered only in regions of the same group (that may differ from the Russian Economic Zones). Such implementations might be less successful

in other regions of other clusters. PES, who want to improve their services and quality, may compare themselves and learn from another PES of the same cluster. Our clustering is a first step into the regional classification of labour markets, which face similarities. However, to provide a more detailed picture, more disaggregated data is required. Nonetheless, the study provides a first solid picture showing in which regions PES-related policies may be implemented and in which regions labour market (dis-)similarities exist.

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About the authors

Stephan Brunow — Dr. Rer. Pol., Professor, University of Applied Labour Studies (HdBA); Scopus Author ID: 15043640000; http://orcid.org/0000–0001-9179–4464 (405, Wismarsche St., Schwerin, 19055, Germany; e-mail: stephan.brunow@arbeitsagentur.de)

Natalia N. Kunitsyna — Dr. Sci. (Econ.), Professor, North-Caucasus Federal University; Scopus Author ID: 56128000600; https://orcid.org/0000–0001-9336–8100 (1, Pushkina St., Stavropol, 355017, Russian Federation; e-mail: nkunitcyna@ncfu.ru).

Информация об авторах

Брунов Стефан — доктор общественно-политических наук, профессор, Университет прикладных трудовых исследований (HdBA); Scopus Author ID: 15043640000; http://orcid.org/0000–0001-9179–4464 (Германия, 19055, г. Шверин, ул. Висмарше, 405; e-mail: stephan.brunow@arbeitsagentur.de)

Куницына Наталья Николаевна — доктор экономических наук, профессор, Северо-Кавказский федеральный университет; Scopus Author ID: 56128000600; https://orcid.org/0000–0001-9336–8100 (Российская Федерация, 355017, г. Ставрополь, ул. Пушкина, 1; e-mail: nkunitcyna@ncfu.ru).

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The authors declare no conflicts of interest.

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