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# The Efficiency of Labor Market Policies in EU Countries

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## Abstract

The objective of this paper is to examine the efficiency of the public sector when it comes to labor market policy (LMP) in European Union (EU) countries. The primary aim is to provide a comprehensive evaluation of public services connected with the LMP from the viewpoint of the efficiency of public expenditure allocated for that purpose. The turning point for the European labor market was marked by the introduction of lockdown in 2020 due to the COVID–19 pandemic. The article's overall aim is to evaluate the efficiency of EU labor markets before and during the pandemic and to ascertain the extent to which the volume of public services (their financial allocations) affects selected labor market indicators.

The efficiency of EU countries in 2019 and 2020 was evaluated by applying the Data Envelopment Analysis (DEA) method. The BCC (Banker, Charnes, Cooper) model was used in this study. The output-oriented BCC model was selected as it seems adaptable to the specifics of the LMP. Microsoft Excel Solver was used for solving the DEA model, which is applied to working out linear optimization models. The efficiency of public expenditure was evaluated using data from Eurostat. A total of seven variables were used for the analysis; they comprised five variables as inputs (government expenditure on services by selected function and two uncontrolled inputs represented by job vacancy rate and GDP per capita) and two variables as outputs of selected labor market indicators (employment rate and unemployment rate <inverted indicator>). The cross-country comparison was conducted in two dimensions – among individual EU countries and among a group of countries that represent different public administration traditions (i.e., Anglo-Saxon, Continental European, South European, Scandinavian, Eastern European, and South-Eastern European).



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The study demonstrates that even though the Southern countries achieved the worst results in terms of labor market indicators, it is in contrast to the efficiency approach using DEA, where countries such as Portugal and Greece achieved full efficiency for both 2019 and 2020. The efficiency approach of the LMP for 2019 and 2020 indicates that there is a very good situation in Central and Eastern European countries. Full efficiency is also achieved by Cyprus, Malta, Sweden and Germany. The least efficient LMP is found in Belgium.
During the pandemic, most of the analyzed groups of countries improved their efficiency scores of public expenditure on LMP. The exceptions were groups of countries with the South European tradition and the Scandinavian tradition, where the measure of efficiency decreased slightly. This may demonstrate the effectiveness of the implemented public policy to counteract the negative effects of COVID–19 on the labor market.
The value added of this paper comes from the demonstration that the proposed methodology, using the DEA method, can be used to measure the efficiency of LMP at micro- and mezzo-levels and to make cross-country comparisons.

Keywords: efficiency, public services, labor market policy, DEA method, EU countries, public administration tradition

JEL: E02, E24, J01, J08

# Introduction

Public services, provided under the labor market policy (LMP), support economic growth by emphasizing the quality, development, and cultivation of human potential (Halaskova, Halaskova, and Prokop 2018). From the viewpoint of theoretical approaches, the theory of state and public financing raises the question of the state's provision of public services (including labor market services). Adam Smith (1976) emphasized the significance of ensuring services for the public benefit that the market is uninterested in due to their unprofitability. Stejskal and Hajek (2015) noted that in relation to the provision of public services, the efficiency of taxation and public expenditure is becoming a matter of interest. Studies have also investigated the connection between measuring performance and public service efficiency (Greiling 2006). However, the efficiency of public services is very often treated as something more than a technical relationship between resources and output. It extends allocative efficiency, which is defined as the optimal combination of inputs so that the output is provided at a minimal cost (Baudnenko, Fritsch, and Stephan 2008). This broad perspective is due to the fact that public services have multiple goals. It is much easier to set objectives for public services in terms of meeting those goals than it is to evaluate the efficiency of resource utilization in achieving those objectives. That is why the effectiveness approach is more popular when evaluating the performance of public services. The same is true for public services provided within the LMP (Rollnik-Sadowska 2019).

The evaluation of the EU labor markets is mainly based on the effectiveness approach, as demonstrated by meeting certain labor market indicators over time. An illustrative

example is the Europe 2020 strategy, which set a target to achieve an employment rate of 75% for the working population by 2020.

The article's overall aim is to evaluate the efficiency of EU labor markets, particularly in relation to the LMP, both before and during the COVID–19 pandemic. We aim to achieve this by conducting a comprehensive assessment of public sector services, focusing on the efficiency of allocated public resources. We also aim to find the extent to which the volume of public services (its financial allocations) affects selected labor market indicators. A turning point for the European labor market was the introduction of the lockdown in 2020 due to the pandemic. To avoid a massive increase in unemployment and to protect jobs, EU countries introduced Job Retention Schemes (JRSs) or expanded existing ones, using, in part, EU funds that were mobilized through the temporary Support to Mitigate Unemployment Risks in Emergency (SURE) instrument (Ando et al. 2022).

To meet the target, the study provides empirical support for the following research questions:

RQ1: How did EU countries vary in terms of LMP efficiency before and during the pandemic?

RQ2: Do EU countries with the same tradition of public administration have a similar rate of efficiency of public expenditure on the LMP?

The cross-country comparison was conducted in two dimensions – among individual EU countries and among a group of countries that represent different public administration traditions (Anglo-Saxon, Continental European, South European, Scandinavian, Eastern European, and South-Eastern).

The rest of the paper is structured as follows. The next section covers the theoretical background to understand how efficiency is evaluated in the public sector in terms of theory and practice in the EU. Section 3 details the research methodology and characteristics of the dataset. Section 4 presents the research results. Finally, in the Discussion and Conclusion sections, the results are compared with other studies and conclusions are drawn.

## Theoretical background

Public services have often been analyzed from the viewpoint of practical questions in relation to their provision and funding. Ensuring public services has a wider significance, which includes guaranteeing, organizing, regulating, and partially controlling and financing public services (Halaskova, Halaskova, and Prokop 2018). Public services financing has been analyzed by many scholars in the framework of public

finance theory, even though there is no single source or tool for the provision of financing public services (Cullis and Jones 2009).

Public expenditure plays a significant role in financing public services, serving as a prerequisite for access to these services as well as their development. Numerous papers have analyzed public expenditure, its changes and its increased efficiency. For instance, Szarowska (2014) examined long-term and short-term relationships between government expenditure and GDP in the EU15. Meanwhile, Agénor and Neanidis (2011) evaluated the relationship between public expenditure and economic growth. Many authors (e.g., Afonso, Schuknecht, and Tanzi 2005; Schaltegger and Torgler 2006; Curristine, Lonti, and Joumard 2007; Mericková and Stejskal 2014) have pointed to increased efficiency of public expenditure in relation to financing public goods and services. They looked for ways to provide public resources more efficiently and accordingly proposed measures for improvement.

Two concepts are inherent in the discourse on public expenditure: efficiency and effectiveness. Public administration efficiency is a wider concept than a technical relationship between resources and output or allocative efficiency, which is defined as the optimal combination of inputs so that the output is provided at a minimal cost (Baudnenko, Fritsch, and Stephan 2008). It has another dimension, which incorporates outputs in relation to values and accountability as an inherent quality of democratic governance (Manzoor 2014). Rutgers and van der Meer (2010) claim that two different meanings of efficiency in public administration can be used: a technical term, which concerns the link between resources and results, and a more substantive meaning, which concerns professional actions and organization, and ensuring compliance with the execution of legal rules and regulations. Rutgers and van der Meer also claim that there might even be a conflict between the measure of efficiency and the other values, and/or it may be impossible to establish priority among the multiple goals. Meanwhile, effectiveness is the degree to which goals have been achieved (Rollnik-Sadowska 2019).

The evaluation of public sector and public service efficiency has also been elaborated on at the macroeconomic level. This approach is based on the definition of the link between public sector performance and efficiency. Afonso, Schuknecht, and Tanzi (2005), for instance, assumed that public sector performance is dependent upon improved values of selected socioeconomic indicators. Other authors have analyzed the efficiency of public expenditure in areas of public services in relation to macroeconomic indicators. Tkacheva, Afanasjeva, and Goncharenko (2017), for instance, examined public expenditure on social support, education, and health care. They showed that once social costs begin to outpace the GDP growth rate, there is a decrease in economic development rates.

Mericková et al. (2017) evaluated the correlation between the volume and structure of public expenditure and socioeconomic development as represented by the Human Development Index. They indicated that the total amount of public expenditure does not

have a significant impact on socioeconomic development; however, public expenditure in "productive" sectors of public services (especially education, health, and social services) has the potential to positively impact socioeconomic development. Mandl, Adriaan, and Ilzkovitz (2008) showed that the efficiency of public services in general, and public expenditure on education and R&D in particular, varies significantly between countries. They also illustrated the difficulties of measuring efficiency and effectiveness. Rollnik-Sadowska and Dąbrowska (2018) studied expenditures on labor-market-policy public and demonstrated that EU countries are diversified in those terms.

Selecting a method for measuring the efficiency of public services is challenging. The literature distinguishes three approaches: the indicator approach, and parametric and non-parametric methods (Rollnik-Sadowska 2019). The indicator approach considers one perspective of obtaining certain outputs; hence, it does not represent the efficiency attitude but the effectiveness approach. The parametric methods require that a production function be established. However, the multidimensional outcomes of public services make it difficult to observe all possible combinations of input and output data and to specify the mathematical form of the production function. However, in non-parametric methods, there is no such requirement. The non-parametric approach is more flexible, as it is used in models whose structure is not established a priori but adapted to the data (Rutkowska 2013). In the non-parametric approach, the linear programming procedure is used, and the influence of a random factor on the efficiency of the objects and potential measurement errors are not considered. It is important to select statistically reliable variables and construct a model that considers both the inputs and outputs of certain public services provided by the decision-making units. In addition, it is possible to consider environmental variables that determine the activity of given decision-making units (Curristine, Lonti, and Joumard 2007).

A popular non-parametric method used to evaluate the efficiency of public services is data envelopment analysis (DEA). DEA is a linear programming approach used as a model–specialized tool to assess the efficiency, performance, and productivity of comparable production units (homogeneous decision-making units – DMUs) based on the size of inputs and outputs. It is based on technical efficiency, defined as the ability to optimize the use of resources by maximizing the outputs achieved at a given level of inputs (outputs-oriented efficiency) or minimizing expenditures with a certain amount of outputs (input-oriented efficiency) (Rollnik-Sadowska 2019). The DEA method has been used in various applications to assess the environmental performance of units of different scales, i.e., regions, countries, provinces, sectors, and firms (Chodakowska and Nazarko 2017). For example, Dutu and Sicari (2016) used DEA to assess the efficiency of welfare spending using a sample of OECD countries around the year 2012, focusing on health care, secondary education, and general public services. Cichowicz et al. (2021) implemented a two-stage DEA to measure the efficiency of public employment services in a Polish

voivodship. The DEA method has also been used on a macro level for country evaluations, allowing for a cross-national comparison (Zaim and Taskin 2000; Färe, Grosskopf, and Hernandez-Sancho 2004; Zhou, Poh, and Ang 2007; Lozano and Gutiérrez 2008; Zhou, Ang, and Wang 2012; Li and Wang 2014 or Chodakowska and Nazarko 2017).

## Research methodology

We evaluated the efficiency of EU countries in 2019 and 2020 by applying the DEA method. A DMU (in this case, an EU country) is efficient when it lies on the border of its productivity capabilities (efficiency frontier), which means that the country makes effective use of its inputs, transforming them into required outputs (Halaskova, Halaskova, and Prokop 2018). The model can be built on the assumption of constant returns to scale, when one unit of input generates one unit of output (CCR model proposed by Charnes, Cooper and Rhodes). It is appropriate when all DMUs operate on an optimal scale (Huguenin 2012). The rather unrealistic condition is solved by introducing variable returns to scale (VRS) that consider all types of returns, i.e., increasing, constant, or decreasing, and assuming that DMUs do not operate on an optimal scale (BCC model proposed by Banker, Charnes, and Cooper) (Halaskova, Halaskova, and Prokop 2018). The BCC model (1) was therefore used in this study.

Moreover, the output-oriented model was selected as it is adaptable to the unique conditions of the LMP. The weighted sums of outputs are maximized, holding inputs constant. In the input-oriented model, the weighted sums of inputs are minimized, holding outputs constant (Huguenin 2012). In contrast to the input-oriented DEA models, the output-oriented models try to increase outputs proportionally while keeping the existing inputs unchanged (Toloo, Keshavarz, and Hatami-Marbini 2021).

For the modeling, we considered a set of $n$ DMUs $j$ ($j = 1, \ldots, n$), each consuming $m$ expenditures (inputs) $x_{ij}$ ($x1_j, \ldots, x_{mj}$) to produce $s$ results (outputs) $y_{rj}$ ($y_{1j}, \ldots, y_{sj}$). The output-oriented DEA-BCC model can be defined as:

$$\max\left(\sum_{r=1}^{s} u_r y_{r0} + v_0\right) \tag{1}$$

subject to

$$\sum_{i=1}^{m} v_i x_{i0} = 1$$

$$\sum_{r=1}^{s} u_r y_{rj} - \sum_{i=1}^{m} v_i x_{ij} + v_0 \leq 0,\ j = 1,\ldots,n$$

$$v_i \geq 0, i = 1,\ldots,m$$

$$u_r \geq 0, r = 1,\ldots,s$$

$v_0$ free

In the model, *xij* represents the amount of input *i* of the DMU *j*; *yrj* represents the amount of output *r* of DMU *j*; $xi_0$ represents the amount of input *i* of the DMU; $yr_0$ represents the amount of output *r* of the DMU; *vi* represents the weight of input *i* for the DMU; *ur* represents the weight of output *r* for the DMU; $v_0$ represents the scale factor; *s* represents the number of outputs analyzed; *m* represents the number of inputs analyzed; and *n* represents the number of DMUs analyzed (in this case, EU countries).

Microsoft Excel Solver was used to solve the DEA model (Proudlove 2000; Wang 2017), which was applied to solve the linear optimization models. The Excel DEA model was formulated as a spreadsheet model and needs to be solved by running Excel Solver for each DMU (Jablonsky 2008; Zhu 2014).

In this study, the efficiency of public expenditure was evaluated using data from Eurostat. A total of seven variables were used for analysis. It comprised five variables as inputs (government expenditure on services by selected function and two uncontrolled inputs represented by job vacancy rate and GDP per capita) and two variables as outputs of the selected labor market indicators.

The following indicators were included as the input data:

I1: Expenditure on labor market services as a percentage of GDP;

I2: Expenditure on total LMP measures (categories 2–7) as a percentage of GDP;

I3: Expenditure on total LMP supports (categories 8–9) as a percentage of GDP;

UI1: Job vacancy rate;

UI2: GDP per capita in purchasing power standard (PPS).

Two variables were involved in the model as outputs:

O1: Employment rate;

O2: Unemployment rate (inverted indicator).

The set of data above is essential to assess the effectiveness and efficiency of the LMP. The expenditure on the LMP is often selected for effectiveness and efficiency analysis

at mezzo- and macro-levels (Baker et al. 2005; Rollnik-Sadowska, Dąbrowska 2018). Meanwhile, the employment rate and the unemployment rate are the most popular measures to evaluate LMP outputs on a macro-scale (Escudero 2018; Dmytrów and Bieszk-Stolorz 2021; Hohlova and Rivza 2022). Two variables were selected as uncontrolled inputs: job vacancy rate and GDP per capita in PPS. They are strongly rooted in economic theory in terms of their direct influence on unemployment and indirect influence on employment. The link between the job vacancy rate and the unemployment rate, known as the Beveridge curve, is widely described in the literature (e.g., Saglam and Gunalp 2012; Christl 2020). Meanwhile, Okun's law presents the relationship between unemployment and GDP. It suggests that there is a negative relationship between movements of the unemployment rate and real GDP (Okun 1962; Pizzo 2020; Rollnik-Sadowska and Jarocka 2021).

The data analysis was conducted for two years – 2019 and 2020 – to identify the influence of the COVID–19 pandemic on the labor market efficiency of EU countries. We selected 2019 for the analysis as it represents a before-pandemic year; 2020 was selected as it was the beginning of the COVID–19 pandemic in the EU, and this was the last year when all data for the analyzed variables were available.

## Research results

By using the effectiveness approach, the EU labor market situation can be analyzed from the perspective of labor market indicators, with the most common being the employment rate and the unemployment rate. Regarding the employment rate and meeting the target of the Europe 2020 strategy, the Netherlands and Sweden had the highest indicators (over 80%) both in 2019 and 2020, undoubtedly influenced by widespread labor market flexibility in those countries (see Figure 1). Denmark, Lithuania, Latvia and Finland also met the target employment rate in both years. Meanwhile, in 2019, before they implemented restrictions connected with the COVID–19 lockdowns, Germany, Czechia and Estonia achieved very high employment rate levels (over 80%). In 2019, Austria, Slovenia and Portugal achieved an employment rate of 75%. In 2020, most EU countries observed a drop in the employment rate (the most severe was in Romania, by 5.7 p.p.). However, in Slovakia, the Netherlands, Malta, Croatia, and Hungary, slight growths were noted in 2020 compared to 2019. The lowest level for both years was registered in Greece and Italy.

The lowest unemployment rates in 2019 and 2020 were registered in Czechia, Poland, Germany, and the Netherlands (see Figure 2). The Czech model of economic development is strongly based on cooperation with Germany (Krpec and Hodulák 2018) and is supported by the fact that Czechia is outside the eurozone. Poland, as the biggest CEE economy, has been a great beneficiary of EU funds and has seen significant economic

growth. It saw the greatest drops in the unemployment rate after joining the EU compared to other CEE members of the EU (Rollnik-Sadowska and Jarocka, 2021). Germany manifests a strong corporate model economy with a significant labor demand and an effective educational system that prevents structural unemployment (Schels and Wöhrer 2022). While the Netherlands, as mentioned above, has a flexible and inclusive labormarket (Yu 2023), it was Greece and Spain that were the leaders regarding the unemployment rate level.

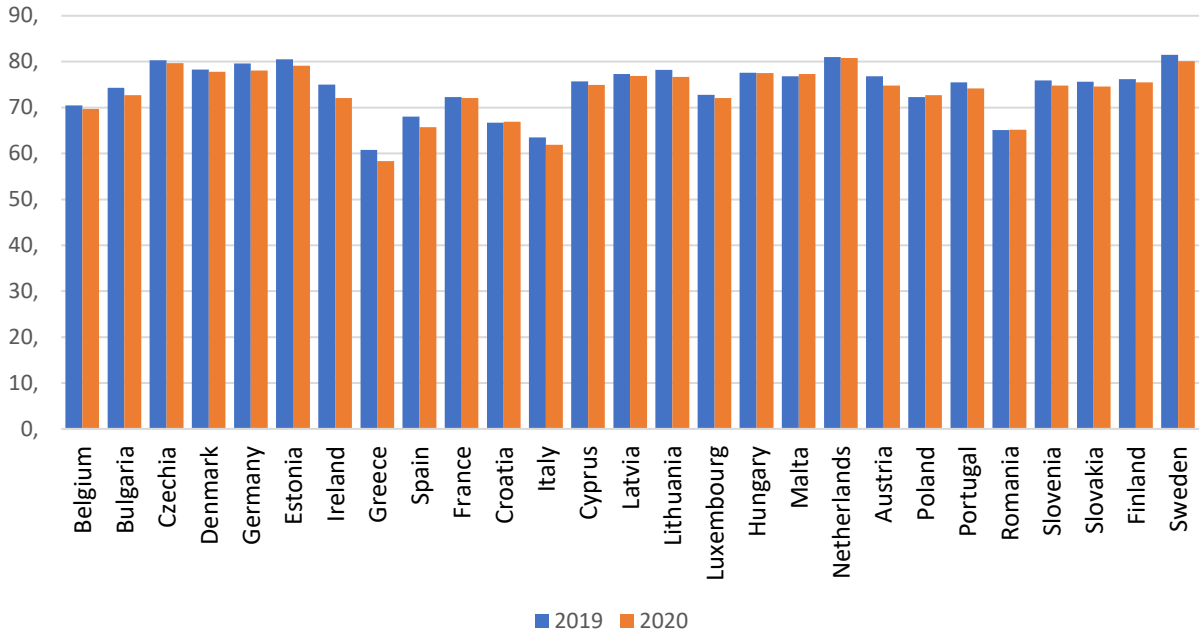


Figure 1. Employment rate in EU countries, 2019 and 2020 (%)

Source: Eurostat (2024a).

In 2020, most EU countries saw an increase in the unemployment indicator as a result of the lockdown measures, with many workers who lost their jobs unable to seek work owing to mobility restrictions. However, although the indicator grew, it was not significant, and some countries (Italy, France, Poland) recorded a drop in the unemployment rate. Job retention schemes averted potential redundancies and replaced them with temporary layoffs and reductions in working hours. Moreover, the workers who lost their jobs and were unable to seek work owing to mobility restrictions were not considered unemployed under the conventional measure of unemployment (Gómez and Montero 2020).

The above-mentioned results of the analysis of the labor market represent the effectiveness approach as it relates to the achieved outputs on the labor market (in terms of employment and the unemployed). The efficiency approach requires a simultaneous consideration of both inputs and outputs. The implementation of the primary research objective, which examined the efficiency of the public sector regarding

the LMP in individual EU countries, was ensured by the use of the DEA method. Five variables were included in the basic model, and additionally, for comparison, two environmental variables were considered (see Figure 3).

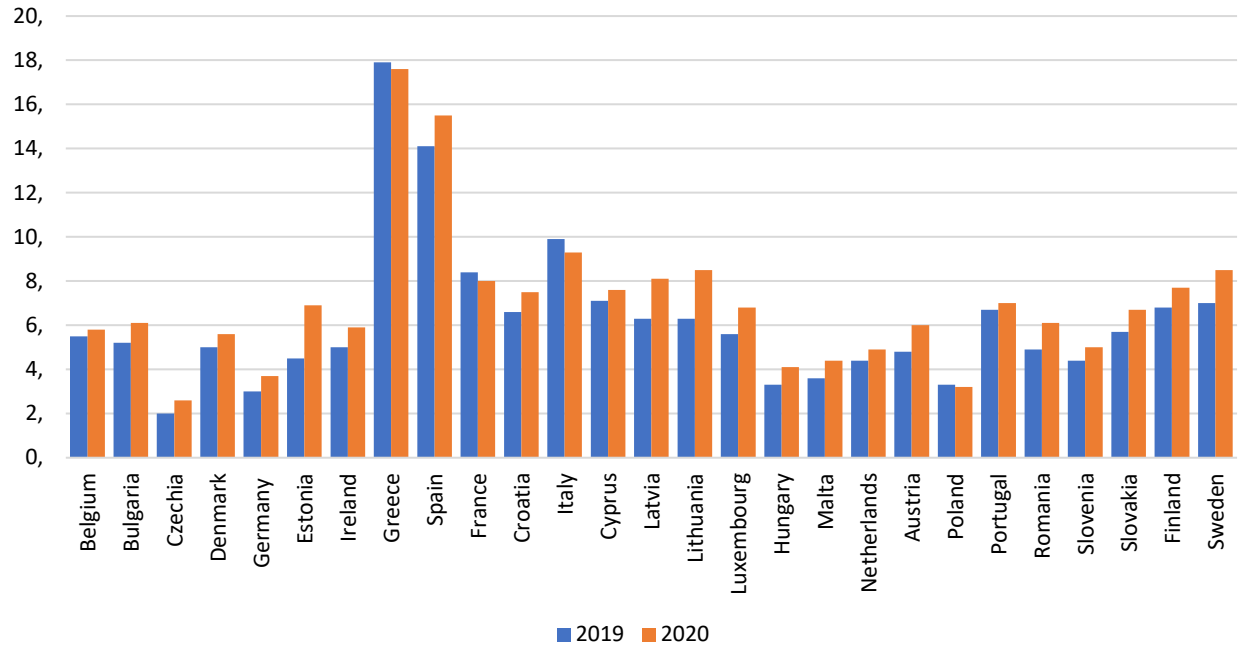


Figure 2. Unemployment rate in EU countries, 2019 and 2020 (%)

Source: Eurostat (2024b).

As mentioned above, to evaluate the LMP in the EU, the study incorporated the BCC output-oriented model. The model provides information on how much, on average, the outputs could be increased in order for a given country to become efficient with the same amount of inputs.

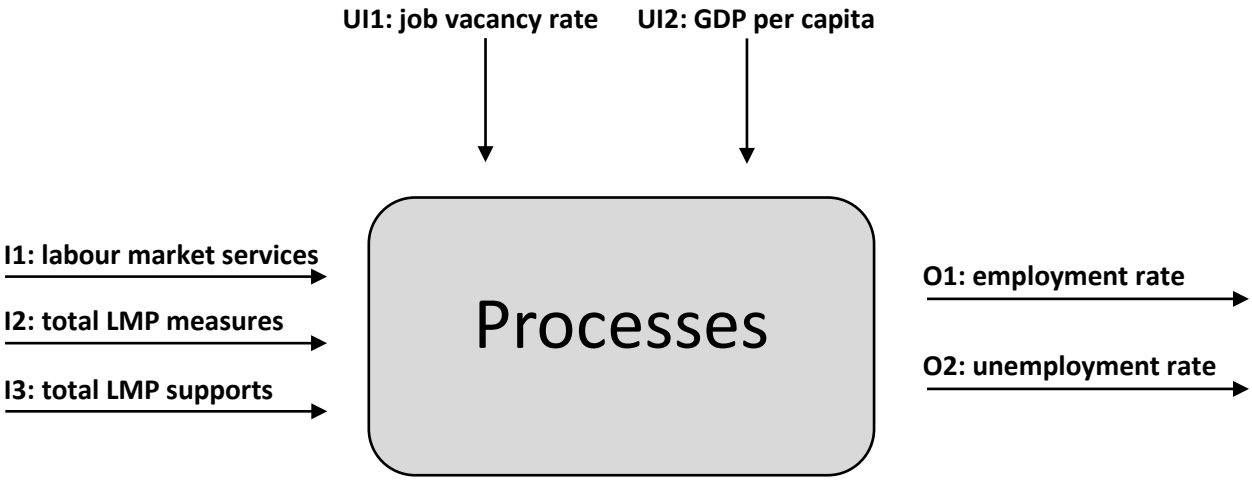


Figure 3. Model of the technical efficiency of EU labor market policies

Source: own study based on Rollnik-Sadowska (2019).

The calculations of technical efficiency were made for two years, 2019 and 2020. They consider four models due to the adopted environmental variables (U1 or U2). The first model only includes the job vacancy rate (U1), the second considers GDP per capita (U2), the third covers the option with both environmental variables, while the fourth does not include any of the uncontrolled variables.

The results of the output-oriented VRS model are shown in Table 1. Efficient countries reached an efficiency rate of 1. Countries that did not reach 1 were not considered efficient (a rate lower than 1 means the country is less efficient).

Table 1. Technical efficiency of EU labor markets in 2019 and 2020

| Country | 2019 with U1 | 2019 with U2 | 2019 with U1 & U2 | 2019 without U1 or U2 | 2020 with U1 | 2020 with U2 | 2020 with U1 & U2 | 2020 without U1 or U2 |
|---|---|---|---|---|---|---|---|---|
| Czechia | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Greece | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cyprus | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Malta | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Romania | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sweden | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Bulgaria | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.994528 |
| Lithuania | 1 | 1 | 1 | 1 | 1 | 0.812358 | 1 | 0.708772 |
| Germany | 1 | 1 | 1 | 1 | 1 | 0.668522 | 1 | 0.581308 |
| Portugal | 1 | 1 | 1 | 0.873078 | 1 | 0.787200 | 1 | 0.347752 |
| Estonia | 1 | 1 | 1 | 0.777778 | 1 | 1 | 1 | 0.651016 |
| Poland | 1 | 0.969299 | 1 | 0.577339 | 1 | 1 | 1 | 1 |
| Spain | 1 | 0.582418 | 1 | 0.139831 | 0.899371 | 0.601648 | 0.899371 | 0.138969 |
| Latvia | 0.991160 | 1 | 1 | 0.991160 | 1 | 1 | 1 | 1 |
| Ireland | 0.973937 | 0.89238 | 0.973937 | 0.89238 | 1 | 1 | 1 | 1 |
| Hungary | 0.92813 | 0.959738 | 0.972314 | 0.871363 | 1 | 1 | 1 | 1 |
| Netherlands | 0.879429 | 0.691039 | 0.879429 | 0.629630 | 1 | 1 | 1 | 1 |
| Slovakia | 0.860717 | 0.832985 | 0.860717 | 0.625055 | 1 | 0.950813 | 1 | 0.884802 |
| Slovenia | 0.845113 | 0.806322 | 0.882861 | 0.744459 | 1 | 0.849097 | 1 | 0.695964 |
| Italy | 0.776471 | 0.776471 | 0.776471 | 0.776471 | 0.717895 | 0.700477 | 0.724544 | 0.623051 |
| Denmark | 0.748209 | 0.566786 | 0.748209 | 0.216216 | 0.724992 | 0.586630 | 0.724992 | 0.259205 |
| Croatia | 0.656085 | 0.910959 | 0.910959 | 0.319209 | 0.640717 | 0.943091 | 0.998406 | 0.315653 |

| Country | 2019 with U1 | 2019 with U2 | 2019 with U1 & U2 | 2019 without U1 or U2 | 2020 with U1 | 2020 with U2 | 2020 with U1 & U2 | 2020 without U1 or U2 |
|---|---|---|---|---|---|---|---|---|
| France | 0.637 199 | 0.5 | 0.637 199 | 0.086 569 | 0.578 506 | 0.593 939 | 0.670 089 | 0.135 233 |
| Finland | 0.550 487 | 0.614 234 | 0.634 570 | 0.365 959 | 0.654 485 | 0.584 098 | 0.654 495 | 0.318 892 |
| Luxem-bourg | 0.548 018 | 0.300 428 | 0.548 018 | 0.300 428 | 0.61 434 | 0.38 196 | 0.614 348 | 0.381 965 |
| Austria | 0.423 427 | 0.508 514 | 0.508 514 | 0.263 672 | 0.473 592 | 0.525 014 | 0.565 517 | 0.208 090 |
| Belgium | 0.261 593 | 0.449 153 | 0.449 153 | 0.057 642 | 0.314 812 | 0.539 195 | 0.556 366 | 0.126 190 |

Source: own study using Microsoft Excel Solver.

In 2019, the fully efficient countries in terms of transforming LMP expenditures into a high employment rate and a low unemployment rate, including both environmental variables, were Czechia, Greece, Cyprus, Malta, Romania, Sweden, Bulgaria, Lithuania, Germany, Portugal, Estonia, Spain and Latvia.

In 2020, Spain left the group of fully efficient EU countries, along with Ireland, the Netherlands, Hungary, Slovakia and Slovenia.

The lowest efficiency for both analyzed years was observed in Belgium, Austria, Luxembourg, Finland and France.

It is noticeable that the inclusion of uncontrolled variables in the model improved the efficiency of labor market expenditures for all EU countries, both in 2019 and 2020. With the exception of Spain, Italy, and Denmark, the efficiency of the EU labor markets increased in 2020 compared to 2019.

The EU countries can also be compared in terms of the efficiency of public expenditure on LMP, including their public administration tradition. This part of the analysis was connected with research question RQ2: Do EU countries with the same tradition of public administration have a similar rate of efficiency of public expenditure on the LMP? According to Demmke (2008), EU countries can be assigned to six different models of public administration and human resource management traditions. Table 2 compares the EU states by the efficiency of public expenditures on LMP in 2019 and 2020.

Based on the data in Table 2, countries with the Eastern European tradition (Czechia, Hungary, Slovakia, Poland, Lithuania, Latvia) and South-Eastern tradition (Bulgaria, Romania, Croatia) are the most homogeneity in terms of efficiency, both in 2019 and 2020. The other groups were more diverse. Some countries with the Continental European tradition (especially Belgium, but also Luxembourg, France, and Austria) had lower efficiency than others (i.e., Germany, the Netherlands and Slovenia). Within the South

European tradition, Italy had lower efficiency than the other countries (Greece, Portugal, Spain and Cyprus). Of the countries with the Scandinavian tradition, Finland and Denmark had lower efficiency than Sweden and Estonia. Therefore, the results did not corroborate research question RQ2 that there is a similarity in the efficiency of LMP expenditure in terms of the public administration tradition.

Table 2. A comparison of EU countries by the efficiency of public expenditure on LMP and public administration tradition in 2019 and 2020

| Tradition of Public Administration | Efficiency 2019 | Average 2019 | Efficiency 2020 | Average 2020 |
|---|---|---|---|---|
| Anglo-Saxon tradition | IE (0.9973) | 0.9973 | IE (1) | 1 |
| Continental European tradition | AT (0.5085)<br>FR (0.6372)<br>DE (1)<br>BE (0.4492)<br>LU (0.5480)<br>NL (0.8794)<br>SI (0.8829) | 0.7007 | AT (0.5655)<br>FR (0.6701)<br>DE (1)<br>BE (0.5564)<br>LU (0.6143)<br>NL (1)<br>SI (1) | 0.7723 |
| Mediterranean/South European tradition | EL (1)<br>IT (0.7765)<br>PT (1)<br>ES (1)<br>CY (1) | 0.9553 | EL (1)<br>IT (0.7245)<br>PT (1)<br>ES (0.8994)<br>CY (1) | 0.9248 |
| Scandinavian tradition | DK (0.7482)<br>FI (0.6346)<br>SE (1)<br>EE (1) | 0.8457 | DK (0.7250)<br>FI (0.6545)<br>SE (1)<br>EE (1) | 0.8449 |
| Eastern European tradition | CZ (1)<br>HU (0.9723)<br>SK (0.8607)<br>PL (1)<br>LT (1)<br>LV (1) | 0.9722 | CZ (1)<br>HU (1)<br>SK (1)<br>PL (1)<br>LT (1)<br>LV (1) | 1 |
| South-Eastern tradition | BG (1)<br>RO (1)<br>HR (0.9110) | 0.9703 | BG (1)<br>RO (1)<br>HR (0.9984) | 0.9995 |

Source: own study based on Halaskova, Halaskova, and Prokop (2018).

In 2019, the highest efficiency of LMP expenditure was found in Ireland (which represents the Anglo-Saxon tradition), as well as countries with the Eastern European and South-Eastern traditions. The lowest efficiency was achieved by countries with the Continental European and Scandinavian traditions.

In 2020, full efficiency was observed in Ireland (Anglo-Saxon tradition) and countries with the Eastern-European tradition. High efficiency was also reported for countries that followed the South-Eastern tradition, due to the improved efficiency of Croatia. A low level of efficiency was noticed for countries with the Continental European tradition, mainly due to Belgium and Austria's poor scores.

In 2020, during the lockdown caused by the COVID–19 pandemic, most groups of countries improved their scores on the efficiency of public expenditure on LMP. The exceptions were countries with the South European tradition and the Scandinavian tradition, where the measures of efficiency decreased slightly.

## Discussion

Kluve and Schmidt developed a macro perspective of cross-country comparison of labor market policies, focusing on the effectiveness of European active labor market programs (Kluve 2010). The approach was later popularized in the literature and social policy practice. However, although the macro perspective of the efficiency approach in terms of the LMP is not very complex, it is not very popular in the literature, and is mainly used in regression analysis. The results demonstrate that unemployment is positively associated with generous unemployment benefits, a high tax wedge, and high union coverage. It is negatively associated with active labor market policies (ALMPs) and highly co-ordinated bargaining (Arpaia and Mourre 2009).

Mourre (2006) focused on the impact of labor market institutions on employment growth. He claimed relevant institutional factors likely to contribute to rising aggregate employment in the euro area include strong development of part-time jobs, lower labor tax rates and, more tentatively, less stringent employment protection legislation, as well as greater subsidies to private employment.

Fialová and Schneider (2008) confirmed that high taxes increase unemployment, while active labor market policies tend to reduce it in the EU. More stringent employment protection and higher taxes reduce the participation rate and the employment rate. Moreover, there seems to be a difference in the institutional effects between the "old" and "new" EU member states.

The World Economic Forum assesses macro labor market efficiency using ten indicators, which include cooperation in labor–employer relations, flexibility of wage determination, hiring and firing practices, redundancy costs (weeks of salary), the effect of taxation on incentives to work, pay and productivity, reliance on professional management, country capacity to retain talent, country capacity to attract talent, and female participation in the labor force (ratio to men) (Schwab and Xavier 2017).

The literature contains examples of research on the efficiency of the LMP using the non-parametric DEA method. It is often used to analyze the efficiency of public institutions (Cooper, Seiford, and Tone 2007; Behrenz, Delander, and Månsson 2013). However, the use of DEA for LMP is connected with micro- or mezzo-dimensions; it is not commonly used on the macro-scale. The efficiency analysis is used to evaluate public employment services (PES) (Rollnik-Sadowska 2019; Cichowicz et al. 2021).

## Conclusion

The literature emphasizes the significant importance of identifying general principles to achieve efficient policy design at both micro- and macro-levels (Arpaia and Mourre 2009). The efficiency approach for evaluating LMP on a macro-scale is not popular in the literature, and the effectiveness approach is used instead. However, the effectiveness approach, represented by labor market indicator analysis, identifies only the outcomes of the LMP policy. It does not include the expenditure required for countries to conduct the policy. The effectiveness approach also does not make it possible to include environmental variables, which have an influence on achieving the LMP outputs while disposing of a certain level of inputs. Based on the effectiveness approach, Southern countries achieved the worst results. This is in contrast to the efficiency approach using DEA, where countries such as Portugal and Greece achieved full efficiency for both 2019 and 2020. Moreover, in Greece – in terms of the effectiveness approach – the labor market situation is worse than in Italy or Spain, which is different when the efficiency approach is included, allowing Greece to achieve better results than its neighbors.

The efficiency approach of LMP for 2019 and 2020 indicates that Central and Eastern European countries, such as Czechia, Poland, Romania, Bulgaria, Lithuania, Estonia, and Latvia, find themselves in a very good situation. Full efficiency was also achieved by Cyprus, Malta, Sweden, and Germany. The worst situation was observed in Belgium.

Countries that follow the Eastern European tradition (Czechia, Hungary, Slovakia, Poland, Lithuania, Latvia) and the South-Eastern tradition (Bulgaria, Romania and Croatia) achieved similar levels of efficiency of LMP in both 2019 and 2020. The other groups of public administration traditions were more diverse.

During the COVID–19 pandemic, most of the groups of countries improved their scores on the efficiency of public expenditure on LMP. The exceptions were groups of countries with the South European tradition and the Scandinavian tradition, where the measure of efficiency decreased slightly. This may prove the effectiveness of the implemented public policy to counteract the negative effects of COVID–19 on the labor market.

The added value of this paper comes from the demonstration that the proposed methodology, using the DEA method, can be used to measure LMP efficiency at the micro- and mezzo- levels and to conduct cross-country comparisons. A limitation of the study is that for efficiency evaluation, only two indicators – labor demand determinants, such as job vacancy rate and GDP per capita – were included as environmental variables. The literature also mentions other institutions that can influence the transformation of labor market inputs into outputs. They include unemployment benefits (both in terms of levels and duration) and Employment Protection Legislation (EPL), which protects the labor force from income volatility (Bertola 2004; Bertola and Keoniger 2004). Some scholars have noted difficulties using standard DEA models in the presence of input ratios and/or output ratios, which can also be treated as a limitation (Emrouznejad and Amin 2009). Additionally, econometric estimations that use macro indicators of labor market institutions tend not to be robust, as there is a degree of measurement error in the variables usually available to proxy policy-induced changes. Furthermore, different specifications and methodologies are employed among countries, further complicating the analysis (Arpaia and Mourre 2009).

## References

Afonso, A., Schuknecht, L., Tanzi, V. (2005), *Public sector efficiency: An international comparison*, "Public Choice", 123, pp. 321–347, https://doi.org/10.1007/s11127-005-7165-2

Agénor, P.R., Neanidis, K.C. (2011), *The Allocation of Public Expenditure and Economic Growth*, "Manchester School", 79 (4), pp. 899–931, https://doi.org/10.1111/j.1467-9957.2011.02197.x

Ando, S., Balakrishnan, R., Gruss, B., Hallaert, J.J., Jirasavetakul, L.B.F., Kirabaeva, K., Klein, N., Lariau, A., Qian Liu, L., Malacrino, D., Qu, H., Solovyeva, A. (2022), *European labor markets and the Covid–19 pandemic: fallout and the path ahead*, "Departmental Paper: 96", International Monetary Fund, https://doi.org/10.5089/9798400200960.087

Arpaia, A., Mourre, G. (2009), *Institutions and Performance in European Labour Markets: Taking a fresh look at evidence*, "European Economy", "Economic Papers" 391, https://ec.europa.eu/economy_finance/publications/pages/publication16277_en.pdf (accessed: 15.06.2023).

Baker, D., Glyn, A., Howell, D.R., Schmitt, J. (2005), *Labor Market Institutions and Unemployment: A Critical Assessment of the Cross-Country Evidence*, [in:] D.R. Howell (ed.), *Fighting Unemployment: The Limits of Free Market Orthodoxy*, Oxford University Press, Oxford, https://doi.org/10.1093/0195165845.003.0003

Baudnenko, O., Fritsch, M., Stephan, A. (2008), *Allocative Efficiency measurement revisited – Do we really need input prices?*, "Economic Modelling", 25 (5), pp. 1093–1109, https://doi.org/10.1016/j.econmod.2008.02.001

Behrenz, L., Delander, L., Månsson, J. (2013), *The Public Employment Service. A Survey of Cost-Benefit Analysis and Productive Efficiency Analysis Studies*, "Labour Market and Discrimination Studies", 12.

Bertola, G. (2004), *A Pure Theory of Job Security and Labour Income Risk*, "Review of Economic Studies", 71, pp. 43–61, https://doi.org/10.1111/0034-6527.00275

Bertola, G., Koeniger, W. (2004), *Consumption Smoothing and the Structure of Labor and Credit Markets*, "Meeting Papers", 263, Society for Economic Dynamics, https://doi.org/10.2139/ssrn.522322

Brown, C.V., Jackson, P.M. (1990), *Public Sector Economics*, Wiley-Blackwell, Oxford.

Chodakowska, E., Nazarko, J. (2017), *Environmental DEA method for assessing productivity of European countries*, "Technological and Economic Development of Economy", 23 (4), pp. 589–607, https://doi.org/10.3846/20294913.2016.1272069

Christl, M. (2020), *A Beveridge curve decomposition for Austria: did the liberalisation of the Austrian labour market shift the Beveridge curve?*, "Journal for Labour Market Research", 54 (7), https://doi.org/10.1186/s12651-020-00271-z

Cichowicz, E., Rollnik-Sadowska, E., Dędys, M., Ekes, M. (2021), The DEA Method and Its Application Possibilities for Measuring Efficiency in the Public Sector – The Case of Local Public Employment Services, "Economies", 9 (2), 80, https://doi.org/10.3390/economies9020080

Cooper, W.W., Seiford, L.M., Tone, K. (2007), *Data Envelopment Analysis. A Comprehensive Text with Models, Applications, References and DEA-Solver Software*, Springer, Berlin, https://doi.org/10.1007/978-0-387-45283-8

Cullis, J., Jones, P. (2009), *Public Finance and Public Choice – Analytical Perspectives*, University Press, Oxford.

Curristine, T., Lonti, Z., Joumard, I. (2007), *Improving Public Sector Efficiency: Challenges and Opportunities*, "OECD Journal on Budgeting", 7 (1), pp. 1–41, https://doi.org/10.1787/budget-v7-art6-en

Demmke, C. (2008), *What are Public Services Good at? Success of Public Services in the Field of Human Resource Management*, European Institute of Public Administration, Maastricht.

Dmytrów, K., Bieszk-Stolorz, B. (2021), *Comparison of changes in the labour markets of post-communist countries with other EU member states*, "Equilibrium. Quarterly Journal of Economics and Economic Policy", 16 (4), pp. 741–764, https://doi.org/10.24136/eq.2021.027

Dutu, R., Sicari, P. (2016), *Public Spending Efficiency in the OECD: Benchmarking Health Care, Education and General Administration*, "OECD Economics Department Working Papers", 1278, pp. 1–26, https://doi.org/10.2478/revecp-2020-0013

Emrouznejad, A., Amin, G.R. (2009), *DEA models for ratio data: Convexity consideration*, "Applied Mathematical Modelling", 33, pp. 486–498, https://doi.org/10.1016/j.apm.2007.11.018

Escudero, V. (2018), *Are active labour market policies effective in activating and integrating low-skilled individuals? An international comparison*, "IZA Journal of Labor Policy", 7 (4), https://doi.org/10.1186/s40173-018-0097-5

Eurostat (2024a), *Employment rate, by citizenship*, https://ec.europa.eu/eurostat/databrowser/view/sdg_08_30a/default/table?lang=en (accessed: 18.10.2023).

Eurostat (2024b), *Unemployment rate – annual data*, https://ec.europa.eu/eurostat/databrowser/view/tipsun20/default/table?lang=en (accessed: 18.10.2023).

Färe, R., Grosskopf, S., Hernandez-Sancho, F. (2004), *Environmental performance: an index number approach*, "Resource and Energy Economics", 26 (4), pp. 343–352, https://doi.org/10.1016/j.reseneeco.2003.10.003

Fialová, K., Schneider, O. (2008), *Labour Market Institutions and Their Effect on Labour Market Performance in the New EU Member Countries*, "CESifo Working Paper Series", 2421, https://doi.org/10.2139/ssrn.1287054

Gómez, Á.L., Montero, J.M. (2020), *Impact of Lockdown on the Euro Area Labour Market in 2020 H1 (December 15, 2020)*, "Banco de España. Analytical Article", 4, https://ssrn.com/abstract=3750162 (accessed: 15.06.2023).

Greiling, D. (2006), *Performance measurement: a remedy for increasing the efficiency of public services?*, "International Journal of Productivity and Performance Management", 55 (6), pp. 448–465, https://doi.org/10.1108/17410400610682488

Halaskova, M., Halaskova, R., Prokop, V. (2018), *Evaluation of Efficiency in Selected Areas of Public Services in European Union Countries*, "Sustainability", 10 (12), 4592, https://doi.org/10.3390/su10124592

Hohlova, V., Rivza, B. (2022), *Effectiveness of active labour market policy measures in Latvia*, "Research for Rural Development", 37, pp. 181–187, https://doi.org/10.22616/rrd.28.2022.026

Huguenin, J.M. (2012), *Data Envelopment Analysis (DEA). A pedagogical guide for decision makers in the public sector*, IDHEAP-Cahier 276.

Jablonsky, J. (2008), *A spreadsheet based system for DEA models*, "Multiple Criteria Decision Making", 3, pp. 51–64, https://mcdm.ue.katowice.pl/index.php?page=publications&id=Jabl07 (accessed: 15.06.2023).

Kluve, J. (2010), *The effectiveness of European active labor market programs*, "Labour Economics", 17 (6), pp. 904–918, https://doi.org/10.1016/j.labeco.2010.02.004

Krpec, O., Hodulák, V. (2018), *The Czech economy as an integrated periphery: The case of dependency on Germany*, "Journal of Post Keynesian Economics", 42 (2), pp. 1–31, https://doi.org/10.1080/01603477.2018.1431792

Li, M., Wang, Q. (2014), *International environmental efficiency differences and their determinants*, "Energy", 78, pp. 411–420, https://doi.org/10.1016/j.energy.2014.10.026

Lozano, S., Gutiérrez, E. (2008), *Non-parametric frontier approach to modelling the relationships among population, GDP, energy consumption and $CO_2$ emissions*, "Ecological Economics", 66 (4), pp. 687–699, https://doi.org/10.1016/j.ecolecon.2007.11.003

Mandl, U., Adriaan, D., Ilzkovitz, F. (2008), *The Effectiveness and Efficiency of Public Spending*, "Working Paper", 301, Directorate General Economic and Financial Affairs (DG ECFIN), Brussels.

Manzoor, A. (2014), *A Look at Efficiency in Public Administration: Past and Future*, SAGE Open, https://doi.org/10.1177/2158244014564936

Mericková, B.M., Stejskal, J. (2014), *Value of Collective Consumption Goods*, "Politická Ekonomie", 62, pp. 216–231, https://doi.org/10.18267/j.polek.947

Mericková, B.M., Nemec, J., Svidronová, M.M., Pischko, V. (2017), *Analysis of the relationship between the size and structure of public expenditure and socio-economic development*, "Ekonomický časopis", 65, pp. 320–333, https://hdl.handle.net/11159/3881 (accessed: 10.05.2023).

Mourre, G. (2006), *Did the pattern of aggregate employment growth change in the euro area in the late 1990s?*, "Applied Economics", 38, pp. 1783–1807, https://doi.org/10.1080/00036840500427072

Okun, A.M. (1962), *Potential GNP: its measurement and significance*, "Proceedings of the Business and Economics Statistics", pp. 98–104.

Pizzo, A. (2020), *Literature review of empirical studies on Okun's law in Latin America and the Caribbean*, "Employment Working Paper", No. 252, International Labour Office, Geneva.

Proudlove, N.C. (2000), *Using Excel for Data Envelopment Analysis*, "Manchester School of Management Working Paper", 2007.

Rollnik-Sadowska, E. (2019), *Efektywność instytucji publicznych – przykład powiatowych urzędów pracy w Polsce. Pojęcie, determinanty, metodyka pomiaru*, Oficyna Wydawnicza Politechniki Białostockiej, Białystok.

Rollnik-Sadowska, E., Dąbrowska, E. (2018), *Cluster analysis of effectiveness of labour market policy in the European Union*, "OeconomiaCopernicana", 9 (1), pp. 143–158, https://doi.org/10.24136/oc.2018.008

Rollnik-Sadowska, E., Jarocka, M. (2021), *CEE labour markets – homogeneity or diversity?*, "Technological and Economic Development of Economy", 27 (5), pp. 1142–1158, https://doi.org/10.3846/tede.2021.15014

Rutgers, M.R., Meer, H. van der (2010), *The Origins and Restriction of Efficiency in Public Administration Regaining Efficiency as the Core Value of Public Administration*, "Administration & Society", 42 (7), pp. 755–779, https://doi.org/10.1177/0095399710378990

Rutkowska, A. (2013), *Teoretyczne aspekty efektywności – pojęcie i metody pomiaru*, „Zarządzanie i Finanse", 11 (1), p. 4.

Saglam, B.B., Gunalp, B. (2012), *The Beveridge curve and labour market dynamics in Turkey*, "Applied Economics", 44 (24), pp. 3195–3202, https://doi.org/10.1080/00036846.2011.570725

Schaltegger, C.A., Torgler, B. (2006), *Growth effects of public expenditure on the state and local level: evidence from a sample of rich governments*, "Applied Economics", 38, pp. 1181–1192, https://doi.org/10.1080/00036840500392334

Schels, B., Wöhrer, V. (2022), *Challenges in School-To-Work Transition in Germany and Austria: Perspectives on Individual, Institutional, and Structural Inequalities*, "Social Inclusion", 10 (2), pp. 221–225, https://doi.org/10.17645/si.v10i2.5770

Schwab, K., Xavier, S.M. (2017), *Global Competitiveness Report 2017–2018*, World Economic Forum, Geneva.

Smith, A. (1976), *An Inquiry into the Nature and Causes of the Wealth of Nation*, The University of Chicago Press, Chicago.

Stejskal, J., Hajek, P. (2015), *Effectiveness of digital library services as a basis for decision-making in public organizations*, "Library & Information Science Research", 37 (4), pp. 346–352, https://doi.org/10.1016/j.lisr.2015.07.001

Szarowska, I. (2014), *Long-term and short-term relationship between government expenditure and GDP in the EU15: Cointegration approach*, "Ekonomista", 6, pp. 865–882.

Tkacheva, T., Afanasjeva, L., Goncharenko, L. (2017), *The Impact of Public Social Expenditures on Economic Development*, Proceedings of the 29th International Conference Education Excellence and Innovation Management through Vision 2020: From Regional Development Sustainability to Global Economic Growth, Vienna, Austria, 3–4 May, pp. 531–540, https://ibima.org/accepted-paper/the-impact-of-public-social-expenditures-on-economic-development/ (accessed: 16.04.2024).

Toloo, M., Keshavarz, E., Hatami-Marbini, A. (2021), *Selecting data envelopment analysis models: A data-driven application to EU countries*, "Omega", 101, https://doi.org/10.1016/j.omega.2020.102248

Wang, J. (2017), *Benchmarking building energy in the multifamily industry: a data envelopment analysis (DEA) model*, Doctoral dissertation, Georgia Institute of Technology, pp. 1–93, https://repository.gatech.edu/handle/1853/58200 (accessed: 16.04.2024).

Yu, Y.Ch. (2023), *Precarious welfare-to-work transitions in a segmented labour market: Evidence from the Netherlands*, "International Journal of Social Welfare", 1 (27), https://doi.org/10.1111/ijsw.12591

Zaim, O., Taskin, F. (2000), *Environmental efficiency in carbon dioxide emissions in the OECD: a nonparametric approach*, "Journal of Environmental Management", 58 (2), pp. 95–107, https://doi.org/10.1006/jema.1999.0312

Zhou, P., Ang, B.W., Wang, H. (2012), *Energy and $CO_2$ emission performance in electricity generation: A non-radial directional distance function approach*, "European Journal of Operational Research", 221 (3), pp. 625–635, https://doi.org/10.1016/j.ejor.2012.04.022

Zhou, P., Poh, K.L., Ang, B.W. (2007), *A non-radial DEA approach to measuring environmental performance*, "European Journal of Operational Research", 178 (1), pp. 1–9, https://doi.org/10.1016/j.ejor.2006.04.038

Zhu, J. (2014), *Quantitative Models for Performance Evaluation and Benchmarking: Data Envelopment Analysis with Spreadsheets*, Springer International Publishing, Cham–Heidelberg–NewYork–Dordrecht–London, https://doi.org/10.1007/978-3-319-06647-9

## Efektywność polityk rynku pracy w krajach UE

Celem niniejszego artykułu jest zbadanie efektywności sektora publicznego w zakresie polityki rynku pracy w krajach UE. Dokonano kompleksowej oceny usług publicznych związanych z polityką rynku pracy z punktu widzenia efektywności wydatkowania środków publicznych na ten cel. Punktem zwrotnym dla europejskiego rynku pracy było wprowadzenie lockdownu w 2020 roku w związku z pandemią COVID–19. Dlatego też oceny efektywności rynków pracy UE dokonano

przed i podczas pandemii oraz ustalono, w jakim stopniu wielkość usług publicznych (ich alokacje finansowe) wpływają na wybrane wskaźniki rynku pracy.
Do oceny efektywności krajów UE w latach 2019 i 2020 wykorzystano metodę Data Envelopment Analysis (DEA). W badaniu zastosowano model BCC (Banker, Charnes, Cooper). Ponadto wybrano zorientowany na wyniki model BCC, który wydaje się dostosowany do specyfiki polityki rynku pracy. Wykorzystano program Microsoft Excel Solver, służący do opracowywania liniowych modeli optymalizacyjnych. Efektywność wydatków publicznych oceniono na podstawie danych z bazy Eurostat. Do analizy wykorzystano łącznie siedem zmiennych, w tym pięć określających nakłady (wydatki sektora publicznego na usługi rynku pracy według wybranej funkcji oraz dwie zmienne określające nakłady niekontrolowane reprezentowane przez wskaźnik wolnych miejsc pracy i PKB *per capita*), a także dwie zmienne wskazujące na wyniki w postaci wybranych mierników rynku pracy (wskaźnik zatrudnienia i stopa bezrobocia – wskaźnik odwrócony). Porównanie przekrojowe przeprowadzono w dwóch wymiarach – wśród poszczególnych krajów UE oraz wśród grup krajów reprezentujących różne tradycje administracji publicznej (tradycja anglosaska, tradycja Europy kontynentalnej, tradycja Europy Południowej, tradycja skandynawska, tradycja Europy Wschodniej i tradycja Europy Południowo-Wschodniej).
Badanie wskazuje, że pomimo osiągania przez kraje Europy Południowej najgorszych mierników rynku pracy, w podejściu efektywnościowym z wykorzystaniem metody DEA takie kraje jak Portugalia i Grecja osiągnęły pełną efektywność zarówno w 2019, jak i 2020 roku. Podejście efektywnościowe polityki rynku pracy dla 2019 i 2020 roku wskazuje również na bardzo korzystną sytuację w przypadku krajów Europy Środkowo-Wschodniej. Pełną efektywność osiągnęły także Cypr, Malta, Szwecja i Niemcy. Najgorsza sytuacja pod względem efektywności polityki rynku pracy występuje w Belgii.
W trakcie pandemii większość analizowanych grup krajów poprawiła swoje wyniki w zakresie efektywności wydatków publicznych na politykę rynku pracy. Wyjątkiem były grupy krajów o tradycji Europy Południowej i skandynawskiej, gdzie miara efektywności nieznacznie spadła. Może to świadczyć o skuteczności prowadzonej polityki publicznej w zakresie zwalczania negatywnych skutków COVID–19 na rynku pracy.
Wartość dodaną tego artykułu stanowi zaproponowanie metodyki z wykorzystaniem metody DEA, która może być używana do pomiaru efektywności polityki rynku pracy nie tylko na poziomie mikro i mezo, ale także do porównań pomiędzy krajami.

Słowa kluczowe: efektywność, usługi publiczne, polityka rynku pracy, metoda DEA, kraje UE, tradycja administracji publicznej