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Evaluating Labour Market Flexibility Using the TOPSIS Method: Sustainable Industrial Relations

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Abstract: This study evaluates labour market flexibility using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), a multi-criteria decision analysis (MCDA) method. TOPSIS is employed by comparing spatial (i.e., different countries) and temporal (i.e., long-time horizon) terms. Sustainable industrial relations processes are considered in shaping the flexibility of the labour market in 15 European Union Member States from 2009 to 2018. Countries are grouped into classes to provide a basis for benchmarking results against social and employment policies implemented at the national level. A five-step quantitative MCDA method is formulated using published data from the Organisation for Economic Co-operation and Development. The results indicate that the TOPSIS method is an appropriate approach for measuring labour market flexibility internationally. Moreover, in relation to workforce phenomena, the findings show that the method offers the possibility of examining the impact of particular factors related to social and employment policies of a country in terms of sustainable development and socioeconomic growth. The lack of precision tools to forecast the development of national and transnational labour markets—particularly during the COVID-19 era—highlights the importance of such a method for workforce planners and policymakers. Developing sustainable industrial relations in terms of associated national externalities is the motivation of the research.

Keywords: economic development; sustainable economy; multi-criteria decision analysis; labour policy; benchmarking; COVID-19 reset; EU-15

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1. Introduction

One of the needs of a modern knowledge-based economy is a flexible labour market. Dynamic technological progress and information and communication technology (ICT) development can affect the labour market and contribute to the reduction of inequalities in different labour-oriented activities (e.g., wages, income, working conditions, job security, career prospects and other work-related circumstances). The challenge of balancing the flexibility of employers with the protection of worker interest is a core element of labour market effectiveness. In the context of the current pandemic and its effects on the workforce, the concern of labour market flexibility is of particular importance. The use of tools to allow for an ex-post benchmarking of flexibility across countries and, at some point, the examination of the effectiveness of public policies to aid in best practices across markets will be crucial in building sustainable industrial relations in a post-COVID-19 era. The importance of flexibility for a smooth functioning labour market is emphasised in several studies. Documents from the European Union (EU), International Labour Organization (ILO) and strategies outlined by individual countries indicate the flexibility of labour markets as priority aspects of social and economic development. Numerous international organisations are making efforts to study how labour markets, in particular businesses, adapt to reforms and external factors (i.e., the current pandemic) to evaluate the importance of the labour market flexibility process [1,2]. Labour market flexibility is an important aspect

of the economic pillar when considering the United Nations Sustainable Development Goals (SDGs) 2030 agenda, i.e., with particular emphasis on SDG 5, 8, 10 and 17 [3,4]. Flexibility can maximize stakeholder benefits and aid in creating an overall better functioning labour market. Importantly, flexibility measures that centre themselves on increasing employment opportunities for the disadvantaged (e.g., women, elderly and people with disabilities) can create a significant impact on the labour market and, in turn, limit the occurrence of economic inequality [5–7]. Respectively, local development and interregional cooperation must be mutually compliant; however, the lack of tools, at present, significantly limits the prospect of designing effective development activities [8,9]. The tool proposed in this paper contributes not only to the general development of economic science, but specifically to the betterment of planned activities in the field of functional domestic labour markets. To better assess design effectiveness, measuring the level of labour market flexibility is explored. This exercise, in theory, should support enhanced sustainable development of the workforce by building a more harmonious labour-market-flexibility-centric society.

In general, labour market flexibility may be defined as the ability of the labour market to adapt to changing economic conditions. The importance of labour market flexibility for economic development was recognized in various economic theories, starting from classical and neoclassical (e.g., the concepts of Pigou, Haberler and Samuelson), Keynesian, through the theory of the natural rate of unemployment proposed by Friedman [10] and non-accelerating inflation rate of unemployment, i.e., first introduced as non-inflationary rate of unemployment by Modigliani and Papademos [11]. Labour market flexibility has both macroeconomic and microeconomic dimensions. The common feature of both dimensions is flexibility is defined through deregulation. Deregulation of the labour market consists in making it more flexible as a result of limiting state intervention and increasing the freedom of entrepreneurs in employee policies. The concept of labour market flexibility refers primarily to three main components: labour supply, labour demand and labour price. The flexibility of labour demand is understood as employment flexibility, labour supply flexibility as labour market mobility and labour price flexibility as wage flexibility. Institutional factors understood as industrial relations processes determine the flexibility of the labour market. Moreover, there is also the idea of the offensive and defensive approach (see Lagos [12]). The traditional defensive approach is based on the view that labour markets are excessively regulated so that it postulates deregulation while the offensive (i.e., active) approach stresses the need to provide the workforce with training and new skills in order to facilitate their adaptability to changes.

In 2020, under the conditions of COVID-19, labour market flexibility research has found a special, new dimensional trait. The ILO has released preliminary assessments on the first effects of COVID-19 on labour markets, including a growth in unemployment between 5.3 million jobs in a low scenario to 24.7 million in a high scenario, as well as a decline in labour income and increase in extreme and moderate working poverty [13]. During this period (i.e., an imminent global economic crisis and uncertainty), greater labour market flexibility could have encouraged more inclusive labour force participation provided that structural changes including work security measures were carried out in parallel. As in their report, published in 2020, the European Foundation for the Improvement of Living and Working Conditions has identified challenges and policy approaches to find the right balance between flexibility and security in the labour market [14]. Hence, the 'flexicurity' (i.e., flexibility + security) concept is closely reflected. It is a complex and multifaceted phenomenon and is yet to be soundly and well-developed as an indicator-monitoring-based framework [15]. It seems to be more political, at the moment, as noted in a number of EU policy documents (e.g., in the Europe 2020 programme of the EU or the EU Agenda in 2019–2024) rather than a socioeconomic real model (i.e., "the EU should ensure that the labour market regulatory framework provides the right balance of flexibility and security for companies and workers, facilitates job creation and does not stifle innovation" [16]. Furthermore, it should be mentioned that the EU's level flexicurity concept has been changing every year with the only countries that show positive achievements being Denmark

and the Netherlands. The Danish concept of flexicurity is based on the "golden triangle", which consists of three elements: flexible labour market, active state policy and social security [17,18]. The Dutch flexicurity model has been designed to serve the hybrid goal of, on the one hand, increasing the security of workers employed via atypical contracts (i.e., deviating from the standard open-ended employment relationship), while, on the other hand, preserving flexibility in the labour market [19]. The experience of these countries will be particularly important in terms of seeking optimal solutions in the post-pandemic period in terms of implementing a flexible labour market to ensure work security for the mutual benefit of employers and employees. To find the right balance, it is essential to have adequate and reliable historical data. Therefore, the question of measuring flexibility is important not only from a scientific point of view but also from a practical point of view.

To enhance labour market flexibility, via measurable means, the proper tools are required. The methods of measuring such phenomenon have been conducted for several decades [9,20]. They vary in character, due to their development, by including adopted components and scope-specific analyses (e.g., monomial measures that consider only one variable versus others that create a set of quantitative and qualitative factors). The methods of measuring labour market flexibility, despite the vastness of the research, are still insufficient. One concern is that their limitations do not allow for extended time-spatial research. In a European context, this is necessary to diagnose the correct performance of European labour markets as well as conduct a common pro-employability policy for the EU. Moreover, it is difficult to identify impact-relating factors that stimulate flexibility. Examination of the correlation between ICT, social and economic changes, as well as individual components via a synthetic labour market measure, can allow for the assessment of stimulant and destimulant valuation [21,22]. Furthermore, the lack of precise tools that can comparatively analyse such phenomena significantly limits the possibility of forecasting the development of national and transnational labour markets—making this research vital to workforce planners and policymakers.

The limitations of existing methods have led researchers to search for new approaches to assess the level of labour market flexibility. In this respect, synthetic measures seem to be one of the most comprehensive—since they are some of the most important factors affecting flexibility. The extent of the literature on this topic is poor, and there are no widespread best practices. The methods that are most used have time and space constraints on the data. Scholars often use their own indicators, which does not ensure the comparability of the results as well as limits that not only kerb cognitive value but, indirectly, restrict the development of the field and hamper in reaching the SDG targets. As such, this gap makes it necessary to develop new synthetic measures for labour market flexibility by improving the validation and dissemination of both the procedure and research results of the market labour flexibility process. The aim of the study is to show that under the terms of imperfect methods of evaluating labour market flexibility, the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), a multi-criteria decision analysis (MCDA) method, can be applied to positively compare spatial (i.e., different countries) and temporal (i.e., long-time horizon) terms. The aptitude to assess sustainable industrial relations processes allows us to consider their role in shaping the flexibility of the labour market on an international scale. In this study, this scale is specific to the EU-15 group (i.e., the Member States before 2004).

2. Materials and Methods

2.1. Hypotheses Development

In our study, we formulated two research questions (RQ), a primary hypothesis (PH) and two sub-hypotheses (SH). The research questions asked the following:

- RQ1: What are the methods and indicators of measuring labour market flexibility?
- RQ2: What are the gaps in measuring labour market flexibility?

The PH of the research explored whether TOPSIS is an effective method of examining labour market flexibility. The two sub-hypotheses followed-up on the PH by looking at whether:

- SH1: TOPSIS makes it possible to measure labour market flexibility in spatial and temporal dimensions;
- SH2: TOPSIS can be used in situations of scarcity of complete data and rely only on publicly available reliable and comparable sources.

At the first stage of the research, we reviewed methods of testing labour market flexibility and approaches previously used. We also assessed the shortcomings and deficiencies of these methods and developed the main research hypothesis based on the assumption that the TOPSIS method can be effective in examining labour market flexibility. Secondly, with the intention of verifying its usefulness and applicability, the TOPSIS method was looked at in terms of measurability of flexibility in the spatial-temporal dimension and its application under conditions of limited source data.

2.2. Theoretical Considerations

Factors affecting the flexibility of the labour market have a different nature and scope. They can be divided into micro and macroeconomic aspects. Quantitative measures related to the form of work performed are listed. These are primarily work statistics (i.e., part-time, temporary, self-employed work, engagements and dismissals, hours worked, etc.) and payroll issues. Attention is drawn to the uncertainty of the impact of individual factors and different strengths of their impact. Difficulties in international comparisons are manifested in individual measures by shaping labour market flexibility in a given region [23]. The flexibility of the labour market, as noted, is a very complex phenomenon. It requires consideration of many categories of quantitative and qualitative factors. The need to comprehensively cover the most important elements results in directing researcher interest by way of synthetic measures. Their character varies depending on the scope, depth of analysis and the qualitative and quantitative nature of the adopted components. Other, more complex approaches to assessing the flexibility of the labour market can be found in the literature [24–26]. For the purpose of comparing labour market flexibility between countries, Gawrońska-Nowak and Skorupińska [27] proposed taxonomy-based indicators, where factors that stimulate and inhibit are considered in four areas: part-time employment, trade union coverage, tax wedge, and compensation rate. The choice of these institutional factors was dictated by the ambiguity in the interpretation of the other variables (i.e., scope of collective agreements, level of regulation of fixed-term employment, etc.). Another example is the Labor Market Regulation Index, with three indicators—flexibility of employment forms, regulation of employment conditions and dismissal conditions [28]. Other measures of labour market flexibility, which are mostly widespread internationally, include [29]: Labor Freedom Index (LFI) [30], Employment Protection Legislation (EPL) index [31] and Composite Indicator of Employment Protection Legislation (EPLex) index [32].

Labour market flexibility, which seems to be clearly defined, is a phenomenon that is difficult to evaluate. There is no single measurement criterion. American economist, Solow, proposed measuring labour market flexibility based on the Beveridge curve concept. It shows the relationship between unemployment and job vacancy rates [33]. However, the measure is the vacancy rate, which is not very reliable and does not consider other components of labour market flexibility. Studies that relate to the flexibility of the labour market in reality often include only one or several variables [34–36]. There is no single, dominant criterion for assessing the flexibility of the labour market. Moreover, even very categorical statements can be found in earlier studies analysing existing indicators, for example, "given the different aspects of labour market flexibility it is impossible to construct a single meaningful measure of labour market flexibility" [37].

The LFI, developed by the Heritage Foundation, is 1 of the 12 pillars of the Index of Economic Freedom [38] and 1 of the 3 components of the so-called efficiency regulators (i.e., next to business freedom and monetary freedom). Freedom with respect to the

labour market concerns the free shaping of employment relations, obtaining or changing employment on both the demand and supply sides. Legislative regulations, trade unions and state intervention may limit freedom understood in this way (i.e., 59.6% on average for the examined countries). In 2020, the overall value of this indicator compared to 2019 has not changed. However, only six variables (i.e., force participation rate has been excluded). Currently, this indicator ranges from over 90% (i.e., highest freedom rates, e.g., Singapore) to around 20% (i.e., lowest freedom, e.g., Cuba and Turkmenistan). The index consists of seven equivalent variables: ratio of minimum wage to the average value added per worker, hindrance to hiring additional workers, rigidity of hours, difficulty of firing redundant employees, legally mandated notice period, mandatory severance pay and labour force participation rate [30,39]. The data necessary to calculate the LFI are quantitative and come primarily from World Bank data from the *Doing Business* report. The most current data are used to calculate the indicator. For the 2020 edition, the state from 30 June 2019 are the latest data available.

The EPL index, developed and calculated by the Organisation for Economic Co-operation and Development (OECD), is a set of indicators illustrating the level of legislative protection of employment. It consists of protection regulations of permanent employees, specific regulations regarding group dismissals and regulations concerning temporary work. In addition, 21 additional complementary variables are analysed [31]. This indicator, due to its extent, was very comprehensive in its area. However, it was mainly limited to issues related to the intensity of employment protection. Similar assumptions regarding the need to examine employment protection are examined by EPLex index. Developed by ILO, it determines the level of employment regulations. For this purpose, over 50 variables are utilised. In the years 2009–2019, it was calculated for 103 countries. The indicator allows, in accordance with the assumed objectives, to compare legislation in the field of termination of employment regulation to include: source and scope of regulation, contract of employment, substantive requirements for dismissals, procedures for individual dismissals, collective dismissals for economic reasons, severance pay and avenues for redress [40].

Moreover, comparable conclusions are drawn from other studies on labour market functioning. The lack of comparability, the variety of factors and measures considered, as well as the different results recorded for the same examined areas are the basic accusations against the available measures. Frequent additional defects are their incompleteness, variability depending on the environmental conditions and difference in their functioning in individual countries (i.e., co-existing indicators in different countries have not only different strength of influence but also direction). These notable methodological weaknesses are indicated in papers by Kässi and Lehdonvirta [41], Klau and Mittelstadt [37], Auer [42] and Bhattacharjea [43]. The research has focused on devoting new challenges in creating labour market indicators using currently available data [44]. Problems with interpretation, despite the large amount of data available, remain unsolved.

The dissemination of existing measures gives a two-way effect. On the one hand, the results are disseminated and with them the advantages of the measures. On the other hand, the disadvantages of individual solutions are also reproduced. Due to limitations, the development of science in this direction is also stabilizing. A review of the above indicators shows some limitations, including both temporal scope (e.g., lack of or outdated data) and spatial scope (i.e., limited number of countries covered). Therefore, it seems necessary to create an indicator that, although in part, would eliminate the limitations encountered so far. From the literature, the conclusion that can be stated is that further work is needed to improve the methodology of examining labour market flexibility [45]. Furthermore, the original indicator should be based on an individual set of factors.

2.3. Practical Implications

There are many ways to analyse systems of sustainable labour relations in countries. The institutional factors that attribute particular importance for the labour market include the tax wedge, employment protection, trade union density and collective bargaining

systems. The tax wedge, measured in the percentage of labour cost, is defined as the ratio between the amount of taxes paid by an average single worker and the corresponding total labour cost for the employer [46]. The employment protection legislation evaluate the regulations on the dismissal of workers on regular contracts and the hiring of workers on temporary ones [31]. The trade union density, expressed in a percentage, corresponds to the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners [47]. Collective bargaining systems are key and complex labour market institutions [48] that are measured in percentages and represent the share of workers covered by valid collective agreements in force [49]. The study, based on the available measures, is varied—due to data availability. Detailed measurements in individual categories are difficult to pinpoint and maintain a high level of complexity which are mostly based on several data points (i.e., the most common measures). This approach gives the opportunity to compare test results over time and space. The widespread use of a common methodology has many advantages, including interpretability, knowledge of the meter, familiarity with the names and its design (i.e., to facilitate and encourage its use).

It is important to note that many variables originally selected for the study were not included due to a lack of data, e.g., Global Competitiveness Index (GCI), LFI, EPL index and EPLex index, as well as the share of economic short-time workers in employment. That being said, according to the World Economic Forum, GCI data are not strictly comparable over time. Even though GCI has published reports measuring country competitiveness since 1979, early data cover just 16 countries. Moreover, the Index includes fewer indicators than it does at present. Its methodology has also undergone several improvements in order to reflect the newest schools of thought specific to the development and measurement of economic growth. Hence, GCI could not be used to create the index using the TOPSIS approach. The data in Table 1 provide the basis for assessing labour market flexibility indicators used in international comparisons and time panels. The basic problems are data availability, methodological difficulties and changing significance of the constituent factors. Other authors also present a similar assessment of existing indicators [35,36,45,50]. Moreover, important practical implications of using tools to analyse labour market flexibility and their facilitation of research activities in coordination with the development of best practices also contributes to the achievement of SDGs.

Table 1. Comparison of the labour market flexibility indicators.

Indicator	Responsible Institution	Time Range	Spatial Range	Comments
GCI Flexibility	World Economic Forum	2017–2018	137 countries (28 EU countries)	The change in the counting methodology makes it possible to compare data from the 2006–2007 report, but due to the limitations of the license agreement, the data are only available from the 2008–2009 report.
EPL	OECD	2013	41 countries (21 EU countries)	According to the current calculation method, the data are not aggregated into one synthetic indicator, the available data cover a short time series, mainly in the years 2008–2013 (i.e., 6 years), no current data, a measure of legal protection of employment.
LFI	Heritage Foundation	2018	186 countries (28 EU countries)	The value of the indicator has been published annually since 2005, the values are given in relative terms, which limits their applicability, a measure of legal protection of employment.
EPLex	ILO	2012	45 countries (13 EU countries)	Data are available from 2009, a short time series (i.e., 5 years, 2009–2013), no current data, a measure of legal protection of employment.

Source: adapted from Galik (2020).

2.4. TOPSIS Approach

The TOPSIS method was first introduced by Hwang and Yoon [51]. The basic concept is that the best-chosen alternative has not only the shortest distance from the ideal solution

(i.e., the best solution) but also the longest distance from the ideal negative solution. Therefore, this method can be treated as a development of the taxonomic method proposed by Hellwig [52], where the development measure was based on comparison only with the ideal standard. Other assumptions remained unchanged [21]. The concept is widely used to solve practical decision problems [53]. It allows ranking alternatives, which makes it easier to choose the optimal variant. This is particularly important with uncertain or incomplete data [54]. Therefore, it is not surprising to use this tool often to support business management.

As an attempt to develop an original indicator based on an individual set of factors, the following solution is proposed, a synthetic labour market flexibility indicator based on the TOPSIS approach. TOPSIS is based on a linear ordering of considered objects with a list of indicators. The TOPSIS method is one of the best-known ranking methods. TOPSIS is a frequently used tool from the group of MCDA methods [55]. In recent years, the use of advanced MCDA techniques have been applied to solve complex problems [56]. These methods allow analysts to better understand the process of assessing phenomenon. It can assist in the decision-making process by providing a reliable tool to systematize information. The desire to build advanced decision models with higher decision support capabilities in a wide range of applications, promotes the integration of MCDA techniques with efficient systems, such as intelligence and expert systems and geographical information systems. The areas of a TOPSIS application can be divided into several categories. Most often, the method used to evaluate alternative solutions can relate to supply chain management and logistics activities [57]. This applies in particular to the selection of the optimal supplier [54,55,58–60] but also the right choices regarding the subject of the delivery itself [61,62]. The ranking method, taking into account the volume of data, allows for choosing the (relative) best solution. Other areas include project management [63], engineering and production systems [64], negotiation processes [65,66], business and marketing management and health, safety and environmental management. Another important area is the assessment of quality of services [67–70]. Moreover, a number of studies using the TOPSIS approach also support decision-making processes in the area of human resource management [71–74]. Finally, another relatively new area of the use of TOPSIS are various types of analyses devoted to sustainability, both for individual enterprises and comparative assessment [68,75,76].

The areas for a TOPSIS application can be divided into several categories. Most often, this method is used to evaluate alternative solutions in the supply chain of management and logistics [57]. This applies in particular to the selection of the optimal supplier [54,55,58–60] but also in developing the right choices regarding the subject of the delivery [61,62]. The ranking method, taking into account the amount of data, allows us to choose the relatively best solution. Specific areas include project management [63], engineering and production systems [64], negotiation processes [65,66], business and marketing management and health, safety and environmental management. Specifically, an important area that has grown over the last decade is the assessment of quality of services [67–70], i.e., a number of studies use the TOPSIS approach to support decision-making processes in the area of human resource management [71–74]. Another relatively new area of the use of TOPSIS are various types of analyses devoted to sustainability, both for individual enterprises and comparative assessments [68,75,76].

The specialization of the areas of analysis using the TOPSIS method is dictated by the popularity of the tool in given scientific environments. This is also evident when the geographical spread of this approach is taken into account. The scientific community has shown that it derives knowledge from its own environment; hence, the popularity of different MCDA methods is spread somewhat unevenly. The TOPSIS method is similar. It is admittedly one of the most frequently used methods of multi-criteria support for decision-making processes, but at the same time, its popularity is diverse with significant amounts of research carried out in China, Iran and Poland [56]. TOPSIS has also been used in analyses of various phenomena in such countries as Croatia [77], Canada [78], Brazil [79],

the USA [80], Bangladesh [70], Taiwan [67] and Turkey [25]. It is our conclusion that the TOPSIS approach is useful primarily for making management decisions [53]. Few studies attempt to use linear ordering models for areas that do not involve the assessment of microeconomic aspects. The question remains, is TOPSIS an effective approach of assessing the level of flexibility of labour markets and their classification according to this indicator? As it has already been stated, typical methods used to study the flexibility of the labour market do not meet analytical needs. The TOPSIS method, thanks to its advantages, reduces existing restrictions.

The key TOPSIS benefit is a consistent approach to decision making based on multiple criteria. The basic advantages of the TOPSIS method [20] are its simplicity, rationally comprehensible concept, good computational efficiency and ability to measure the relative performance for each alternative in a simple mathematical form [81]. Among many multi-criteria techniques (e.g., bipolar, VIKOR, SAW, PROMETHEE and SMART), the TOPSIS method was selected because it is one of the most frequently used methods in discrete MCDA research [82]. Simple mathematics are very important in using TOPSIS (Table 2). That is why it is relatively easy to adapt to different areas. Compared to other methods supporting the decision-making process, TOPSIS is distinguished by considering the weight of criteria used in the construction of the indicator [83,84]. This is one of the most frequently repeated advantages of this method and allows, if necessary, for more reliable results.

Table 2. Advantages of the classic TOPSIS method.

Advantage	Selected Publications
Rationality	García-Cascales and Lamata [85]; Li et al. [86]; Başdar and Alper [25]
Understandability	García-Cascales and Lamata [85]; Ginting et al. [76]; Li et al. [86]; Komlan [83]; Başdar and Alper [25]; Safari et al. [73]; Szarafinska and Fabisiak [84]
Simple mathematics—allowing for the best alternatives for each criterion to be presented in a simple mathematical form	García-Cascales and Lamata [85]; Ginting et al. [76]
Weights are included in the comparative procedures	García-Cascales and Lamata [85]
Reliability	Li et al. [86]
Effective implementation	Komlan [83]; Safari et al. [73]; Szarafinska and Fabisiak [84]
Intuitiveness of the procedure	Safari et al. [73]

Source: own elaboration.

For an effective TOPSIS application, it is necessary to select criteria for evaluation and to assign appropriate weights (i.e., if needed). For this purpose, the Analytic Hierarchy Process (AHP) method is most often used, as well as the Analytic Network Process (ANP). The applicability of using either of the described methods [59,62,63,86–89] is confirmed via their effectiveness and application potential to support real decision-making processes. There are examples of using TOPSIS to evaluate policy strategies of cities and regions based on several types of data (i.e., qualitative and quantitative) to eliminate any skewed assessment factors. The effectiveness of the methods has also been assessed by looking at development strategies at national and local levels [77], assessing the state of the environment [90,91] and assessing the financial condition or spatial diversity of regions [92–94] and quality of individual areas of public health care [95]. The TOPSIS method has also been used on a macro scale to assess the labour market environment [8,96], including its flexibility. Numerical examples [97,98] confirm TOPSIS as an appropriate method of comparing labour market flexibility between countries. TOPSIS is therefore used not only as a tool to support decision-making processes at the industrial relations level but also as a method of assessing given socioeconomic phenomena in individual areas or in comparative analysis.

The TOPSIS method also has some disadvantages and limitations. Some of them concern the method, especially the idea of a bipolar reference point, while some critical

remarks focus on supporting procedures. One of the problems attributed to TOPSIS is that its use in accordance with the assigned procedure can cause a phenomenon called rank inversion. In this phenomenon, the order of alternative preferences changes when the alternative is added or removed from the decision problem. In some cases, this can lead to so-called total rank reversal, and the best alternative may become the worst [85]. This phenomenon may, in many cases, not be acceptable. In addition, the characteristic feature, which is the need to precisely determine the weighting of the criteria and their assessments using real values, is also treated as its limitation [65].

Due to the limitations, new variants of the TOPSIS method are created, tailored to specific research needs. Despite critical comments, the effectiveness of the classic TOPSIS method in studies in various contexts has been confirmed. This indicates a tendency to increase their number and frequency of use as a tool for ranking alternatives in decision-making processes [56]. Until recently, the TOPSIS method was rarely used to study macroeconomic phenomena [25,77]. The lack of interest of this method in studying macro-scale phenomena should not come as a surprise. TOPSIS is included in the group of tools used to make decisions in a multi-criteria environment. This is not a basic assumption for macroeconomic research. However, the advantages of TOPSIS, its versatility and the ability to classify results into individual groups also suggests the possibility of its wider use. This method is particularly useful for considering the evaluation of phenomena and their categorization in groups separated according to the best assessment.

2.5. Study Scope

The study covers a period of 10 years from 2009 to 2018 for the EU-15 group (i.e., the Member States before 2004) comprising of the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom [99]. The selection of countries for the study was determined by access to data in the year of the survey (2020). All data used in the study to create the index were published by the OECD and calculated according to their measurement methodology. The established spatial and temporal scope and the selection of variables adopted for the study resulted from the timeliness, availability in reliable sources of information and comparability of data at the time of the study. The selection of variables was also determined by access to data. At first, a wide range of data, different types of indicators describing flexibility and all EU member states were considered. Due to a large number of missing data, the study was limited to the EU-15 using seven variables. After performing the calculations, the test was repeated (i.e., using a back testing procedure) with missing data imputation with similar results being obtained. This process illustrated that the TOPSIS method could be applied even with limited data availability. As such, for individual missing data, the deterministic imputation method was used based on the mean of the known values of some variable for the missing values on the same variable [100]. In the survey, administrative data were used as indicated by different research centres. In the absence of data, survey data were used, provided by research institutions. The study was compiled using Microsoft Excel 2021 in conjunction with the add-in program Analysis ToolPak. The procedure of the study is expressed in the following five steps [97,98].

1. Formal and objective choice of input measures (i.e., indicators) of labour market elasticity. The choice of input indicators was based on two criteria. First, the variance ratio is analysed in order to exclude quasi-constant variables. Second, the inverse correlation matrix is computed, and its diagonal elements are used to exclude variables exhibiting too strong a correlation with other indicators. As a result, a data matrix of dimensions (i.e., countries, indicators and years) are included in one matrix. Number of rows is equal to m*t because for each country k was made up of t entries (i.e., where: t = number of years), i.e., $m \times txn$, was created, Equation (1):

$$X = [x_{kit}] \quad (1)$$

where:
x_{kit} = value of the kth indicator of labour market elasticity (i.e., $k = 1, 2, \ldots, n$) for the ith country (i.e., $i = 1, 2, \ldots, m$) in year t (i.e., $t = 1, 2, \ldots, t$);
n = number of elasticity indicators (i.e., $n = 7$);
m = number of analysed countries (i.e., $m = 15$);
t = number of years in the analysis (i.e., $t = 10$).

2. Normalization and standardization of input indicators. These operations were performed due to indicators having different scales and values. Because during the construction of synthetic indicators input variables will be averaged, it is necessary to assure that they have the same scale (i.e., range of values) and direction (i.e., positive or negative). In order to achieve that, stimulants and destimulants were transformed into nominants. Stimulant is the variable exhibiting positive correlation with the outcome (i.e., dependent) variable. Higher values of the independent variable coincide with higher values of the dependent variable. Destimulant is the variable exhibiting negative correlation with the outcome (i.e., dependent) variable. Higher values of the independent variable coincide with lower values of the dependent variable. Nominant is the variable which is a stimulant until a certain threshold (i.e., called the nominal value). As a result, after this threshold level it becomes a destimulant. The following formulae, Equations (2)–(5), were used. For stimulants:

$$Z_{kit} = \frac{x_{kit} - \min\limits_{it}\{x_{kit}\}}{\max\limits_{it}\{x_{kit}\} - \min\limits_{it}\{x_{kit}\}} \quad (2)$$

For destimulants:

$$Z_{kit} = \frac{\max\limits_{it}\{x_{kit}\} - x_{kit}}{\max\limits_{it}\{x_{kit}\} - \min\limits_{it}\{x_{kit}\}} \quad (3)$$

For nominants:

$$Z_{kit} = \frac{x_{kit} - \min\limits_{it}\{x_{kit}\}}{\max\limits_{it}\{x_{kit}\} - \min\limits_{it}\{x_{kit}\}} \quad \text{gdy } x_{kit} \leq \text{nom}\{x_{kit}\} \quad (4)$$

$$Z_{kit} = \frac{\max\limits_{it}\{x_{kit}\} - x_{kit}}{\max\limits_{it}\{x_{kit}\} - \min\limits_{it}\{x_{kit}\}} \quad \text{gdy} \quad x_{it} > \text{nom}\{x_{kit}\} \quad (5)$$

where:
i = number of countries (i.e., $i = 1, 2, \ldots, 15$);
k = number of input elasticity indicators (i.e., $k = 1, 2, \ldots, 7$);
t = number of years (i.e., $t = 1, 2, \ldots, 10$);
$\max\limits_{it}\{x_{kit}\}$ = maximum value of the kth indicator in year t;
$\min\limits_{it}\{x_{kit}\}$ = minimum value of the kth indicator in year t;
$\text{nom}\limits_{it}\{x_{kit}\}$ = nominal value of the kth indicator in year t.

3. Calculation of the Euclidean distance of input indicators for all the countries in a given year from pattern $z^+ = (1, 1, \ldots, 1)$ and anti-pattern $z^- = (0, 0, \ldots, 0)$ was performed using the following formulae, Equations (6) and (7):

$$d_{it}^{+} = \sum_{i=1,t=1}^{\min} \left(\sqrt{z_{kit}} - z_{it}^{+}\right)^2 \quad (6)$$

$$d_{it}^{-} = \sum_{i=1,t=1}^{\min} \left(\sqrt{z_{kit}} - z_{it}^{-}\right)^2 \quad (7)$$

where:
i = number of countries (i.e., i = 1, 2, . . . , 15);
k = number of input elasticity indicators (i.e., k =1, 2, . . . , 7);
t = number of years (i.e., t = 1, 2, . . . , 10).

The countries were ordered according to their distance from an ideal object, i.e., first, an ideal object (optimal values of all the variables) is chosen, and then, for each country, a distance from this object is computed. In the computation of distance, all the factors had an equal weight of one. Objects were grouped according to the distance.

4. Calculation of the synthetic measure of labour market elasticity in the TOPSIS methodology utilises Equation (8). The synthetic measure takes values $q_{it} \in [0:1]$. Higher values indicate higher elasticity of the labour market. Analysis of changes of q_{it}. in time allows to assess the dynamics of labour market elasticity within time and, in comparison, to other countries:

$$q_{it} = \frac{\mathrm{d}_{it}^{-}}{d_{ti}^{-} + d_{it}^{+}} \tag{8}$$

where:
i = number of countries (i.e., i = 1, 2, . . . , 15);
t = number of years (i.e., t = 1, 2, . . . , 10).

5. Linear ordering and classification of the analysed Member States was performed according to their labour market elasticity. Classification was conducted based on the values of the synthetic indicator. Classes were established based on the mean and standard deviation of the synthetic indicator using the following thresholds, Equations (9)–(12):

Class I (i.e., high labour market elasticity):

$$q_i \geq \overline{q} + s_q \tag{9}$$

Class II (i.e., medium high labour market elasticity):

$$\overline{q} + s_q > q_i \geq \overline{q} \tag{10}$$

Class III (i.e., medium low labour market elasticity):

$$\overline{q} > q_i \geq \overline{q} - s_q \tag{11}$$

Class IV (i.e., low labour market elasticity):

$$q_i < \overline{q} - s_q \tag{12}$$

where:
q_i = mean of the synthetic indicator of labour market elasticity;
s_q = standard deviation of the synthetic indicator of labour market elasticity.

The synthetic indicator of labour market flexibility was calculated using seven variables: tax wedge, trade union density, unemployment rate, temporary employment, part-time employment rate, employment rate by age group 15–24 and employment rate by age group 55 to 64. Table 3 presents a set of all variables used in the study with a description of the unit of measurement [101–106]. The selection of variables was based on formal and substantive criteria. Measuring the flexibility of the labour market is possible only through the analysis of various measures and the interdependence of broad economic indicators [107]. As previously reported in the literature, the following factors have a high impact on the labour market: tax wedge, employment protection, unemployment benefits, trade unions and centralisation or decentralised wage bargaining. The set of variables indicated in previous research of labour market flexibility [97,98] were also considered. The selection of

variables for the study was determined by access to data. A number of variables originally selected for the study were not included due to lack of data, including flexibility—labour market efficiency—Global Competitiveness Index, LFI, EPL index, EPLex index and share of economic short-time workers in employment.

Table 3. Variables of the labour market flexibility qualified for the study.

Variable Designation	Variable Description	Description of Measure Unit
x_1	Tax wedge	The ratio between the amount of taxes paid by an average single worker and the corresponding total labour cost for the employer. The indicator is measured in percentage of labour cost [101].
x_2	Trade union density	The ratio of union members divided by the total number of employees. The database contains information from administrative and survey data. Administrative data were mainly used in the present study. The indicator is measured in percentage of total employment [102].
x_3	Unemployment rate	The ratio between unemployed people and the labour force. The indicator is measured in percentage of labour force [103].
x_4	Temporary employment	Temporary employment includes wage and salary workers whose job has a pre-determined termination date. The indicator is measured in percentage of dependent employment [104].
x_5	Part-time employment rate	The proportion of persons employed part-time among all employed persons. The indicator is measured in percentage of employment [105].
x_6	Employment rate by age group 15–24	The employment rate for a given age group is measured as the number of employed people of a given age as a percentage of the total number of people in that same age group. Employment rates are shown for age groups, e.g., people entering the labour market following education aged 15 to 24 and people passing the peak of their career and approaching retirement aged 55 to 64. This indicator is measured as a percentage in that same age group [106].
x_7	Employment rate by age group 55–64	Safari et al. [73]

Source: own elaboration.

Labour market flexibility variables were divided into stimulants and destimulants. Three of these variables were considered destimulants: tax wedge, trade union density and unemployment rate. An increase in the value of these variables led to a decrease in labour market flexibility. The following four variables were considered stimulants: employment rate of temporary workers, share of part-time workers, employment rate of younger workers aged 15–24 and employment rate of older workers aged 55 to 64. An increase in the value of these variables led to an increase in labour market flexibility. A similar selection of variables was used in other research studies [97,98]. Statistical data of the indicators selected for the study allowed to calculate the synthetic index of labour market flexibility for each country in each year, according to the procedure of the TOPSIS method (i.e., dynamic evaluation). All data were collected and converted in 2020. Table 4 presents the values of the labour market flexibility index in the EU-15 in 2009 to 2018.

Table 4. Values of the synthetic index of labour market flexibility in the EU-15 in 2009–2018 using the TOPSIS method.

No.	Country †	Year										Average from 2009–2018
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
1	Austria	0.481	0.493	0.493	0.499	0.503	0.505	0.499	0.509	0.509	0.506	0.500
2	Belgium	0.288	0.291	0.321	0.326	0.324	0.322	0.321	0.326	0.331	0.348	0.320
3	Denmark	0.510	0.501	0.507	0.507	0.508	0.513	0.521	0.565	0.555	0.544	0.523
4	Finland	0.422	0.438	0.457	0.476	0.473	0.464	0.452	0.459	0.465	0.481	0.459
5	France	0.432	0.442	0.454	0.472	0.488	0.484	0.485	0.479	0.483	0.473	0.469
6	Germany	0.549	0.577	0.597	0.599	0.605	0.601	0.594	0.596	0.595	0.588	0.590
7	Greece	0.396	0.383	0.333	0.310	0.311	0.325	0.332	0.325	0.320	0.316	0.335
8	Ireland	0.531	0.507	0.508	0.519	0.536	0.544	0.558	0.579	0.579	0.585	0.545
9	Italy	0.366	0.364	0.377	0.385	0.379	0.379	0.386	0.388	0.392	0.392	0.381
10	Luxembourg	0.439	0.437	0.433	0.444	0.432	0.433	0.439	0.423	0.434	0.427	0.434
11	Netherlands	0.751	0.758	0.767	0.797	0.792	0.808	0.814	0.814	0.826	0.820	0.795
12	Portugal	0.526	0.516	0.508	0.501	0.491	0.492	0.495	0.501	0.510	0.523	0.506
13	Spain	0.457	0.449	0.454	0.449	0.452	0.456	0.475	0.487	0.494	0.495	0.467
14	Sweden	0.479	0.496	0.520	0.523	0.528	0.528	0.523	0.521	0.520	0.513	0.515
15	United Kingdom	0.576	0.581	0.583	0.594	0.601	0.610	0.615	0.622	0.619	0.615	0.602

† list of countries in alphabetical order. Source: based on OECD [101–106].

3. Results

The research allowed a comparison of the economies based on a 10-year time series (Table 5). The Netherlands was the country with the highest labour market flexibility, while Belgium scored the lowest. All the countries were classified into four types according to the level of labour market flexibility. In Class I, with high labour market flexibility, there was one country, the Netherlands. In Class II, with average labour market flexibility, there were seven countries: the United Kingdom, Germany, Ireland, Denmark, Sweden, Portugal and Austria. In Class III, with below-average labour market flexibility, there were five countries: France, Spain, Finland, Luxembourg and Italy. In Class IV, with low labour market flexibility, there were two countries: Greece and Belgium.

Table 5. Linear order and typology (i.e., Class) according to the average value of synthetic index of labour market flexibility for EU-15 in 2009–2018 using the TOPSIS method.

Labour Market Flexibility	Type (i.e., Class)	Value of the Synthetic Index of Labour Market Flexibility †	Country	Mean Value of the Synthetic Index of Labour Market Flexibility	Averages Values
high	I	>0.612	Netherlands	0.795	0.496
Medium high	II	0.496–0.612	United Kingdom	0.602	0.496
			Germany	0.590	0.496
			Ireland	0.545	0.496
			Denmark	0.523	0.496
			Sweden	0.515	0.496
			Portugal	0.506	0.496
			Austria	0.500	0.496
Medium low	III	0.379–0.496	France	0.469	0.496
			Spain	0.467	0.496
			Finland	0.459	0.496
			Luxembourg	0.434	0.496
			Italy	0.381	0.496
Low	IV	<0.379	Greece	0.335	0.496
			Belgium	0.320	0.496

† based on $\overline{q} = 0.496$, $s_q = 116$, $\overline{q} + s_q = 0.612$, $\overline{q} - s_q = 0.379$. Source: based on OECD [101–106].

Figure 1 presents mean values of the synthetic labour market flexibility index in the EU-15 countries from 2009–2018, calculated using the TOPSIS approach. Above the average value there were the countries from the first and second type (i.e., eight countries). The countries from the third and fourth type (i.e., seven countries) were below the average. The results of such calculations can be used for further causal or correlative studies relating to labour market policies and labour market flexibility. Various databases collecting information on labour market reforms can be used, such as LABREF, managed by the European Commission in cooperation with the Employment Committee [108], as well as other international or national data sources.

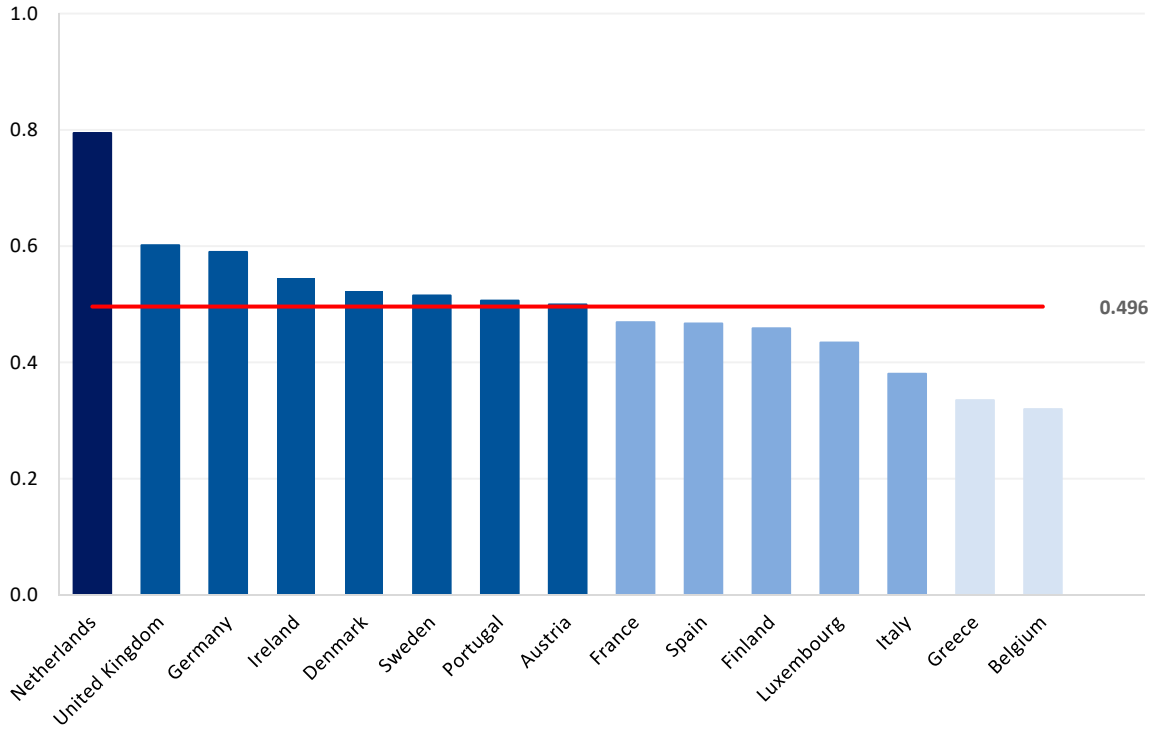

Figure 1. Average values of the synthetic labour market flexibility index in the EU-15 countries from 2009–2018 using the TOPSIS method. Note: The graph follows the order of flexibility, with countries with the most flexible labour markets on the left-hand side and those with the lowest flexibility rating on the right-hand side. The graphs show the arithmetic mean of data reported for the EU-15, divided into four typological classes according to the flexibility of the labour market, marked with the colour of the column. The more intense the blue colour, the more flexible the labour market is according to the mean value of the synthetic labour market flexibility index in the EU-15 in 2009 to 2018. The average arithmetic value was marked by red line. Source: based on OECD [101–106].

Analysing the percentage change in the mean value of the synthetic index of labour market flexibility in the EU-15 countries between the data for 2009 and 2018 (Figure 2), the largest increases in value were recorded in Belgium, Finland and Ireland. Decreases in value were noted in Greece, Luxembourg and Portugal. The analysis of the percentage changes in a given period can also be used to investigate the abovementioned relationships but can also be an effective tool to compare changes between countries for given periods when there are common external drivers, such as the COVID-19 pandemic.

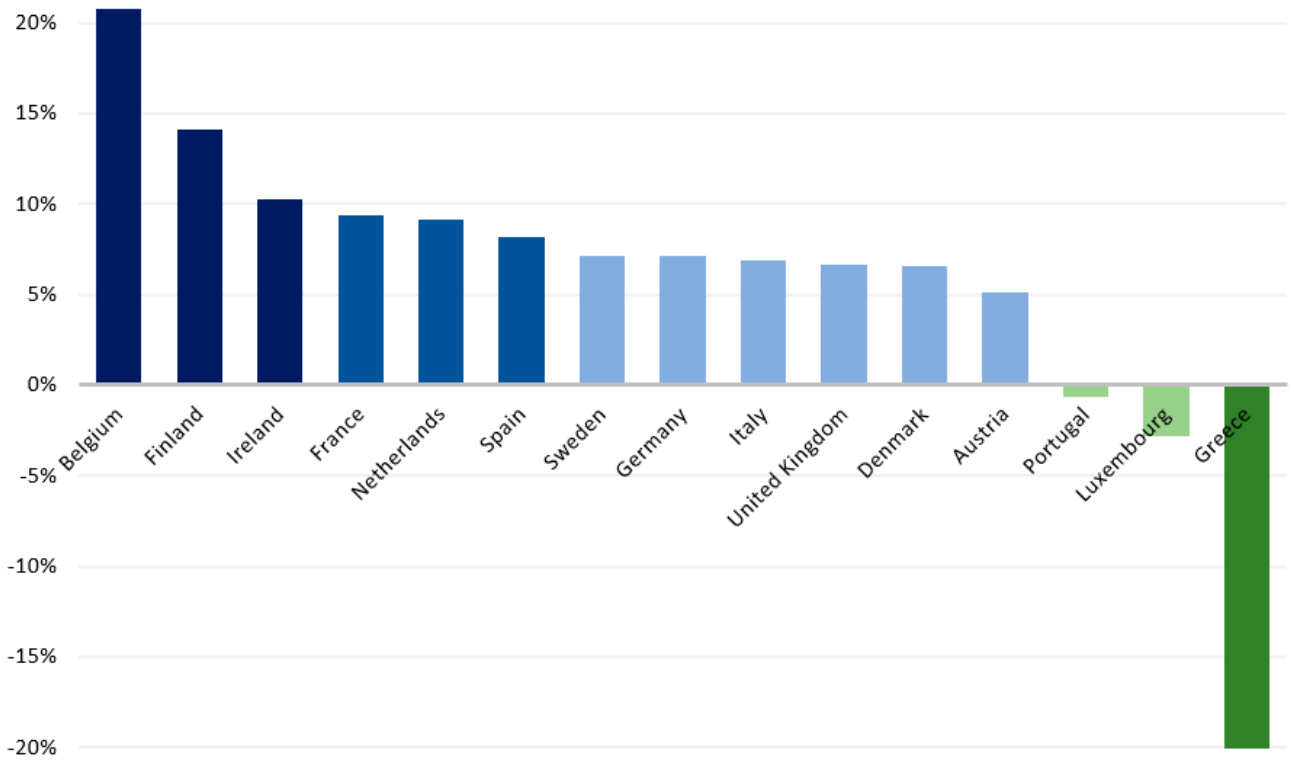

Figure 2. Percent change (i.e., increase/decrease) in the average value of the synthetic labour market flexibility index in the EU-15 in 2009 and 2018 using the TOPSIS method. *Note*: increase/decrease in percentage = [(index value in 2018 − index value in 2009)/index value in 2009] × 100%; order of data from the country with the highest percentage increase in labour market flexibility to the country with the highest percentage decrease in labour market flexibility. Source: based on OECD [101–106].

4. Discussion and Conclusions

Building a sustainability-based, synthetic measure of labour market flexibility, the use of the TOPSIS approach has made it possible to compare the EU-15 countries in a given period. The results indicate that in the analysed countries there are different levels of labour market flexibility. Grouping countries into classes provides a convenient basis for benchmarking the results against policies at the national level. The research may be a good basis to further engage the relationship and our understanding of comparing workforce-related phenomenon. The lack of precision tools to forecast the development of national and transnational labour markets—particularly during the COVID-19 era—can elevate and aid workforce planners and policymakers alike to rethink industrial relations. There is already a diverse opinion in the scientific and media world about the consequences of the pandemic. There is also a lack of indicators to help diagnose and forecast possible solutions for economic and social policies. TOPSIS is an appropriate approach for measuring labour market flexibility on an international scale that offers the possibility to examine the impact of particular elements of social and employment policies of a country in terms of sustainable development and socioeconomic growth of regions and countries. This can empower respective entities (e.g., government agencies) to forecast sustainability-focused industrial relations and changes as a result of future unforeseen risks with similar effects via isolation and the freezing of economies [109,110]. In the age of globalisation, this seems to be an important analytical factor [111,112].

Future research could conduct detailed studies of the evaluation of labour market flexibility in individual EU countries with a higher level of resolution by examining correlative domestic labour market values. On this basis, it would be possible to determine at the national level which determinants have the greatest impact on shaping the flexibility of the labour market and the direction of their influence. A key question being, what can

help to find the best solutions tailored to the current problems and needs of the labour market itself? This would make it possible to determine which of the components of the synthetic labour market flexibility index proposed by Galik [29] would be most important in shaping flexibility and in which of them a positive correlation could be found. Such studies point to those elements of the functioning of the labour market which have the greatest potential to make domestic labour markets more flexible [19,113,114]. From an implementation point of view, it may constitute the basis for building a sustainable social and economic development strategy based on flexible labour markets. It may also indicate the most optimal tools for returning to the state of equilibrium in moments of economic and labour market fluctuations. A noteworthy limitation, however, is that the TOPSIS approach is not widely used in labour market flexibility research. This, in turn, means that we do not have extensive comparative material. Nonetheless, studies available so far [29,97,98] confirm the reliability of the method. Moreover, the research gives convergent results and indicates wide possibilities of dissemination of the approach among labour market researchers. In all, the availability of data for time-space analysis on the components of the synthetic labour market flexibility meter is still limited—a problem for all the available indicators. In TOPSIS, this problem has been significantly reduced; however, the lack of data still significantly limits the possibility of extending the temporal and spatial studies.

Furthermore, the limitations in the availability of statistical data necessary for spatial and temporal analysis are an important barrier to research in the field of labour market flexibility. The smaller number of variables considered may suggest some difficulties in implementing the conclusions drawn up on the basis of the study. Therefore, when a greater number of reliable data sources, tailored to the needs of spatial-temporal analysis, are available, re-verifying the model output should allow for higher resolution results as well as for better statistical examination.

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References

1. European Central Bank Wage Dynamics Network (WDN). Available online: https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_wdn.en.html (accessed on 10 October 2021).
2. European Commission. *Labour Market Adjustments during the Crisis and the Role of Flexibility*; European Commission: Brussels, Belgium, 2018.
3. Van Tulder, R.; Rodrigues, S.B.; Mirza, H.; Sexsmith, K. The UN's Sustainable Development Goals: Can multinational enterprises lead the Decade of Action? *J. Int. Bus. Policy* **2021**, *4*, 1–21. [CrossRef]
4. United Nations Sustainable Development Goals. Available online: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (accessed on 3 May 2019).
5. Hay, I. *Geographies of the Super-Rich*; Edward Elgar: Cheltenham, UK, 2013; ISBN 0857935682.
6. Boldrin, M.; Canova, F.; Pischke, J.-S.; Puga, D. Inequality and Convergence in Europe's Regions: Reconsidering European Regional Policies. *Econ. Policy* **2001**, *16*, 205–253. [CrossRef]
7. Joshi, R. Assessing the Impact of Income Inequality on Economic Growth. *Indian Econ. J.* **2017**, *65*, 1–26. [CrossRef]

8. Ali, F.M.; Ezatollach, L.; Malihe, R. Regional Differences in the Work Market in Urban Areas. *Hum. Geogr. Res. Q.* **2016**, *47*, 645–655.
9. Ghaleb, A.M.; Kaid, H.; Alsamhan, A.; Mian, S.H.; Hidri, L. Assessment and Comparison of Various MCDM Approaches in the Selection of Manufacturing Process. *Adv. Mater. Sci. Eng.* **2020**, *2020*, 4039253. [CrossRef]
10. Friedman, M. The Role of Monetary Policy. *Am. Econ. Rev.* **1968**, *58*, 1–17.
11. Modigliani, F.; Papademos, L. Targets for Monetary Policy in the Coming Year. *Brook. Pap. Econ. Act.* **1975**, *1975*, 141. [CrossRef]
12. Lagos, R.A. Labour market flexibility: What does it really mean? *CEPAL Rev.* **1994**, *1994*, 81–95. [CrossRef]
13. ILO. *COVID-19 and the World of Work: Impact and Policy Responses*; International Labour Organisation: Geneva, Switzerland, 2020.
14. Weber, T.; Hurley, J.; Mandl, I.; Bisello, M.; Vacas-Soriano, C. *Labour Market Change: Trends and Policy Approaches towards Flexibilisation*; Publications Office of the European Union: Luxembourg, 2020.
15. De Pedraza, P.; Álvarez-Díaz, M.; Domínguez-Torreiro, M. Sympathy for the devil? Exploring flexicurity win–win promises. *IZA J. Labor Policy* **2019**, *9*. [CrossRef]
16. Business Europe. *Prosperity People Prosperity Planet. Three Pillars for the EU in 2019–2024*; Business Europe: Brussels, Belgium, 2019.
17. Bredgaard, T.; Larsen, F.; Madsen, P.K. Flexicurity: In Pursuit of a Moving Target. *Eur. J. Soc. Secur.* **2008**, *10*, 305–323. [CrossRef]
18. Bonoli, G.; Madsen, P.K. The Danish Model of Flexicurity: A Paradise—With Some Snakes. In *Labour Market and Social Protection Reforms in International Perspective*; Routledge: Oxfordshire, UK, 2018; pp. 243–265.
19. Bekker, S.; Mailand, M. The European flexicurity concept and the Dutch and Danish flexicurity models: How have they managed the Great Recession? *Soc. Policy Adm.* **2019**, *53*, 142–155. [CrossRef]
20. Olson, D.L. Comparison of weights in TOPSIS models. *Math. Comput. Model.* **2004**, *40*, 721–727. [CrossRef]
21. Balcerzak, A.; Pietrzak, M. Wpływ efektywności instytucji na jakość życia w Unii Europejskiej. Badanie panelowe dla lat 2004–2010. *Prz. Stat.* **2015**, *1*, 71–91.
22. Hajduk, S.; Jelonek, D. A Decision-Making Approach Based on TOPSIS Method for Ranking Smart Cities in the Context of Urban Energy. *Energies* **2021**, *14*, 2691. [CrossRef]
23. Beatson, M. *Labour Market Flexibility. Employment Market Research Unit*; Employment Department, Research Strategy Branch: London, UK, 1995.
24. Kozera, A. Financial self-sufficiency of the metropolises in 2007–2015. *Stud. Reg. Lokal.* **2018**, *71*, 82–105. [CrossRef]
25. Başdar, C.; Alper, D. A Comparison of TOPSIS and ELECTRE Methods: An Application on the Factoring Industry. *Bus. Econ. Res. J.* **2017**, *8*, 627–646. [CrossRef]
26. Paradowski, B.; Wieckowski, J.; Dobryakova, L. Why TOPSIS does not always give correct results? *Procedia Comput. Sci.* **2020**, *176*, 3591–3600. [CrossRef]
27. Gawrońska-Nowak, B.; Skorupińska, K. Elastyczność rynku pracy a charakter instytucji w krajach europejskich. *Gospod. Nar.* **2006**, *206*, 23–40. [CrossRef]
28. Boni, M.; Piotrowski, B.; Radziwłł, A.; Rusielewicz, A.; Sowa, A.; Sztanderska, U.; Walewski, M.; Wojnarowski, J. Elastyczny rynek pracy w Polsce. Jak sprostać temu wyzwaniu? *Zesz. BRE Bank–CASE* **2004**, *73*, 7–121.
29. Galik, A. *Wpływ Nowych Technologii na Elastyczność Rynku Pracy*; University of Gdańsk: Gdańsk, Poland, 2020; ISBN 978-83-7865-930-3.
30. Heritage Foundation Labor Freedom. Available online: https://www.heritage.org/index/labor-freedom (accessed on 9 October 2021).
31. OECD OECD Indicators of Employment Protection. Available online: https://www.oecd.org/employment/emp/oecdindicatorsofemploymentprotection.htm (accessed on 12 October 2021).
32. ILO Employment Protection Legislation Database—EPLex. Available online: https://eplex.ilo.org (accessed on 9 October 2021).
33. Solow, R.M. *What Is Labour-Market Flexibility? What Is It Good for?* The British Academy: London, UK, 1998; pp. 189–211.
34. Bande, R.; Karanassou, M. Labour market flexibility and regional unemployment rate dynamics: Spain 1980–1995. *Pap. Reg. Sci.* **2009**, *88*, 181–207. [CrossRef]
35. Kiander, J.; Virén, M. Measuring labour market flexibility in the OECD countries. *Empirica* **2001**, *28*, 187–201. [CrossRef]
36. Monastiriotis, V. A Panel of Regional Indicators of Labour Market Flexibility: The UK, 1979–1998. In *The European Labour Market. AIEL Series in Labour Economics*; Caroleo, F.E., Destefanis, S., Eds.; Physica-Verlag HD, Elsvier: Amsterdam, The Netherlands, 2006; pp. 221–244. [CrossRef]
37. Klau, F.; Mittelstadt, A. Labour Market Flexibility. *OECD Econ. Stud.* **1986**, *6*, 7–45.
38. Miller, T.; Kim, A.B.; Roberts, J.M. *2020 Index of Economic Freedom*; The Heritage Foundation: Washington DC, USA, 2020.
39. Heritage Foundation Methodology. Available online: https://www.heritage.org/index/pdf/2020/book/methodology.pdf (accessed on 8 October 2021).
40. ILO. *Employment Protection Legislation: Summary Indicators in the Area of Terminating Regular Contracts (Individual Dismissals)*; ILO: Geneva, Switzerland, 2015; ISBN 9789221294764.
41. Kässi, O.; Lehdonvirta, V. Online labour index: Measuring the online gig economy for policy and research. *Technol. Forecast. Soc. Chang.* **2018**, *137*, 241–248. [CrossRef]
42. Auer, P. Protected Mobility for Employment and Decent Work: Labour Market Security in a Globalized World. *J. Ind. Relat.* **2006**, *48*, 21–40. [CrossRef]

43. Bhattacharjea, A. Labour market flexibility in Indian industry. A critical survey of the literature. *Cent. Dev. Econ. Delhi Sch. Econ. Work. Pap.* **2019**, *160*, 197–217. [CrossRef]
44. Aleksynska, M.; Cazes, S. Composite indicators of labour market regulations in a comparative perspective. *IZA J. Labor Econ.* **2016**, *5*, 3. [CrossRef]
45. Cazes, S. Do Labour Market Institutions Matter in Transition Economies? An Analysis of Labour Market Flexibility in the Late Nineties. *SSRN Electron. J.* **2005**. [CrossRef]
46. OECD Tax Wedge (Indicator). Available online: https://www.oecd-ilibrary.org/taxation/tax-wedge/indicator/english_cea9eba3-en (accessed on 8 October 2021).
47. OECD Trade Unions: Trade Union Density (Edition 2016). Available online: https://www.oecd-ilibrary.org/employment/data/trade-unions/trade-unions-trade-union-density-edition-2016_fbf99961-en (accessed on 8 October 2021).
48. OECD. *Negotiating Our Way up. Collective Bargaining in a Changing Word*; OECD: Paris, France, 2019.
49. OECD Collective Bargaining Coverage. Available online: https://www.oecd.org/employment/collective-bargaining.htm (accessed on 10 October 2021).
50. Oliveira, P.; Forte, R. Labour market flexibility and FDI attraction: A macroeconomic analysis. *Panoeconomicus* **2018**, *68*, 267–291. [CrossRef]
51. Hwang, C.-L.; Yoon, K. Methods for Multiple Attribute Decision Making. In *Multiple Attribute Decision Making*; Springer: Berlin/Heidelberg, Germany, 1981.
52. Hellwig, Z. Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom ich rozwoju oraz zasoby i strukturę wykwalifikowanych kadr. *Prz. Stat.* **1968**, *4*, 307–327.
53. Behzadian, M.; Khanmohammadi Otaghsara, S.; Yazdani, M.; Ignatius, J. A state-of the-art survey of TOPSIS applications. *Expert Syst. Appl.* **2012**, *39*, 13051–13069. [CrossRef]
54. Rudnik, K.; Kacprzak, D. Rozmyta Metoda TOPSIS Wykorzystująca Skierowane Liczby Rozmyte. *XVIII Konf. Innow. Zarz. Inż. Prod.* **2015**, 958–968. Available online: http://www.ptzp.org.pl/files/konferencje/kzz/artyk_pdf_2015/T1/t1_0958.pdf (accessed on 8 October 2021).
55. Ladorucki, G.; Wolski, W. Ewaluacja dostawców w procesie logistycznym przedsiębiorstwa metodą fTOPSIS. *Stud. Proc. Pol. Assoc. Knowl. Manag.* **2018**, *88*, 52–62.
56. Zyoud, S.H.; Fuchs-Hanusch, D. A bibliometric-based survey on AHP and TOPSIS techniques. *Expert Syst. Appl.* **2017**, *78*, 158–181. [CrossRef]
57. Chen, K.H.; Liao, C.N.; Wu, L.C. A selection model to logistic centers based on TOPSIS and MCGP methods: The case of airline industry. *J. Appl. Math.* **2014**, *2014*, 470128. [CrossRef]
58. Shahanaghi, K.; Yazdian, S. Vendor selection using a new fuzzy group TOPSIS approach. *J. Uncertain Syst.* **2009**, *3*, 221–231.
59. Freeman, J.; Chen, T. Green supplier selection using an AHP-Entropy-TOPSIS framework. *Supply Chain Manag.* **2015**, *20*, 327–340. [CrossRef]
60. Boran, F.E.; Genç, S.; Kurt, M.; Akay, D. A multi-criteria intuitionistic fuzzy group decision making for supplier selection with TOPSIS method. *Expert Syst. Appl.* **2009**, *36*, 11363–11368. [CrossRef]
61. Chu, T.C.; Lin, Y.C. A fuzzy TOPSIS method for robot selection. *Int. J. Adv. Manuf. Technol.* **2003**, *21*, 284–290. [CrossRef]
62. Dağdeviren, M.; Yavuz, S.; Kilinç, N. Weapon selection using the AHP and TOPSIS methods under fuzzy environment. *Expert Syst. Appl.* **2009**, *36*, 8143–8151. [CrossRef]
63. Mahmoodzadeh, S.; Shahrabi, J.; Zaeri, M.; Pariazar, M. Project selection by using fuzzy AHP and TOPSIS technique. *Int. J. Hum. Soc. Sci.* **2007**, *1*, 270–275.
64. Dmytrów, K. Wpływ wag w metodach TOPSIS i TMAL na czas kompletacji produktów—Analiza symulacyjna. *Stud. Pr. Wydz. Nauk Ekon. Zarz. US. Metod. Ilościowe Ekon.* **2018**, *54*, 103–112. [CrossRef]
65. Roszkowska, E. Analiza procesu negocjacji z wykorzystaniem procedury TOPSIS. Studia ekonomiczne. *Stud. Ekon. Uniw. Ekon. Katow.* **2013**, *138*, 95–108.
66. Wachowicz, T. Metody i narzędzia wspomagania fazy prenegocjacyjnej. *Decyzje* **2010**, *14*, 55–84.
67. Sun, C.C.; Lin, G.T.R. Using fuzzy TOPSIS method for evaluating the competitive advantages of shopping websites. *Expert Syst. Appl.* **2009**, *36*, 11764–11771. [CrossRef]
68. Büyüközkan, G.; Ifi, G. A novel hybrid MCDM approach based on fuzzy DEMATEL, fuzzy ANP and fuzzy TOPSIS to evaluate green suppliers. *Expert Syst. Appl.* **2012**, *39*, 3000–3011. [CrossRef]
69. Yu, X.; Guo, S.; Guo, J.; Huang, X. Rank B2C e-commerce websites in e-alliance based on AHP and fuzzy TOPSIS. *Expert Syst. Appl.* **2011**, *38*, 3550–3557. [CrossRef]
70. Kabir, G.; Hasin, M.A.A. Comparative Analysis of TOPSIS and Fuzzy TOPSIS for the Evaluation of Travel Website Service Quality. *Int. J. Qual. Res.* **2012**, *6*, 169–185.
71. Kelemenis, A.; Askounis, D. A new TOPSIS-based multi-criteria approach to personnel selection. *Expert Syst. Appl.* **2010**, *37*, 4999–5008. [CrossRef]
72. Shekari, G.A.; Khayat Moghadam, S.; Hakimzadeh, A.; Salahshour, S.; Keifi, A.H. Ranking factors affecting the productivity of human resources using MADM techniques. *J. Soft Comput. Appl.* **2012**, *2012*, 9. [CrossRef]
73. Safari, H.; Cruz-Machado, V.; Zadeh Sarraf, A.; Maleki, M. Multidimensional personnel selection through combination of TOPSIS and Hungary assignment algorithm. *Manag. Prod. Eng. Rev.* **2014**, *5*, 42–50. [CrossRef]

74. Mammadova, M.H.; Jabrayilova, Z.G. Decision-making support in human resource management based on multi-objective optimization. *TWMS J. Pure Appl. Math* **2018**, *9*, 52–72.
75. Bilbao-Terol, A.; Arenas-Parra, M.; Cañal-Fernández, V.; Antomil-Ibias, J. Using TOPSIS for assessing the sustainability of government bond funds. *Omega* **2014**, *49*, 1–17. [CrossRef]
76. Ginting, G.; Fadlina, F.; Aan, M.; Rahim, R.; Siahaan, A.P.U. Technical Approach of TOPSIS in Decision Making. *Int. J. Recent Trends Eng. Res.* **2017**, *3*, 58–64. [CrossRef]
77. Trstenjak, B.; Kavran, A.K.; Bujan, I. Evaluation of Croatian Development Strategies Using SWOT Analyses with Fuzzy TOPSIS Method and K-Means Methods. *J. Econ. Bus. Manag.* **2015**, *3*, 687–693. [CrossRef]
78. Awasthi, A.; Chauhan, S.S.; Omrani, H.; Panahi, A. A hybrid approach based on SERVQUAL and fuzzy TOPSIS for evaluating transportation service quality. *Comput. Ind. Eng.* **2011**, *61*, 637–646. [CrossRef]
79. Krohling, R.A.; Campanharo, V.C. Fuzzy TOPSIS for group decision making: A case study for accidents with oil spill in the sea. *Expert Syst. Appl.* **2011**, *38*, 4190–4197. [CrossRef]
80. Lai, Y.J.; Liu, T.Y.; Hwang, C.L. TOPSIS for MODM. *Eur. J. Oper. Res.* **1994**, *76*, 486–500. [CrossRef]
81. Yeh, C.H. A Problem-based Selection of Multi-attribute Decision-making Methods. *Int. Trans. Oper. Res.* **2002**, *9*, 169–181. [CrossRef]
82. Trzaskalik, T. Wielokryterialne wspomaganie decyzji: Przegląd metod i zastosowań. *Zesz. Nauk. Politech. Śl. Organ. Zarz.* **2014**, *74*, 239–263.
83. Komlan, G. Integrating AHP-TOPSIS Approach on Prioritizing Self-Service Technology (SST) Decision Making in Financial Institution (TOGO). *Br. J. Math. Comput. Sci.* **2016**, *16*, 1–22. [CrossRef]
84. Szarafinska, M.; Fabisiak, L. Analiza porównawcza metod wielokryterialnych w ocenie audiencji serwisów internetowych. *Metod. Ilościowe Bad. Ekon. Szk. Główna Gospod. Wiej.* **2010**, *11*, 232–241.
85. García-Cascales, M.S.; Lamata, M.T. On rank reversal and TOPSIS method. *Math. Comput. Model.* **2012**, *56*, 123–132. [CrossRef]
86. Li, X.; Wang, K.; Liuz, L.; Xin, J.; Yang, H.; Gao, C. Application of the entropy weight and TOPSIS method in safety evaluation of coal mines. *Procedia Eng.* **2011**, *26*, 2085–2091. [CrossRef]
87. Wu, C.S.; Lin, C.T.; Lee, C. Optimal marketing strategy: A decision-making with ANP and TOPSIS. *Int. J. Prod. Econ.* **2010**, *127*, 190–196. [CrossRef]
88. Ezhilarasan, N.; Vijayalakshmi, C. Optimization of Fuzzy programming with TOPSIS Algorithm. *Procedia Comput. Sci.* **2020**, *172*, 473–479. [CrossRef]
89. Ban, A.I.; Ban, O.I.; Bogdan, V.; Sabau Popa, D.C.; Tuse, D. Performance evaluation model of Romanian manufacturing listed companies by fuzzy AHP and TOPSIS. *Technol. Econ. Dev. Econ.* **2020**, *26*, 808–836. [CrossRef]
90. Bąk, A. Zastosowanie metod wielowymiarowej analizy porównawczej do oceny stanu środowiska w województwie dolnośląskim. *Wiad. Stat.* **2018**, *63*, 7–20.
91. Luczak, A.; Just, M. The positional MEF-TOPSIS method for the assessment of complex economic phenomena in territorial units. *Stat. Transit.* **2020**, *21*, 157–172. [CrossRef]
92. Kopczuk, A. *Benchmarking Powiatów i Miast Powiatowych (Gmin Miejskich) w Województwie Podlaskim—Zróżnicowanie Przedsiębiorczości i Dynamiki Rozwoju Gospodarczego*; Urząd Marszałkowski Woj: Białystok, Poland, 2015.
93. Łuczak, A.; Wysocki, F. Zastosowanie uogólnionej miary odległości GDM oraz metody TOPSIS do oceny poziomu rozwoju społeczno-gospodarczego powiatów województwa wielkopolskiego. *Prz. Stat.* **2012**, *59*, 298–311.
94. Roszkowska, E.; Piotrowska, E. Analiza zróżnicowania województw Polski w aspekcie kształtowania się gospodarki opartej na wiedzy. In *W Kierunku Zrównoważonej Gospodarki Opartej na Wiedzy w Polsce*; Sochaczewski, P., Ed.; Wyższa Szkoła Ekonomiczna w Białymstoku: Białystok, Poland, 2011; pp. 12–51.
95. Ren, L.; Zhang, Y.; Wang, Y.; Sun, Z. Comparative analysis of a novel M-TOPSIS method and TOPSIS. *Appl. Math. Res. eXpress* **2007**, *2007*, abm005. [CrossRef]
96. Marti, L.; Puertas, R. European countries' vulnerability to COVID-19: Multicriteria decision-making techniques. *Econ. Res. Istraz.* **2021**. [CrossRef]
97. Ertman, A. Zróżnicowanie elastyczności rynków pracy w wybranych krajach europejskich oraz USA w świetle metody TOPSIS. *Oecon. Copernic.* **2011**, *3*, 43–64. [CrossRef]
98. Jadamus-Hacura, M.; Melich-Iwanek, K. Elastyczność współczesnych rynków pracy. *Stud. Ekon.* **2015**, *220*, 36–57.
99. OECD Glossary of Statistical Terms. EU15. Available online: https://stats.oecd.org/glossary/detail.asp?ID=6805 (accessed on 10 October 2021).
100. European Commission Eurostat. *New Techniques and Technologies for Statistics II. Proceedings of the Second Bonn Seminar*; IOS Press: Amsterdam, The Netherlands, 1997.
101. OECD Tax Wedge. Available online: https://data.oecd.org/tax/tax-wedge.htm (accessed on 12 October 2021).
102. OECD Trade Union. Available online: https://stats.oecd.org/ (accessed on 10 October 2021).
103. OECD Unemployment Rate. Available online: https://www.oecd-ilibrary.org/employment/unemployment-rate/indicator/english_997c8750-en (accessed on 9 October 2021).
104. OECD Temporary Employment. Available online: https://www.oecd-ilibrary.org/employment/temporary-employment/indicator/english_75589b8a-en (accessed on 10 October 2021).

105. OECD Part-Time Employment Rate. Available online: https://www.oecd-ilibrary.org/employment/part-time-employment-rate/indicator/english_f2ad596c-en (accessed on 10 October 2021).
106. OECD Employment Rate by Age Group. Available online: https://www.oecd-ilibrary.org/employment/employment-rate-by-age-group/indicator/english_084f32c7-en (accessed on 10 October 2021).
107. Siek, E. Elastyczność rynków pracy a bezrobocie w krajach Unii Europejskiej w okresie kryzysu. *Gospod. Prakt. Teor.* **2012**, *2*, 115–127.
108. European Commission Employment, Social Affairs & Inclusion. Available online: https://ec.europa.eu/social/home.jsp (accessed on 10 October 2021).
109. Yang, Z. Tax reform, fiscal decentralization, and regional economic growth: New evidence from China. *Econ. Model.* **2016**, *59*, 520–528. [CrossRef]
110. Poniatowicz, M. Determinanty autonomii dochodowej samorządu terytorialnego w Polsce. *Nauk. Finans.* **2015**, *1*, 11–30. [CrossRef]
111. Gonzalez, B. *Globalization: Economic, Political and Social Issues*; Nova Science Publishers, Inc.: New York, NY, USA, 2016; ISBN 1634854535.
112. Lall, S.; Narula, R. Foreign direct investment and its role in economic development: Do we need a new agenda? *Eur. J. Dev. Res.* **2004**, *16*, 447–464. [CrossRef]
113. Driffield, N.; Taylor, K. FDI and the labour market: A review of the evidence and policy implications. *Oxf. Rev. Econ. Policy* **2000**, *16*, 90–103. [CrossRef]
114. Almeida, F.; Santos, J.D. The effects of COVID-19 on job security and unemployment in Portugal. *Int. J. Sociol. Soc. Policy* **2020**, *40*, 995–1003. [CrossRef]