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Facultad de Ciencias Económicas y Empresariales

TRABAJO FIN DE GRADO EN
Programa Internacional en Administración y Dirección de Empresas

LABOR MARKET AND INDUSTRIAL RELATIONSHIPS AS DRIVERS OF INEQUALTIY: A STATISTICS ANALYSIS

Módulo:
Métodos Cuantitativos

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ABSTRACT

The purpose of this End-of-Degree Project is to study the Social Mobility and Inequality of a group of countries. The research aims to analyze the relationship between Social Mobility and Inequality and the labor market of a country. To do this, we summarize the information in a lower number of indicators (Principal Components Analysis) and study the conformation of homogeneous groups of countries (Cluster Analysis) in terms of Work Opportunities, Fair Wages and Working Conditions. Finally, we examine the level of relationship between belonging to one of these Clusters and a set of indicators of Social Mobility and Inequality (ANOVA Analysis).

The information is obtained from the data provided by the Global Social Mobility Report. In the paper it is concluded that there is a significant association between Social Mobility and Inequality and the Work Opportunities, Fair Wages and Working Conditions.

KEY WORDS

Social Mobility, Inequality, Work Opportunities, Fair Wages, Working Conditions, Principal Components Analysis, Cluster Analysis, ANOVA Analysis

RESUMEN

El presente Trabajo Fin de Grado tiene por objeto el estudio y análisis de la Movilidad Social y Desigualdad en un conjunto de países. El trabajo pretende estudiar la relación entre la Movilidad Social y Desigualdad con el mercado laboral de un país. Para ello, se sintetiza la información en un menor número de indicadores (Análisis Compuestos Principales) y se estudia la conformación de grupos homogéneos de países (Análisis Clúster) en cuanto a las Oportunidades de Trabajo, la Remuneración y las Condiciones de Trabajo. Finalmente, se examina el nivel de relación entre pertenecer a uno de estos Clústeres y un conjunto de indicadores de Movilidad Social y Desigualdad (Análisis ANOVA).

La información se obtiene a partir de los datos proporcionados por el Informe de Movilidad Social Global. En el trabajo se concluye que existe una asociación significativa entre la Movilidad Social y Desigualdad y las Oportunidades de Trabajo, la Remuneración y las Condiciones de Trabajo.

PALABRAS CLAVE

Movilidad Social, Desigualdad, Oportunidades de Trabajo, Remuneración, Condiciones de Trabajo, Análisis de Componentes Principales, Análisis Clúster, Análisis ANOVA.

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1. PRESENTATION AND OBJECTIVES OF THE STUDY

Inequality has been one of the multiple issues that have accompanied society throughout history, as humans progressed the differences settled among them have changed but have never been eradicated. For the last centuries, the world has experienced an unprecedented explosion of innovation and development. Because of globalization and the Fourth Industrial Revolution, society has experienced great benefits. However, inequality has been exacerbated in our societies. Nowadays, the social and economic consequences of inequality are profound and significant: a growing sense of unfairness, precarity, perceived loss of identity and dignity, weakening social unity, diminishing trust in institutions and disappointment with political processes. Consequently, the answer must include a collaborative effort to create new pathways to socioeconomic mobility, ensuring everyone has fair opportunities for success.

The Global Social Mobility Report was published for the first time in 2020 by the Global Economic Forum[1] and has been created to help policymakers, business leaders and other participants to structure their socio-economic strategies in the age of the Fourth Industrial Revolution. The report has become a reality thanks to the collaboration of several organizations including Hass Institute for a Fair and Inclusive Society, Institute for Health Metrics and Evolution, International Labour Organization, International Telecommunications Union, OECD, Transparency International, UNDP, UNESCO, and the World Bank. All these organizations have worked to collect data to further source the World Economic Forum with the indicators that compose the report. In addition to these especially remarkable institutions, the forum counts with the partnership of 85 other organizations and business.

To fully understand the importance of such report it is necessary to be aware of the concept of social mobility. As a broad definition, it could be stated that social mobility is the extent to which everyone in society has a fair chance to fulfill their potential, regardless of their socio-economic background, the origin of their parents, or the place where they were born. Therefore, it can be understood in relative or in absolute terms between generations and it can be measured about a wide range of outcomes such as health or educational achievement as well as income levels.

[1] The World Economic Forum was established in 1971 as a not-for profit foundation by Klaus Schwab and according to its mission, it is independent, impartial, and not tied to any special interests.

The report is structured in two different parts. The first one reviews the concepts used to create the Global Social Mobility Index and defines the methods applied to calculate it. This section also includes the 2020 rankings, overall trends, and commentaries for selected countries. Finally, an in-focus segment provides a big data-driven exploration of wages across several industries and job categories in the United States as well as a key component of Social Mobility, the extent of professional networks. The second part of the report contains the Economy Profiles, providing a more detailed image of the strengths and weaknesses of each country's performance. It is extremely relevant to consider that this report analyzes the situation of 82 selected countries worldwide.

The Global Social Mobility Index is determined from the information provided by 10 pillars:

1. Health
2. Education Access
3. Education Quality and Equity
4. Lifelong Learning
5. Technology access
6. Work opportunities
7. Fair wages
8. Working conditions
9. Social Protection
10. Inclusive institutions

After studying the performance of the 82 countries included in the study over the 10 pillars the Global Social Mobility Index displays several findings. Being the most remarkable the direct and linear relationship existing between a country's income Inequality and its Social Mobility score on the index. Consequently, lower Social Mobility is stimulated by historical inequalities and higher income inequalities. This vicious cycle could be turned into a virtuous one by enhancing Social Mobility, what would further benefit economic growth. As it could be expected, economies with larger Social Mobility offer more equal opportunities regardless of socio-economic background, geographic location, gender, or origin. Our main interest is on analyzing the Work Opportunities, Fair Wages and Working Conditions, corresponding to the pillars 6,7 and 8, respectively.

Based on the information provided by the Global Social Mobility Report, the main objective of this research is to deeply analyze the extent to which the variables related

to the labor market and industrial relations are determinant in Social Mobility and Inequality. For that, a four-step study is carried out:

1. Description of variables' regarding the opportunities and conditions of the labor market.
2. Simplification of the information provided by the above-mentioned variables through a Principal Components Analysis.
3. Creation of groups or clusters of countries showing similarities regarding the factors described in the previous stage.
4. Dependency study concerning the Social Mobility and Inequality variables similarities among clusters.

After this introduction, the study is structured to start with the database and methodology, which are extensively described to facilitate a full comprehension of the following interpretations and results. The third part includes an explanation of the multivariant approaches being employed in the research. Finally, the results obtained are exposed and the final conclusions end the report.

2. DATABASE AND METHODOLOGY

2.1 Data source

In this section of the paper, we will proceed to clarify the database and methodology being used throughout the study. The obtaining of all the data necessary for the analysis will be described as well as the decisions being taken regarding the information. The section will finish with a description of the variables that will be employed in the research.

As it has been mentioned before in the document, the report from which we will obtain the data is the Global Social Mobility Report 2020, published by the World Economic Forum. Since in the previous section it has already been explained the structure and main objective of this report, we will not be repeating the same information again. However, it is important to keep in mind the relevance of this report to understand Inequality and society nowadays.

The report includes 10 pillars of which it analyzes several indicators for each country. Nonetheless, due to the complexity and length of realizing an examination of all the pillars, we will be focused on three of them for now on. More specifically, this study is dedicated to understanding the impact of the work opportunities and conditions impact on Social Mobility and Inequality. For that, the three pillars related to the labor market will be the ones analyzed, which are: Work Opportunities, Fair Wages and Working Conditions.

The first pillar, related to Work Opportunities involves a total of six different variables, which will be further explained at the end of this section. In general, most of the variables included in this pillar are related to unemployment. However, a couple of them are more related to other issues such as female participation and vulnerable employment. It could be said that mostly this pillar describes the chances of people to get a decent job in a country.

The other two pillars are concerned about the conditions of that work the employee has been hired for. The Fair Wages pillar includes five indicators, all of them relate to employees' salaries. More specifically, several of them study the inequalities and differences in income between the wealthy and the impoverished in the country. This pillar is directly connected to the economic inequalities taking place in every nation nowadays and it is consequently essential for our analysis on Social Mobility.

The last pillar, Working Conditions, is focused on the fairness and the rights of the worker being respected. It also includes five variables that represent different characteristics related to the compliance of the individual's rights as a person who works. While some of these indicators have a more collective emphasis, other are focused on the conditions of each individual and their recognition inside the company.

Once the pillars included in the study have been clarified, it is necessary to decide which countries will be examined. To be able to include a variety of territories that showed different cultures, historical backgrounds, and development level, it has finally been decided to include the Organization for Economic Co-operation and Development (OECD) countries. This is an international group that works to shape policies that foster prosperity, equality, opportunity, and well-being for all.

The OECD members sum up to being 37 at the moment and are the following: Australia, Austria, Belgium, Canada, Chile, Colombia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom (UK) and the United States of America(USA). In addition, and to expand the number of countries being studied, several nations have been included in the analysis due to their relationship with the OECD. An example of this is Costa Rica, which is now a candidate for access to the organization. Moreover, the group counts with key partners that will also be included in the investigation. These are: Brazil, China, and Indonesia. Finally, Russia holds the status of

associate member and will be included as well as two countries that are sometimes included in the decisions and committees of the organization: Argentina, and Saudi Arabia.

In total, 44 countries were included in the study at the beginning. However, due to several reasons one state has been taken out of the analysis: Greece. The main motive why this country has been removed is the lack of data relevant to the study. As it has previously been study, three pillars of the report are being considered and Greece does not have the data for all the indicators included in these pillars and will make the analysis less accurate. Consequently, the investigation will be carried out including a total of 43 countries located all around the world.

2.2 Indicator's description

As it has previously been explained, the indicators considered in this analysis have been taken from three of the pillars contained in the Global Social Mobility Report. In addition, the Gross Domestic Product per capita, the Gini Index and the Global Social Mobility Index are being included as measures related with Inequality. Regarding the indicators coming from the three different pillars is of vital importance to consider that the data being study is that of the score computed by the World Economic Forum. This score can be as low as 0 and reach a maximum of 100, being this last one the best position. Using the already mentioned score has been exceptionally helpful as it guarantees all indicators to be measured in the same manner.

2.2.1 Work Opportunities Pillar

- Unemployment among labor force with basic education: considering basic education as that including primary or lower secondary education, this indicator represents the percentage of unemployed people in the labor force with a basic level of education. After computing the analysis, the country with the highest unemployment rate among labor force with basic education is the Slovak Republic, which score is considered zero. Meanwhile, the one with the lowest rate is Saudi Arabia with a total of 95.3.
- Unemployment among labor force with intermediate education: fraction of people with an intermediate level of education in the labor force who are unemployed. Intermediate education consists of upper secondary or post-secondary education. Having a mark of 38.1, Spain is in the third worst position. This is not a big surprise considering Spain's high rates of unemployment. The shocking difference is with our neighbour Portugal, which holds the highest position with a score of 97.1.

- Unemployment among labor force with advanced education: short-cycle tertiary education, a bachelor's degree, a master's degree or doctoral degree or equivalents education levels form the advanced education. The proportion of people in the labor force with an advanced level of education who are unemployed is measured by this indicator. One can clearly perceive the global difference between this indicator and the two previous ones as the minimum score in this case is held by Costa Rica with a minimum of 49.2. Therefore, high-level education is proved to guarantee fewer risks of unemployment, in general.
- Unemployment in rural areas: out of the total labor force in rural areas, the number of persons who are unemployed. Among the countries being studied, Mexico holds an astonishing position with a score of 91.9. The considerable difference between the mean and median (74.8514 and 81.4, respectively), leads to the conclusion that there are quite extreme values altering the mean.
- Ratio of female to male labor force participation rate: female labor force participation to that of male participation rate. Saudi Arabia has the lowest score in this indicator (11.9), this is quite expectable considering the massive effect religion has in this country, being an Islamic monarchy. Despite of the vast disparity, even Sweden and Norway being the ones with the highest scores (88.2) reach a low score contrasted to other indicators.
- Workers in vulnerable employment: as a percentage of total employment, this statistic measures the amount of contributing family workers or own-account workers. In this statistic, Saudi Arabia changes its position radically, reaching the top position with a punctuation of 95.1.

2.2.2 Fair Wages Distribution Pillar

- Low pay incidence: proportion of workers earning less than two-thirds of gross median earnings of a full-time worker. Scoring 52.3, Spain holds the twentieth position in this statistic, which could be considered close to the mean (51.5381). Turkey owns the first position scoring 97.8, which translate to a percentage of only 0.8% of its employees.
- Ratio of bottom 40% to top 10% labor income share: ratio in between the labor income share of the decile (1-4) to the top 10th decile. This statistic involves all possible scores as it reaches from the minimum of 6.1 by Indonesia to the maximum of 100 by the Slovak Republic. Consequently, it is no revelation that the median is so close to 50, scoring 51.05.

- Ratio of bottom 50% to top 50% labor income share: stake in between the labor income share of the decile (1-5) to the top 5 deciles (5-10). Due to the resemblance between this and the indicator above, having the same states scoring the lowest and the highest amounts is not a shock. Although Indonesia maintains its low score (5.4), the Slovak Republic decreases to 91.7. Contrary to the median, which has increased to 52.15.
- Mean income of bottom 40%: mean consumption of bottom 40% as a percentage of national mean consumption. It is to highlight the score of the percentile 25, being owned by China with 50.2. This means that only 25% of the nations are below that mark. Consequently, both the mean and the median have increased being both over 62. Despite the logic behind all these, the country with the bare minimum, Brazil in this case, keeps a score of 10.8.
- Adjusted labor income share: including self-employed workers and contributing family workers, labor portion of income as a percentage of GDP. Spain holds one of its best positions in this indicator being in the sixth place with a score of 80.4. There is nonetheless a considerable disparity with the top place, held by Switzerland with a total of 100. Differently to the ones above, in this statistic, the bottom position has a score of 14.4, maintained by Saudi Arabia.

2.2.3 Working Conditions Pillar

- Workers' Rights Index: adapted from the International Trade Union Confederation (ITUC) Global Rights Index, this indicator measures the level of protection of internationally recognized core employment standards. The most remarkable fact about this measure is high score of the twenty-fifth percentile, being 70, meaning that 75% of the nations have a record higher than 70. Another point that should be highlighted is the significant disparity between the mean and the median being 79.0930 and 86, respectively. Once again, very extreme data distort the mean, distancing it from the median.
- Cooperation in labor-employer relations: obtained from the results between "generally confrontational" to "generally cooperative" to the survey question "In your country, how do you characterize labor-employed relations?". Taken by Korea, the bare minimum makes it to a total of 43.2. Hence, having outcomes closer to "generally cooperative" labor-employed relations in most territories. However, these values do not achieve extraordinary findings as the upper limit merely reaches a total score of 85.2, by Switzerland.

- Pay and productivity: measures the meritocracy at work with the responses to the survey question "In your country, to what extent is pay related to employee productivity?". The answers were ranked from "not at all" to "to a great extent". The most noteworthy point of this indicator is its low maximum, as it is reached by Switzerland with a score of 74.6, relatively small comparing to other statistics. However, the percentile 75 gets to a total of 62.25, therefore having only 25% of the countries over that extent. Spain holds the spot thirty-eight with a score of 44.3.
- Employees working more than 48 hours per week: based on national workforce surveys, portion of employees working more than 48 hours per week in full-time and part time contracts. Lithuania owns the top place with a score of 97.3, meaning that it is the nation with less workers working more than 48 hours per week. Being one of its best positions in the whole analysis, Spain scores 91.4 maintaining the position number 10. In general, it can be stated that most countries have a reasonably high score implying that in most states the number of employees working more than the maximum declared by the International Labour Organization (ILO) remains fairly at a low level.
- Collective bargaining coverage ratio: as a percentage of the total number of employees, this indicator considers the number of employees whose pay and/or conditions of employment are determined by one or more collective agreements. The mean (45.9034) and the median (31.45) keep a considerable gap among them. Therefore, it can be concluded that this is another indicator with substantial extreme values. The leading position is taken by France with a mark of 98.5, while Spain reaches the seventh position, achieving 83.6.

2.2.4 GDPpc and Inequality Indicators

The following indicators have been included in the study for different reasons. Firstly, the Gross Domestic Product per capita (GDPpc) aims to provide supplementary information about the general situation on each country in the study. This indicator will be used to form more accurate conclusions in the report. The Gini Index is an indicator of inequality independent from the Global Social Mobility Report and consequently brings more objectivity to the study. Finally, the Global Social Mobility Index is created based on the data used in the Global Social Mobility Report and therefore can be seen as an indicator of the overall Social Mobility and Inequality in each country.

A bad redistribution of the wealth, namely Economic Inequality, triggers a decrease in the GDPpc. Some studies show that a low Social Mobility has a negative impact on Inequality

by increasing it and consequently causing a decrease of the wealth. Therefore, low levels of equality may amplify the negative impact of Income Inequalities on Economic Growth. Figure 1 represents the relationship between these factors. (Aiyar & Ebeke, 2019)

Figure 1: impact of low Social Mobility on Economic Growth through Economic Inequality

Source: Author's own elaboration

- Gross Domestic Product per capita (GDPpc): stands for the Gross Domestic Product per person in one nation. It is obtained by computing a straightforward division of the total GDP by the population. Due to the great disparities among the countries being studied, the bottom and the top position are vastly far away from each other. Indonesia holds the lowest amount with $3870.6, while Luxembourg has the highest one with $114234.2. It is of vital relevance to consider the population of each country regarding this measure as it might explain part of the motivation why both territories have such a gigantic gap in their GDPpc. Spain reaches the twenty-second place with a GDPpc of $30697.3.
- Gini Index (GINI): the magnitude to which the allocation of income among individuals within an economy diverges from a perfectly equal distribution is measured by this indicator. A Gini Index of zero symbolizes perfect equality, and 100, perfect inequality. Therefore, being assessed the inverse way statistics included in the pillars are scored. Between percentiles 25 and 75, 50% of the countries have a score between 30.425 and 38.4750, symbolizing that most states have a remarkably similar outcome in this category. The most disturbing nation is Brazil carrying a mark of 53.3. Regarding the Gini Index, Spain occupies a lower spot than in the previous indicator, reaching the position fourteen with a score of 36.2, close to the mean (35.5773).
- Global Social Mobility Index (GSMI): a country's ability to foster Social Mobility across its population. This indicator measures the extent to which fundamental elements of equality of opportunity are in place regardless of socio-economic background, gender, origin, and other factors. The highest the score in the Global Social Mobility Index, the greater creation of equally shared opportunities in that territory. All countries included in the study have a punctuation above 45 points,

being the highest Denmark with 85.2. Denmark is as well the top country in the Global Social Mobility 2020 Report. Regarding Spain's position, it has a score of 70, which is quite close to the average (70,5698). Consequently, it could be stated that although slightly below the mean, Spain is in a decent position in the Global Social Mobility Index.

3. MULTIVARIANT ANALYSIS

In addition to the variables' descriptive analysis, several statistic multivariant techniques are going to be used. The procedures will be explained below, and the process followed is the next one:

1. Principal Components Analysis to create new indicators and summarize the information.
2. Cluster Analysis to form homogeneous groups.
3. Variance Analysis (ANOVA) to study the dependency among clusters.

3.1 Principal Components Analysis

As mentioned before, the first multivariant technique being applied in the study is the Principal Components Analysis. The intention with this is to summarize the information included in the evaluation. The results obtained in this analysis will be used for the rest of the examination to facilitate the completion and comprehension of the following methods included.

3.1.1Principal Components Methodology

The Principal Components Analysis is an interdependence technique. Its main objective is to simplify the information available. In addition, it can sometimes extract latent information hidden between the variables.

It consists of constructing new variables from the original ones in such a way that the most essential information is kept while reducing the number of variables. The new variables created are known as components. It is of vital relevance to keep in mind that these factors are lineal combinations of information without measurement units. For this approach, the variables have been standardized and all the resulting factors are independent among them. Therefore, obtaining a high punctuation in one factor does not imply having a specific punctuation in another one.

The requirements for this approach are for the variables to be quantitative and for them to have a normal distribution approximately. In addition, it is indispensable for the variables to have a minimum structure of correlation among them. This technique is based on the

variance and the correlation of the standardized original variables. As it takes the main components to form the new factors, the information is now described in a summarized and simplified way.

Throughout the process, there is information that is going to be left out of the new factors created and consequently, of our study. The communality measures the amount of information being maintained from the original variables. A trade-off takes place here as the analyst must decide the amount of information to keep in the factors being created. The more information been kept, the more reliable are the factors. However, this distances the analysis from the main goal of reducing the information being used in the study.

In our case, we have 16 variables related to Work Opportunities, Fair Wages and Working Conditions. Before studying their potential dependence with the Social Mobility and Inequality variables, we are going to reduce the number of variables by building new factors or principal components. For that, the technique of Principal Components is going to be used separately to the set of Work Opportunities, the Fair Wages set, and the Working Conditions set.

3.1.2 Principal Components Analysis: Procedure and Results

One basic requirement to perform the of the Principal Components Analysis is the Bartlett's sphericity test. This test states in the null hypothesis that the variables are independent. Consequently, we are interested in being able to reject it so that the technique can be continued, and the information can be summarized in a lower number of components. To be able to reject the Bartlett's test, at a significance level of 5% .

In all the pillars' table can be observed that the p-value is lower than the 5% of significance level necessary to reject the null hypothesis. Consequently, it is stated that the variables are not independent of each other and that there is correlation among them. The following tables show the already mentioned correlation by pillar as well as the result of the Bartlett tests.

Tables 1,2,3: Correlations of the different variables inside each pilar

Correlations Pilar Work Opportunities

	Unempl. basic education laborers	Unempl. medium education	Unempl. advanced education	Unempl. rural areas	Ratio female/male participation	Workers in vulnerable empl.
Unempl. basic education laborers	1	,391	-,059	,549	-,370	-,316
Unempl. medium education laborers	,391	1	,583	,723	,289	,339
Unempl. advanced education laborers	-,059	,583	1	,590	,632	,411
Unempl. rural areas	,549	,723	,590	1	,318	,092
Ratio female/male participation	-,370	,289	,632	,318	1	,373
Workers in vulnerable empl.	-,316	,339	,411	,092	,373	1

Bartlett's test significance level = 0.000

Correlations Pillar Fair Wages

	Low pay incidence	Ratio bottom 40% top 10% income share	Ratio bottom 50% top 50% income share	Mean income bottom 40%	Adjusted labor income share
Low pay incidence	1	,226	,247	,209	,192
Ratio bottom 40% top 10% income share	,226	1	,985	,778	,160
Ratio bottom 50% top 50% income share	,247	,985	1	,759	,187
Mean income bottom 40%	,209	,778	,759	1	,251
Adjusted labor income share	,192	,160	,187	,251	1

Bartlett's test significance level = 0.000

Correlations Pillar Working Conditions

	Workers' Rights Index	Cooperation labor-employer	Pay and productivity	Employees working +48h./week	Collective bargaining coverage ratio
Workers' Rights Index	1	,330	,076	,488	,265
Cooperation labor-employer	,330	1	,682	,209	,134
Pay and productivity	,076	,682	1	,123	-,016
Employees working +48h./week	,488	,209	,123	1	,428
Collective bargaining coverage ratio	,265	,134	-,016	,428	1

Bartlett's test significance level = 0.000

Source: Author's own creation

With the aim of simplifying the information and removing potential latent variables we carry out the technique of principal components in each of the analyzed pillars. Consequently, we obtain the results that will be further explained below.

To understand the components obtained from the variables, we need to analyze the matrix of components. Tables 4,5 and 6 show the coefficients of correlation of all the variables included in the study, separated by pillars.

Starting with the pilar related to Work Opportunities, two factors are extracted from the 6-original variables, including 77% of the initial information. The variables with higher coefficients in the first component are the *unemployment among labor force with basic education*, *unemployment among labor force with intermediate education* and *unemployment in rural areas*. Considering this, the first component could be denominated as **"unemployment level"**. On the other hand, the variables with higher coefficients in the second components are the *unemployment among labor force with advanced education*, *ratio of female to male labor force participation rate* and *workers in vulnerable employment*. Although the variable unemployment among labor force with advanced education might seem to be more related to the first component, it obtains a greater coefficient in the second one, which will be named as **"inclusive employment"**. This decision is made due to the two other variables included in the

component that are related to the inclusion of females in the workforce and the number of self-employees.

Table 4: Component matrix

Rotated component matrix

	Component	
	1	2
Unempl. basic education laborers	,738	-,599
Unempl. intermediate education laborers	,835	,310
Unempl. advanced education laborers	,530	,718
Unempl. rural areas	,924	,162
Ratio female/male participation	,144	,832
Workers in vulnerable employment	,034	,733

Source: Author's own creation

From the Fair Wages pillar two components are extracted from the 5 original variables, keeping 77% of the information. In this case, there are three variables clearly highlighted in the first component. As the three of them are related to the comparison of income share the component will be named **"salary inequality"** henceforth. On the other hand, the two variables left are the ones obtaining higher coefficients in the second component. These variables are *low pay incidence* and *adjusted labor income share*. Therefore, the second component of the Fair Wages pillar will be defined as **"salary impact on wealth"**.

Table 5: component matrix

Rotated component matrix

	Component	
	1	2
Low pay incidence	,150	,722
Ratio bottom 40% top 10% income share	,974	,100
Ratio bottom 50% top 50% income share	,963	,132
Mean income bottom 40%	,865	,191
Adjusted labor income share	,079	,801

Source: Author's own creation

Finally, the Working Conditions pillar will keep a lower amount of the original information compared to the previous ones, maintaining 70% of it. This pillar was originally formed by 5 variables of which two components have been extracted. Three variables will form the first component: *worker's rights index*, *employees working more than 48 hours per week* and *collective bargaining coverage ratio*. As all these variables represent values concerning the general situation of workers, the component is denominated **"collective workers' rights"**. The two variables

left will form the second component, being both more focused on the individual conditions. Consequently, the second component will be formed by the *cooperation in labor-employer relations* and the *pay and productivity variables*, and it will be named **"labor incentives"**.

Table 6: Component matrix

Rotated component matrix

	Component	
	1	2
Workers' Rights Index	,732	,204
Cooperation labor-employer	,216	,894
Pay and productivity	-,035	,921
Employees working +48h./week	,828	,112
Collective bargaining coverage ratio	,739	-,073

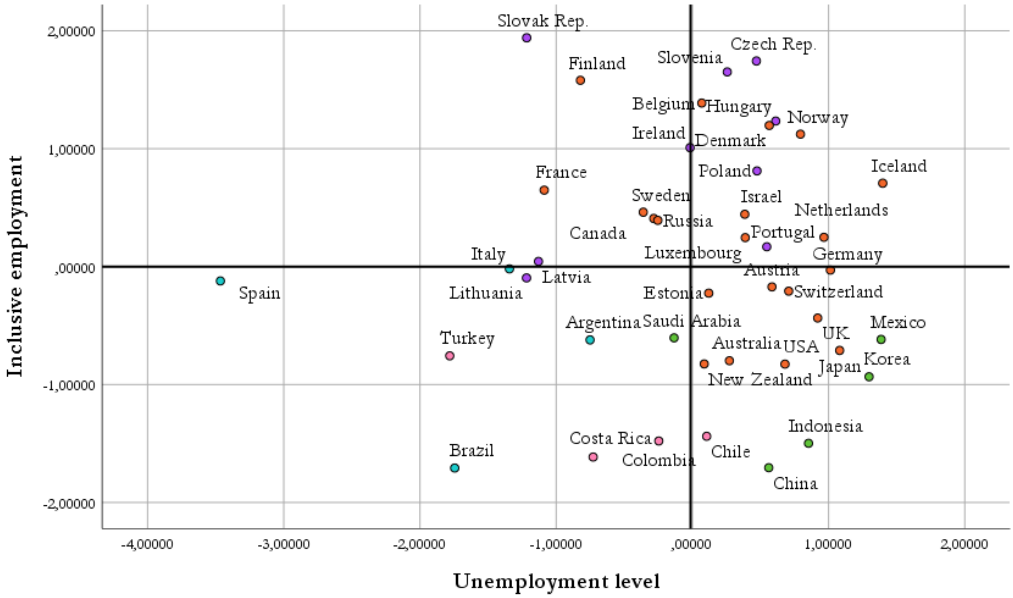
Source: Author's own creation

At this point it is important to remember that all the original variables are measured in scales from 0 to 100, being the best position to obtain a value of 100. Consequently, a high punctuation in the unemployment level means a low unemployment level in that country.

Once the components have been defined and named, it is possible to analyze each of them in detail. Although there are now a total of 6 components collecting the data, the components are going to be studied by pairs, according to the pillar each of them belongs to. The following graphs show the position of each country regarding each of the components being included in the representation.

As it can be seen the horizontal axis of graph 1 includes the first and more relevant component, the unemployment level. All the countries situated in the right side of the average line have less unemployment and are situated above the average in this issue. The vertical axis includes the inclusive employment, meaning that all the countries above the line have a considerable diversity in their labor forces. In this graph, it is effortless to find Spain's position as it is completely separated from any other nation. Despite having a substantially positive inclusive employment, Spain is by far the country with highest unemployment level and consequently it is situated the closest to the left. Although almost all the European countries are situated above the line in the inclusive employment, there is more disparity regarding the unemployment level as several nations are under the average, however much closer to the line than Spain. This means that even though some European countries do have high levels of unemployment as well, none of them have such an elevated amount as Spain.

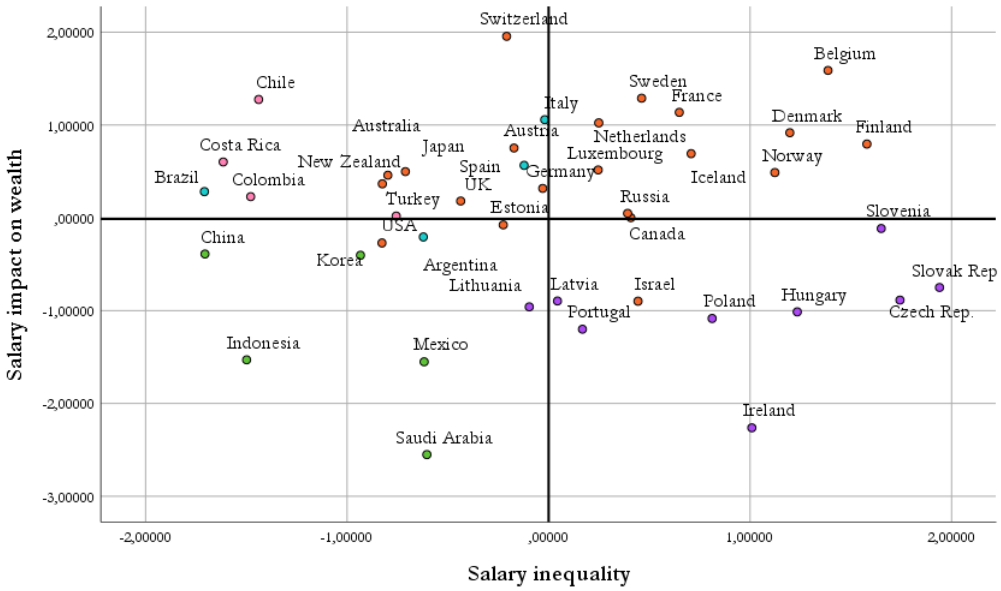
Graph 1: punctuations in the components, by country



Source: Author's own creation

The next pillar included in our study, Fair Wages, is formed by two components. These are the salary inequality and the impact of wages on wealth. Both are represented in the graph below, including the position of each country being study regarding these factors.

Graph 2: punctuations in the components, by country



Source: Author's own creation

In this case, the horizontal axis represents the salary inequality while the vertical axis shows the salary impact on wealth. Concerning the salary inequality, the higher the punctuation a country obtains in this indicator, the less inequality there is in the salaries of that country. Therefore, it could be stated that all the countries located at the right side of the average line have incredibly low salary inequality. On the other side, the salary impact on wealth

represents the amount of economic benefit the employees obtain from the profits obtained in the company. A low punctuation in this case means the company's profits are not allocated among the workers but are taken by the owners or shareholders.

Spain's position is a much better one regarding these components, being close to the average line in both cases. However, our country is in the left side of the salary inequality meaning that there is inequality even though it is not much. Spain has a positive value in the salary impact on wealth meaning that the economic benefits are more shared between the workers and the shareholders in the company.[2]

Some of the countries with good positions in the first graph have now a negative position in salary inequality or in salary impact on wealth. There is no better example for this than the United States of America (USA). This nation has a low unemployment level and a great inclusive employment, holding a quite decent position in the first graph. However, it is in the second graph that we can observe how this nation has negative values in both the salary inequality and the impact of salary on wealth.

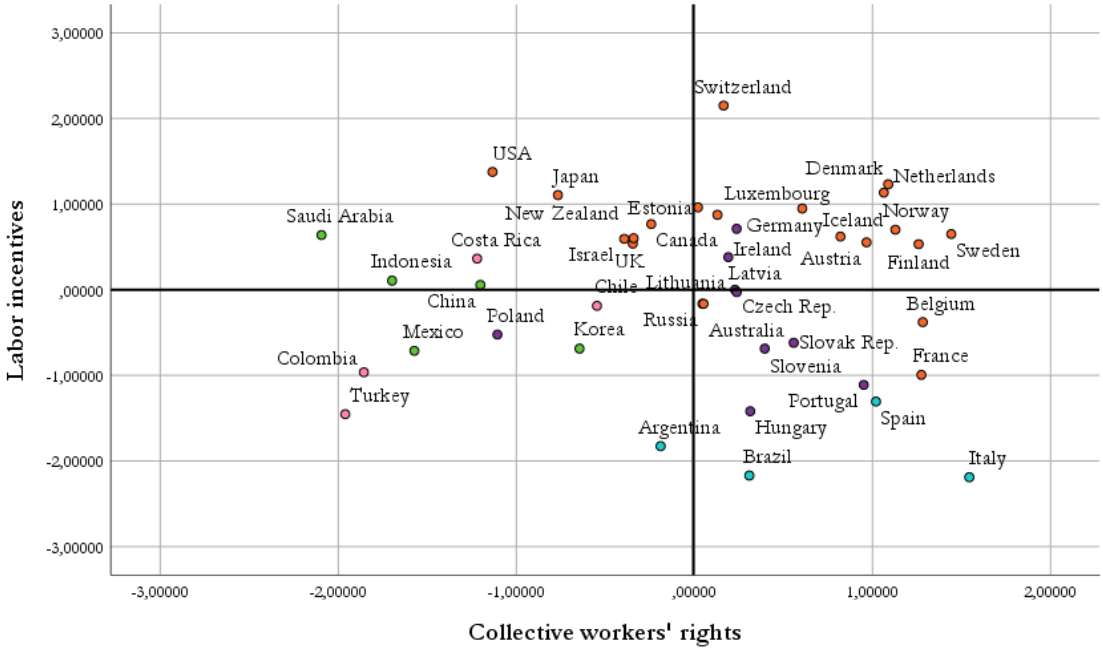
Finally, the last pillar, working conditions was compounded of 5 variables too and there are now two factors saving 70% of the information previously included. Collective workers' rights and labor incentives are the two components extracted from these variables. As in the previous pillars, the components extracted have been represented in graph 3.

The collective workers' rights component is now the one represented in the horizontal axis and the labor incentives is embodied in the vertical axis. Regarding the first indicator, the higher the punctuation means employees hold more rights in that country. The second component is focused on the labor incentives that is made to the worker according to their productivity.

In this graph, Spain has one of the best positions on the horizontal axis, therefore its collective workers' rights are elevated. However, it has a noticeably low position in the labor incentives, being fairly below the average.

[2] Compared with the graph including the factors related to the work opportunities pillar, it seems like there is a higher disparity among territories. Because Spain had such a low value in the unemployment level, the other countries seem to be closer to each other than in this second graph. Looking at the values in both graphs, most territories have values between minus two and two in the both the horizontal and the vertical axes.

Graph 3: punctuations in the components, by country



Source: Author's own elaboration

There are only a few countries that punctuate positive in all the six factors that have been represented in the graphs. Analyzing it in more depth, it can be concluded that these countries are all situated in the North of Europe, countries that are publicly known for being the most developed in the world. Some of these nations are Norway, Denmark, Iceland, and the Netherlands, even though this last one is not considered part of the Nordic Countries. On the opposite side, some countries obtain bad punctuations in all the factors. The best example of this is Argentina, which punctuates negative in the six factors. Other countries in a similar position are Colombia and Turkey, which punctuate negative in five of the six factors with the only exception of the salary impact on wealth, being still quite close to the average.

In a general analysis, Spain could be included among the countries that are neither the best ones nor the worst ones. Being below the average in two of the six factors being studied, the only one in which it is clearly over the mean is in the collective workers' rights. Regarding the other three factors included in the analysis, Spain is quite close to the average, being slightly above in the salary impact on wealth. Therefore, despite its geographical proximity to other European countries, considered the best ones in the study, Spain is moderately weaker regarding Work Opportunities, Fair Wages and Working Conditions.

3.2 Cluster Analysis

After having reduced the amount of information being included in the variables by the formation of the components, it is now the moment to study the countries included in the analysis. The Cluster technique allows us to form groups according to the similarities of the states concerning the components obtained from the previous method. These similarities might not always be the ones we would expect at first, consequently being the cluster analysis a quite interesting procedure.

3.2.1 Cluster Analysis Methodology

The Cluster Analysis is an interdependence technique with the aim of creating groups (clusters) depending on their resemblance. The similar observations are collected in the same group (internal homogeneity) and at the same time, the groups differ from one another (heterogeneity among groups).

The approach follows a hierarchical process in which the groups are formed in successive stages according to their similarities. This process continues until a single group is formed or until the analyst decides to stop the formation of clusters.

However, the first decision the researcher must take is regarding the similarity measurement to be used. The Euclidean distance, the squared Euclidean distance and the Block distance are the most common measurements. Once this is settled, the matrix of observations distances is formed. The most similar observations here are the first ones to start creating the first cluster.

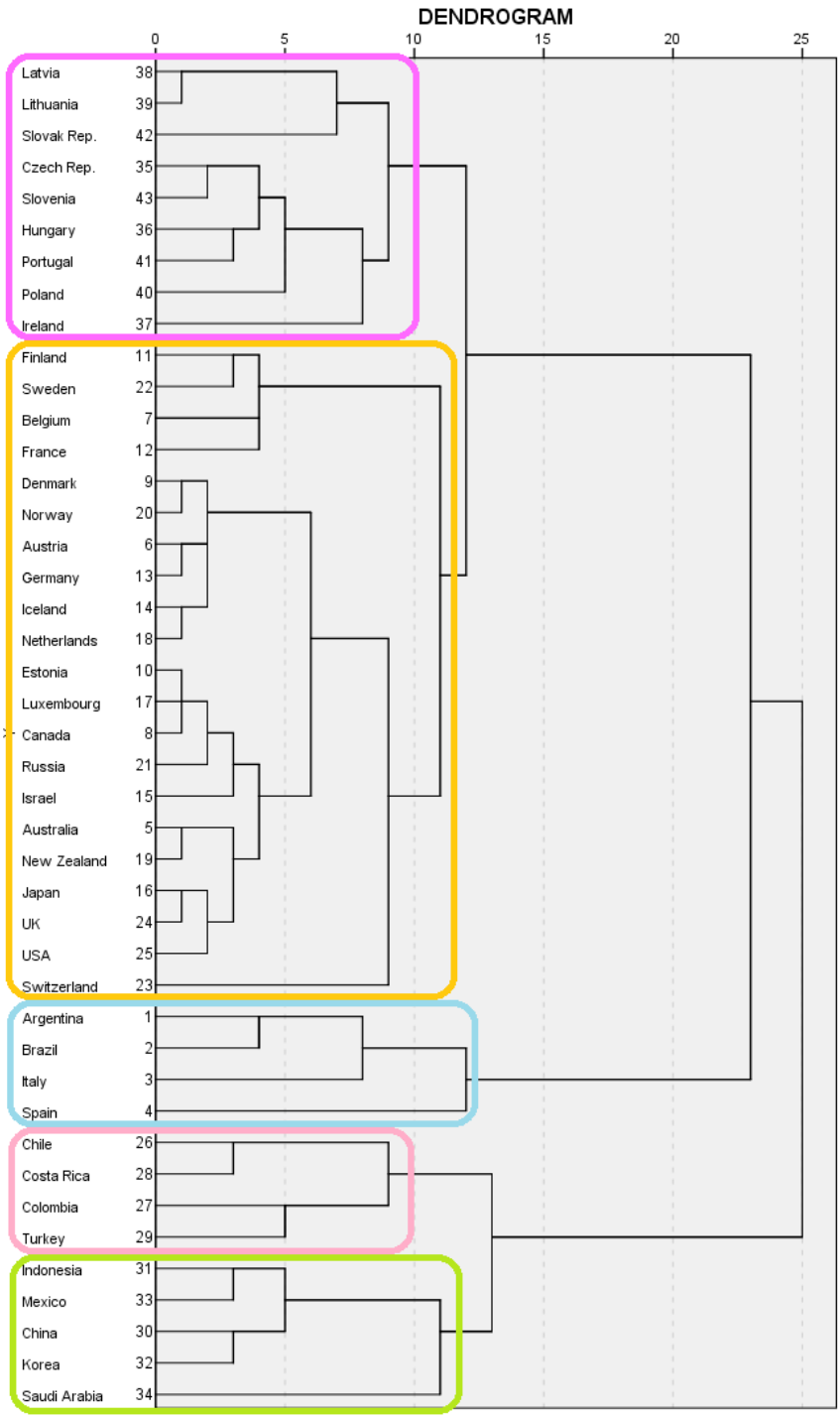
The next decision to be made is regarding the distance between clusters measurement to be used. The most popular ones are the linkage with the closest neighbor, the linkage with the furthest neighbor and the linkage between-groups. After this is decided, a new matrix is formed and once again the closest observations are joined together, forming different groups or clusters. The linkage chosen must be maintained during the whole process and once it is settled, the process is continually repeated until the amount of clusters desirable is formed. Therefore, it is necessary to decide in which moment is the process going to be stopped, this is, how many Clusters are we going to remain. Finally, the chosen solution must be validated. For that, a simulation modifying the distance or linkage is carried out. If the solution obtained is like the original one, we can state that it is robust, and it is validated.

3.2.2 Cluster Analysis: Procedure and Results

To perform the creation of the groups according to their Work Opportunities, Fair Wages and Working Conditions, it is necessary to take several decisions, considering the results will

depend on those resolutions. As it has been previously explained, the original 16 variables have been summarized in 6 factors, which would be the ones forming the Clusters. Standardizing these factors is essential to avoid weight differences in the analysis.

Figure 2: Dendrogram of the countries forming the 5 clusters of the study



Source: Author's own elaboration

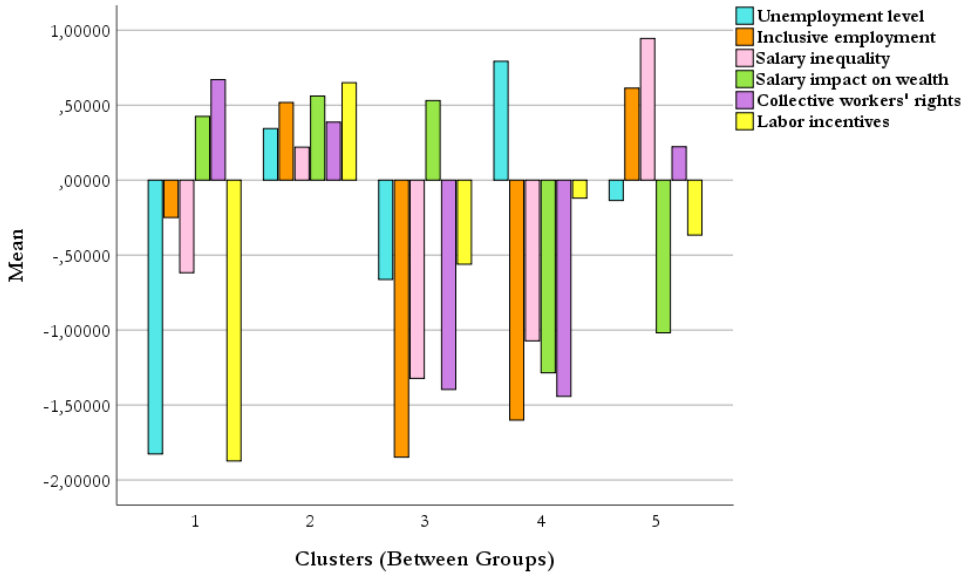
Two of the main decisions to take are regarding the distance and the correlation between the countries included in the study. In this case, the squared Euclidean distance and the between groups linkage methods have been used, respectively. Finally, according to the results and the dendrogram, the

number of clusters is decided. After analyzing the results and the dendrogram, the number of clusters has been limited to 5 different groups of countries according to their Work Opportunities, Fair Wages and Working Conditions. Figure 2 includes the dendrogram showing the formation of the different clusters.

3.2.2.1 Procedure Analysis

As it can be seen in graph 4, there are considerable differences between the clusters, what leads us to the conclusion that there is a great disparity among the countries included in the analysis.

Graph 4: typified punctuation of the clusters in the six components



Source: Author's own elaboration

However, it is highly remarkable that none of the factors are over ±2 points in any of the factors being studied. Indeed, out of the three lowest punctuations, two of them belong to the first cluster. These are the first and the last factors, being unemployment level and labor incentives, respectively. The third lowest punctuation appears in the third cluster regarding the inclusive employment. The three factors that have just been mentioned are all over -1,5 points, what could be quite far for the average.

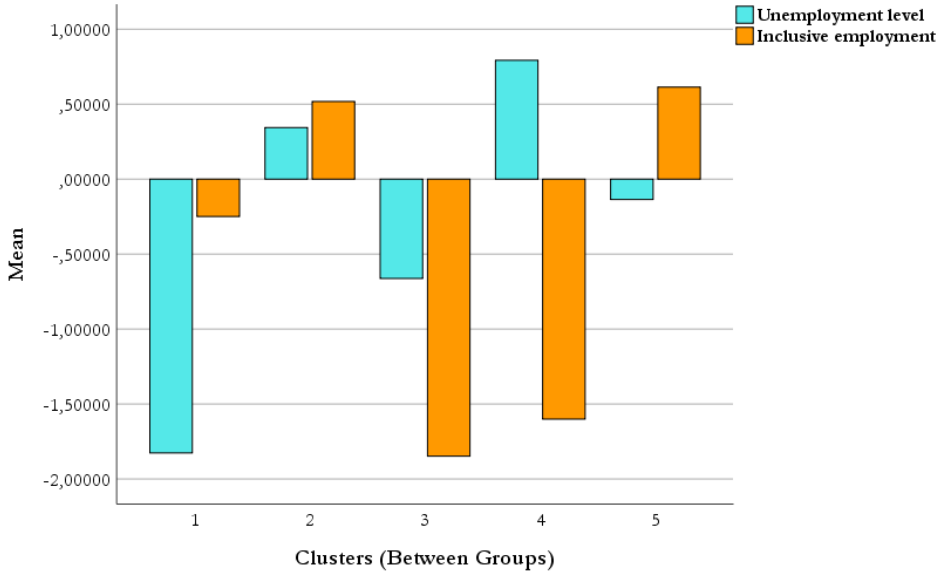
Another factor to highlight is the unemployment level in cluster number 4. In this case, a higher amount in this factor involves a lower unemployment level in the countries included in the cluster. To finish the general description of the factors among the different clusters, it is noteworthy the fact that only the second cluster has a positive value in all the factors. Undoubtedly, an impressive position that will be deeply analyzed in the following sections.

3.2.2.2 Factors inside Clusters Description

Focusing on the factors, we analyze their value on each cluster. For that, new graphs have been created, in which two factors are shown regarding each cluster. The factors have been grouped according to the pilar of variables they represent, either the Work Opportunities, the Fair Wage Distribution, or the Working Conditions.

To start with, the graph 5 shows the factors unemployment level and inclusive employment, both representing the variables included in the Work Opportunities pilar.

Graph 5: typified punctuation of the clusters in two components



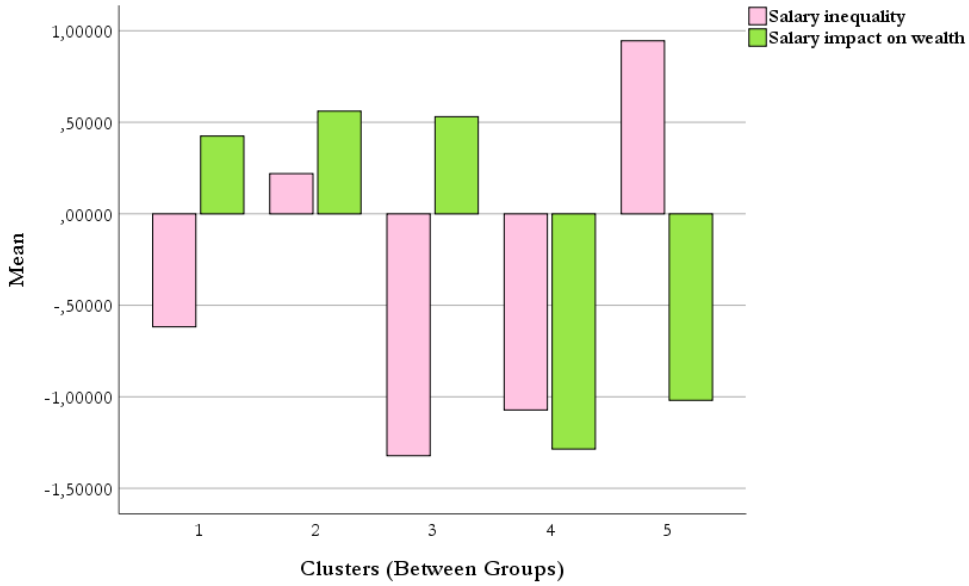
Source: Author's own elaboration

Regarding the first factor, unemployment level, it is necessary to emphasize the massive difference in the first cluster from the average. Almost reaching -2 points, this can be translated to the fact that the unemployment level in the countries included in such cluster are incredibly high. Having also a negative value, both the third and the fifth clusters show unemployment levels higher than the average, although much closer to it than the first group. On the other hand, both the second and the fourth clusters show positive values above the mean, being this last one the cluster with lower unemployment levels.

In the second factor there are also great disparities between the clusters about the integration of minorities in the employment. Both the third and the fourth clusters are more than 1.5 points below the average. Consequently, both clusters have a lower diversity in the workforce than the average. Although also negative, the first cluster shows a position much closer to the mean while both the second and the fifth groups have positive positions, close to 0.5 points over the average line.

Moving to the factors representing Fair Wage pilar, the next graph shows the salary inequality and the salary impact on wealth. Once again, the clusters show a very characteristic situation as each of them has a very differentiated value for both factors involving the salary paid to workers in those countries.

Graph 6: typified punctuation of the clusters in two components



Source: Author's own elaboration

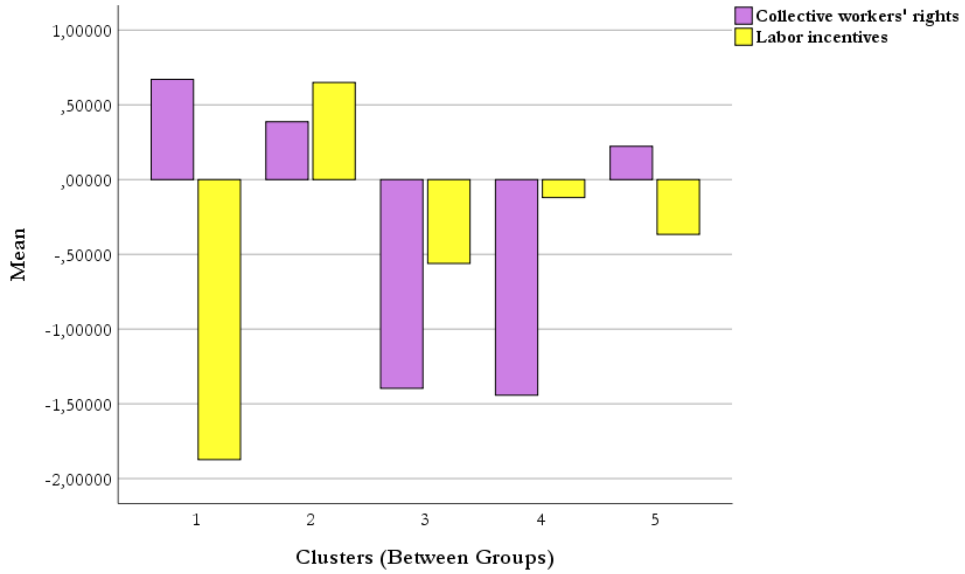
Regarding the salary inequality, only the second and fifth clusters show a positive value over the mean. This factor represents the salary inequality in such a way that the higher the value, the less inequality. Therefore, those two groups are the ones with less disparity in the workers' salaries. On the contrary, the first, the third and the fourth groups have negative values, being more than one point below the average line in the case of the third and fourth clusters. This represents the high inequality in the salaries paid to employees in the countries included in the already mentioned clusters.

Despite the values obtained in the previous factor, the first and third clusters have a positive value regarding the salary impact on wealth, meaning that in these countries' employees' salaries have a higher impact in the general wealth of the nation. This is considerably different to the situation in the fourth and fifth clusters both reaching more than one point below the average.

Finally, the last two factors to analyze are the ones related to the working conditions pilar. These are the collective workers' rights and the individual labor incentives. Even though three of the clusters present a positive value in this factor, the three are relatively close to the average as none of them reaches a point of difference over it. Quite differently, the other two clusters, the third and fourth, show a punctuation of more than one point below the

mean, almost reaching the 1.5 mark. This translates into the lack of workers' rights being respected and supported in those countries.

Graph 6: typified punctuation of the clusters in two components



Source: Author's own elaboration

Concerning the last factor, labor incentives, it is very foreseeable that only one of the five groups, the second one, has a positive value over the average. In addition, it should also be highlighted the low value the first group shows in this factor, almost reaching the two points mark under the average line. Regarding the last three clusters, all of them although below the mean, are relatively close to it as none of them surpass the one-point mark. These clusters have punctuations slightly under the average, being the third one the furthest with a value close to the half point mark.

In a nutshell, it has been possible to conclude that each cluster presents vastly different situations, representing the high disparity among countries regarding the factors being studied. It is now important to pay a closer attention to the clusters and the countries included in each of them to further analyze and understand their individual Work Opportunities, Fair Wages and Working Conditions.

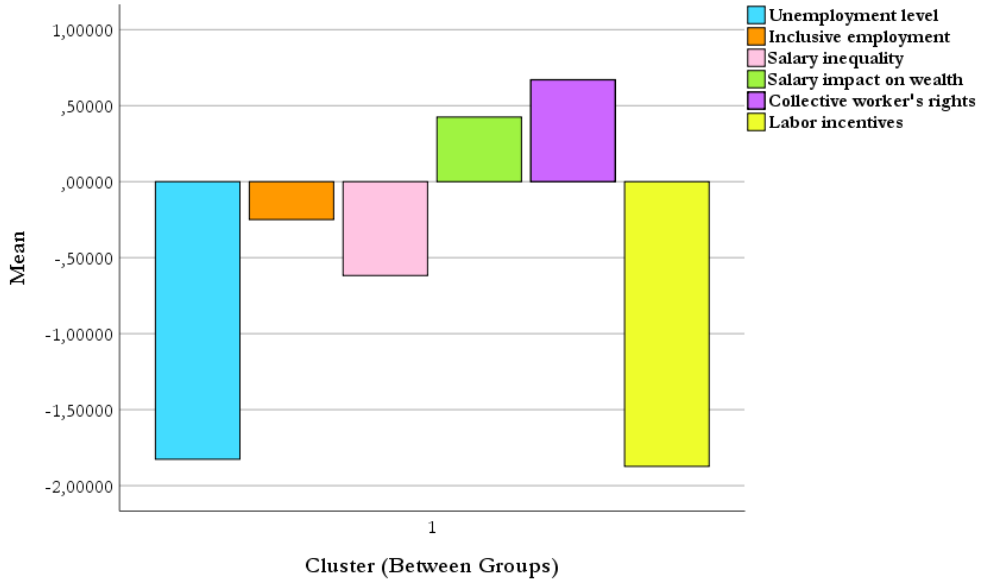
3.2.2.3 Cluster's Description

<u>Cluster 1</u>

Argentina, Brazil, Italy, and Spain

This group is formed by two different pairs of countries. Italy and Spain share more similarities among them than with the other two nations included in the cluster: Argentina and Brazil.

Graph 7: typified punctuations of the first cluster in the six components



Source: Author's own elaboration

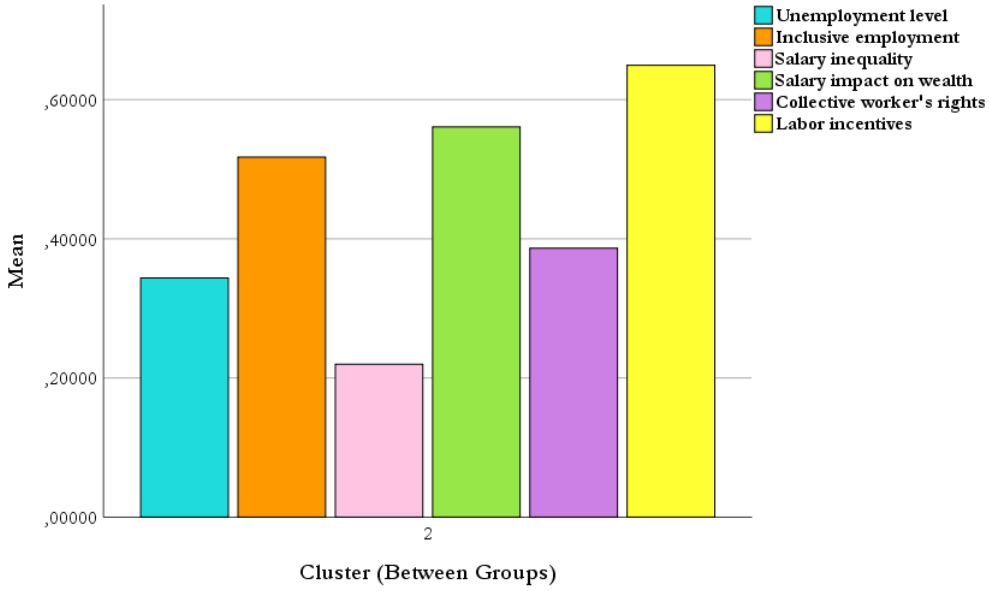
Not only are both, Italy and Spain, Mediterranean countries situated considerably close to each other, these territories share remarkably similar historical backgrounds, and their current situations are quite alike. This might be one of the reasons why they are culturally similar and in both places their population's lifestyles are resemblant. Both members of the European Union, although many times considered different to the rest of the nations. Countless changes have taken place in the political field of both countries.

In general, in this cluster it is important to highlight the excessively high unemployment level as well as the labor incentives to the employee. Opposite to this, these countries enjoy the highest punctuation of all groups in collective workers' rights. This means these four countries are the ones more over the average regarding the rights workers are guaranteed. These nations are also considerably close to the mean in inclusive employment which translates into places where the integration of minorities in the employment is like the general average of all countries included in the study.

Cluster 2

Australia, Austria, Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Iceland, Israel, Japan, Luxembourg, Netherlands, New Zealand, Norway, Russia, Sweden, Switzerland, the United Kingdom (UK), and the United States of America (USA)

Graph 8: typified punctuations of the second cluster in the six components



Source: Author's own elaboration

This cluster involves many countries, which could be divided in four smaller groups. This separation has been made according to the closeness the countries have during the process of creating the clusters. Surprisingly, not all the countries have grouped in a way that could be expected, therefore each group will be analyzed independently later. The groups formed inside this cluster are divided as follows:

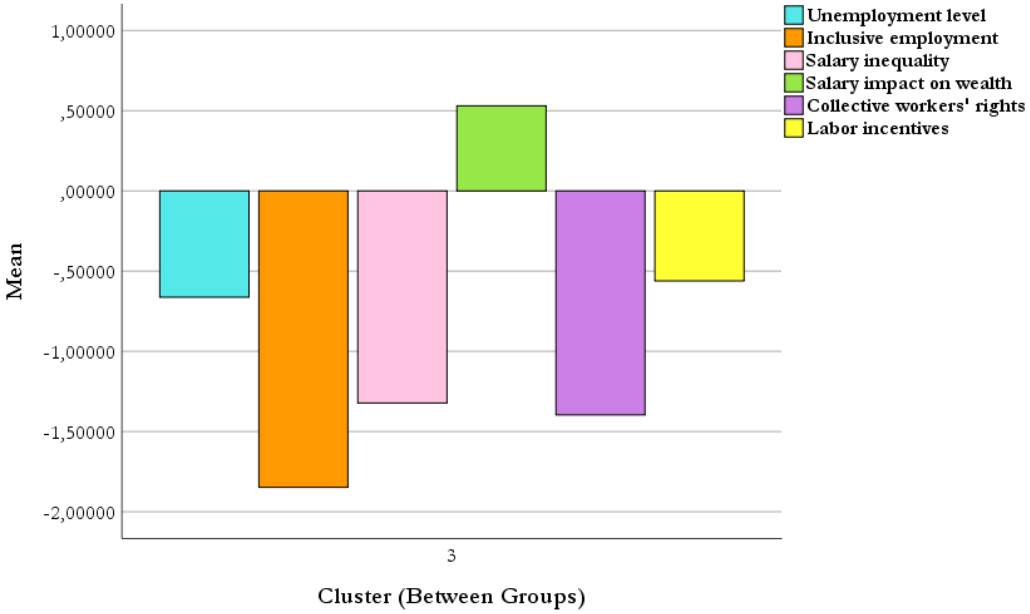
- Group 1: Finland, Sweden, Belgium, and France
- Group 2: Denmark, Norway, Austria, Germany, Iceland, Netherlands
- Group 3: Estonia, Luxembourg, Canada, Russia, Israel, Australia, New Zealand, Japan, UK, USA
- Group 4: Switzerland

As it can be seen, only the two first groups seem to have a geographical remarkable closeness. In the first case, it is possible to identify two pairs of countries sharing borders with each other. On one hand, Finland, and Sweden and on the other hand, Belgium, and France. Concerning the second group all these countries are in Central and North Europe and are countries that generally, hold a considerable resemblance. The third group might be the most random one as it includes three European countries with not many similarities (Luxembourg, Russia, and Estonia) as well as all the countries included in this cluster that are not European. Finally, there is a country that has historically being characterized for keeping itself distanced from others and the same happens in this situation, this is Switzerland. Despite being situated in the center of all the European continent, this country is usually very independent from the others.

Focusing in a more general analysis of this cluster, all the countries included share a relatively well stablished political and institutional systems. A surprise in this could be Russia, which government has always been quite controversial. Although this cluster does not have the highest punctuations in any of the factors being studied, it is the only one with marks over the average line in all the factors. These countries are the ones that usually the whole world looks up to, the ones used as an example to follow. Therefore, there is no revelation in their position related to that of the other clusters. In addition, the similarity in the values this cluster has in all the factors is remarkable, being a clear proof of the stability in these territories.

Cluster 3

Graph 9: typified punctuations of the third cluster in the six components



Source: Author's own elaboration

Chile, Colombia, Costa Rica, Turkey

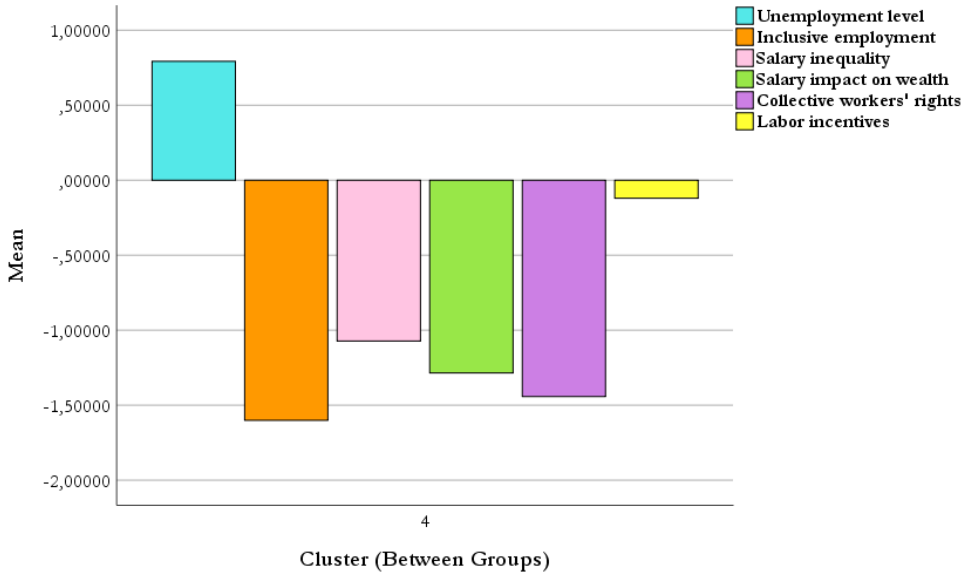
This cluster could be considered the opposite to the previous one. While cluster 2 had all the factors over the average, cluster 3 has values under the average in all factors except for the impact of salaries on wealth. The factor in which the difference with the average is higher is the inclusive employment, meaning that in these countries, minorities face considerably worse Work Opportunities, Fair Wages and Working Conditions. Below the average, it is also remarkable the significant salary inequality in these countries as well as the lack of respect for collective workers' rights.

Geographically, there is not much relation among these countries. Although both Chile and Colombia are in South America, these countries do not share borders. Costa Rica is located in Central America and Turkey is in the Middle East. All of them are characterized by unstable political and institutional systems. All countries lived dictatorships during the 19th Century, except for Turkey, whose current political situation is highly controversial.

After analyzing all these aspects, the social instability is expectable. Human rights violations, gender inequality, extremely high crime rates and even terrorist issues are some of the social matters these societies must deal with. Therefore, it can be stated that these countries' Work Opportunities, Fair Wages and Working Conditions are just a representation of the general political, economic, and social instability.

Cluster 4

Graph 10: typified punctuations of the fourth cluster in the six components



Source: Author's own elaboration

China, Indonesia, Korea, Mexico, Saudi Arabia

Geographically, this cluster is mainly located in the most Oriental side of Asia, apart from Saudi Arabia, in the middle East and Mexico in Central America. While China, Indonesia and Korea could be relatively close, the other two countries although similar in the Work Opportunities, Fair Wages and Working Conditions are especially far.

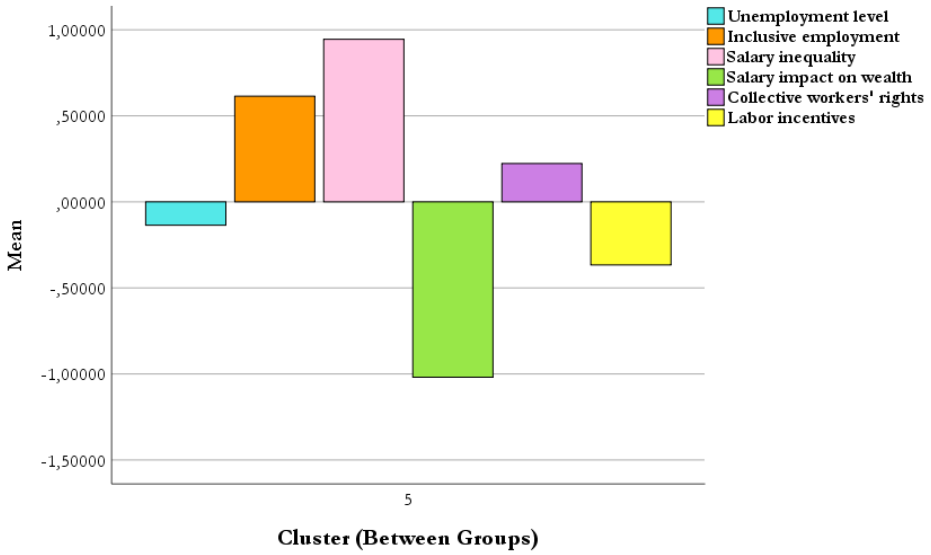
Regarding the political topic, most of the countries included in this group have stablished a democratic republic system. However, Saudi Arabia is ruled under a monarchy and China, although officially a democratic republic has been very debated due to its social-communist ideology.

When analyzing the factors included in this study, only the unemployment level is above the average line, meaning that unemployment is rather low in these territories. However, it should not be overlooked that all the other factors are significantly below the mean. The most remarkable factor is the inclusive employment, implying that these states do not have minorities incorporated in their occupation. This comes as no surprise in some of them like Mexico and Saudi Arabia, which are known for having a general sexist culture. All the other factors, collective workers' rights, salary impact on wealth and salary inequality, rate below the average, with the only exception of the labor incentives that stands close to the global mean.

Overall, these countries seem to be working on the most individualist factors like the labor incentives and unemployment, however all of them have huge social issues. Inequalities in all fields take place in these territories and there is no sense of collectivist fight towards rights or minorities integration. In addition, in some of them there are very differentiated social classes with people being either very wealthy or very mediocre.

Cluster 5

Graph 11: typified punctuations of the fifth cluster in the six components



Source: Author's own elaboration

Czech Republic, Hungary, Ireland, Latvia, Lithuania, Poland, Portugal, Slovak Republic, Slovenia

The closeness between most of the countries included in this cluster is rather obvious. Excluding Ireland and Portugal, the other seven countries are situated in Eastern Europe, close enough to have borders in common. Therefore, there is a clear cultural and historical bond among these nations.

Indeed, most of these countries were part of the Soviet Union. In addition, several of them suffered a lot during the World War II like Poland and the Czech Republic. Undoubtedly, these events have had an enormous impact in the states' development and growth.

Regarding the factors included in this study, it is remarkable the fact that this cluster has the highest value of all groups in two of the factors: inclusive employment and salary inequality. This means that minorities are very included in the workforces and labor world and that the salary inequality is exceptionally low in these countries. Both facts are incredibly positive for any nation. The factor about collective workers' rights have a positive value, situating these countries over the mean, while close to it. However, all the other factors are below the average line, punctuating lower than the global one. The unemployment level although negative, is quite close to the line so their joblessness is near to the average. Therefore, it could be considered that even though it is not a positive value, it is not a catastrophic one either. Something similar happens with the labor incentives. The most noteworthy value is the impact of salary on wealth as it is below -1 in relation to the mean line.

3.3 Variance Analysis (ANOVA)

Once the Clusters have been formed, it is the moment to study the potential influence of belonging to a Cluster might have in the Social Mobility and in the Inequality in that territory. Consequently, through this analysis we will try to answer the questions: ¿is there a relationship between the Work Opportunities, Fair Wages and Working Opportunities and the Social Mobility and Inequality in that country? Does belonging to a determined Cluster involve a specific level of Inequality?

3.3.1 ANOVA Methodology

The Variance Analysis (ANOVA) is a multivariant method that evaluates the differences between means among several groups. It studies the potential influence that specific qualitative variables (factors) might have on other quantitative indicators (dependent variables).

In our case, we will make use of the model including one factor and one dependent variable and it will be carried out twice. For each factor being study, a null hypothesis is established. This null hypothesis states that the average of the different dependent variables is the same for each level of the factor. Maintaining it means that the factors have no influence in the dependent variable while rejecting it implies that the averages among the different levels of the factor are not equal and therefore, the factor affects the dependent variable. To be rejected, the significance level must be 5% or lower. . In case it is rejected, a post-hoc test

can be executed, which helps identify how the groups differ from each other. The null hypothesis of the ANOVA is stated as follows:

$$H_0: \ \mu_1 = \mu_2 = \ldots = \mu_k$$

In addition to this, it is important to keep in mind that to be able to develop an ANOVA, several requirements are necessary. On one hand, the dependent variable distribution must be normal. On the other hand, a desirable requirement is for the variances to be equal, which is known as homoscedasticity.

Homoscedasticity measures the quality of the data and it involves that the quantitative variable variances must be equal in all the groups that are being compared, this is homogeneity of variance. For that, the Levene test is carried out. This test formulates the null hypothesis of variances to be equal.

$$H_0: \ \sigma_1^2 = \sigma_2^2 = \ldots = \sigma_k^2$$

As usual, the hypothesis is rejected in case the significance level is 5% or lower too. However, the desired result in the Levene test is to keep the hypothesis, meaning that the variance of the dependent variable is the same for the different levels of the factor.

3.3.2 ANOVA: Procedure and Results

As it has previously been mentioned, we carry out two different ANOVA Analysis. In both cases the factor is the Cluster to which countries belong to while the dependent variables are a) the Gini Index and b) the Global Social Mobility Index. Since the clusters have been created from the Work Opportunities, Fair Wages and Working Conditions variables, the analysis will allow us to stablish a relationship of dependence between the labor market and Inequality.

3.3.2.a Gini Index

In this section the Gini Index, an inequality indicator independent from the rest of the report is compared among the different Clusters that have been formed. After computing the Levene test, we obtain a significance level over 5%. Consequently, it can be stated that the variable Gini has the same variance in the five clusters included in our study.

Regarding the ANOVA and as it can be seen in table 7, the results conclude that the significance level is below 5%, meaning that the average of the Gini Index is not the same for all the Clusters. Therefore, the null hypothesis is rejected.

Table 7: ANOVA Analysis of the Gini Index

ANOVA

GINI Index in that country (inequality index)

	Sum of squares	df	Mean square	F	p-value
Between groups	1177,383	4	294,346	12,677	,000
Within groups	882,296	38	23,218		
Total	2059,679	42			

Source: Author's own elaboration

To further analyze the results of the ANOVA, we compute the post-hoc tests, more specifically the Ryan-Einot-Gabriel-Welsch F test (R-E-G-W-F). The means obtained of the Gini Index in the different groups are not equal, however it is possible to form two groups out of the five original clusters. These two groups include countries with similar, although different averages. As it can be seen in the following table, Clusters 5 and 2 could be included in one group and clusters 4, 1 and 3 would form the second group.

Table 8: post-hoc test of the ANOVA

GINI Index in that cluster (inequality index)

Ryan-Einot-Gabriel-Welsch F

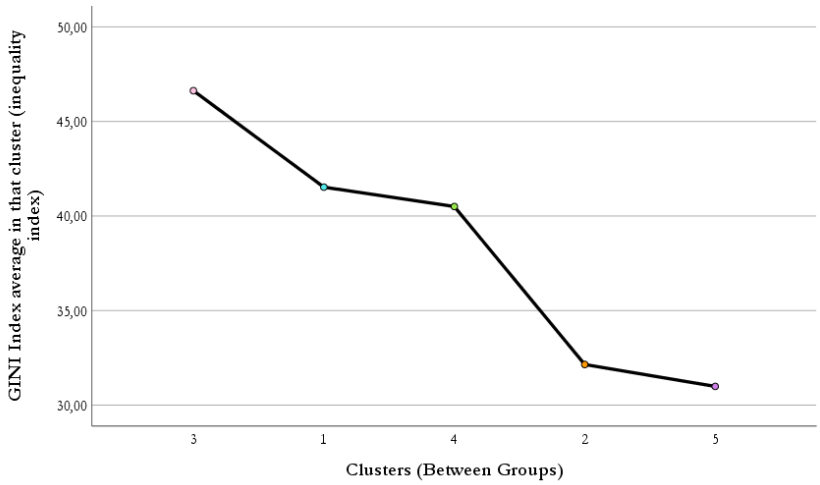
Clusters (Between Groups)	N	1	2
5	9	30,9889	
2	21	32,1476	
4	5		40,5000
1	4		41,5250
3	4		46,6250
F-value		,864	,243

Source: Author's own elaboration

A brief reminder concerning the Clusters is that the groups 5 and 2 are the ones formed mostly by European countries and the most developed countries in the world. The Cluster 2 is the one formed by 21 different countries, considered the most advanced ones. Although Cluster 5 is also formed by European countries, these could be a in second level of development. On the other hand, Clusters 1,3 and 4 are the ones with countries that in general are seen in a worst position than the previous ones. Cluster 1 is the one including Spain, Italy, Brazil, and Argentina, which could be seen as the least advanced countries in Europe and the most advanced ones in South America. Indeed, Cluster 3 is formed by other South American states with the addition of Turkey. Finally, the Cluster 4 is the one including most of the Asiatic territories in the study (except for Japan, included in the Cluster 2) as well as Mexico, which is more like these ones than to the other nations closer to it in geographical distance.

In addition, the next graph shows the Gini Index mean for each cluster, clearly representing the differences among them. As it can be seen, Clusters 2 and 5 have the lower averages, meaning that their Gini Indexes have a low punctuation. It is important to remember that the lower the Gini Index, the less inequality in that territory and therefore, more equality. On the other hand, Clusters 1, 3 and 4 have means considerably higher, concluding that the inequality in these countries is significantly higher.

Graph 12: average Gini Index punctuations by cluster



Source: Author's own elaboration

3.3.2.b Global Social Mobility Index (GSMI)

The second quantitative variable being study is the Global Social Mobility Index (GSMI). As this indicator has been calculated from the variables included in the Global Social Mobility Index Report, it is not as objective as the Gini Index. To analyze the homoscedasticity of this case, we compute the Levene test, obtaining a significance level substantially higher than the 5% needed to keep the hypothesis. Therefore, the desirable requirement of the GSMI having the same variance in all the clusters is maintained.

The null hypothesis of the ANOVA states that the mean of the GSMI is equal for all the clusters, implying that the Social Mobility in each country is not affected by its Work Opportunities, Fair Wages and Working Conditions. As the significance level obtained in this case is equal to zero, the null hypothesis is rejected (a p-value over 5% is needed to maintain this hypothesis). Then it can be confirmed that the mean of the GSMI is not equal in all the countries. Table 9 includes all the data necessary for the analysis.

Table 9: ANOVA Analysis of the GSMI

ANOVA

Global Social Mobility Index

	Sum of squares	df	Mean square	F	p-value
Between groups	2987,167	4	746,792	21,416	,000
Within groups	1325,083	38	34,871		
Total	4312,251	42			

Source: Author's own elaboration

As done for the Gini Index, the same post-hoc analysis is carried out to study the differences among the means. In this case, three different groups are formed regarding the similarities in the averages of the clusters of their GSMI. As table 10 shows, clusters 1, 3 and 4 can be included in a group, like happened during the analysis of the Gini Index. However, the difference between clusters 2 and 5 are greater now, and these clusters are separated in different individual groups.

Table 10: post-hoc test of the ANOVA

Global Social Mobility Index

Ryan-Einot-Gabriel-Welsch F

Clusters (Between Groups)	N	1	2	3
3	4	55,8750		
4	5	58,3800		
1	4	61,7000		
5	9		71,2222	
2	21			77,6810
P-value		,555	1,000	1,000

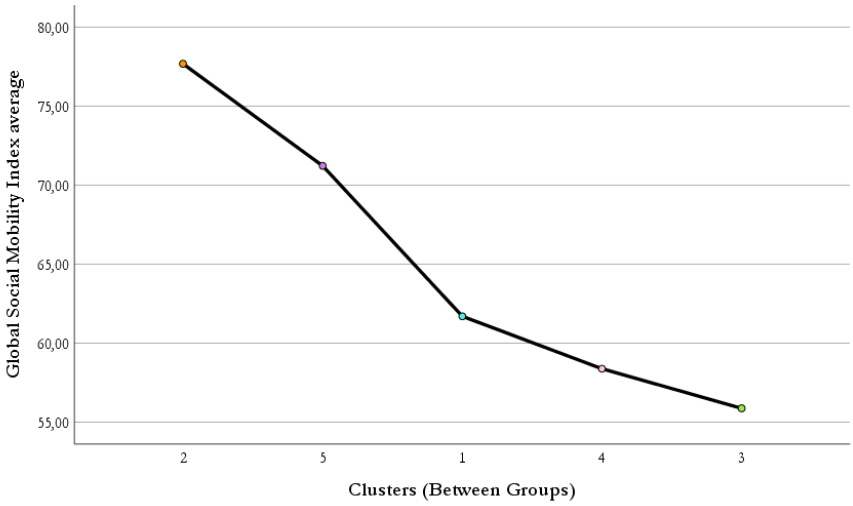
Source: Author's own elaboration

Contrary to the Gini Index, it is desirable to obtain a high punctuation in the Global Social Mobility Index. The highest punctuation in this indicator represents lower inequality. Indeed, the differences among clusters are massive. Because clusters 1, 3 and 4 have rather low means, it can be stated that Social Mobility is lower in these countries. Therefore, the opportunities people held to live up to their efforts and talent are lower in these countries. Clusters 2 and 5, although in different subgroups, have higher means regarding this indicator. Consequently, there are more opportunities for Social Mobility in the countries included in these clusters. A clear representation of the different means the clusters have regarding their GSMI is shown in graph 13.

After carrying out the ANOVA Analysis over both variables, it is possible to observe that the Clusters 1,3, and 4 have quite similar means in both cases. The other clusters, 2 and 5, are separated from the three previous clusters. Moreover, in the case of the GSMI these

clusters are also separated from each other. According to the Gini Index, the most equalitarian cluster is number 5. However, according to the GSMI, the cluster having a better Social Mobility is Cluster 2.

Graph 13: average GSMI punctuations by cluster



Source: Author's own elaboration

In conclusion, two indicators concerning Social Mobility and Inequality have been tested to observe the influence of living in a country included in one cluster or another does influence the Social Mobility and Inequality one might face in life or not. Both dependent variables have proved to have the same variance in the different clusters through the Levene test, which is used to analyze the homoscedasticity. More importantly, for both dependent variables the principal null hypothesis has been rejected, meaning that the factor influences in the dependent variables. Therefore, Social Mobility and Inequality levels differ from one Cluster to another.

4. SUMMARY AND CONCLUSIONS

We know that the Work Opportunities, the Fair Wages, and the Working Conditions are related to Inequality. However, to what level are these terms determinant? In this work we conclude that they are fundamental and can be considered drivers of Social Mobility and Inequality.

From the statistical analysis carried out we extract several conclusions:

1) The information from the 16 original variables related to the labor market can be summarized in 6 new components, which we have denominated unemployment level, inclusive employment, salary inequality, salary impact on wealth, collective workers' rights, and labor incentives. The 43 countries included in the sample have a

punctuation in each of these components. It is observed that Central and Nordic European countries always obtain the best positions. On the contrary, countries like Argentina, Colombia and Turkey obtain among the worst punctuations in all the components. Spain could be included among the average ones as it punctuates quite close the average of the sample in three of the six components being analyzed.

2) Regarding the results obtained from the Cluster Analysis and ANOVA we conclude that in general there have not been vast surprises and the results are quite close to the expectations. More specifically from each cluster it can be concluded that:
    a. In the first cluster and despite all the parallels, Italy is usually in a better position than Spain. A factor to consider is the Gini Index, which measures Inequality. These countries are similar according to this index. However, their punctuations are slightly over the European average. On the other side, Argentina and Brazil share some similarities but are more distinct from each other than the previous countries. Both nations show especially high punctuations in the Gini Index. Indeed, Brazil has one of the highest values (53,3) in the whole world, what translates in being one of the territories with higher inequality.
    b. As it has previously been mentioned, the countries included in the second cluster are the most developed ones in the world, including Central and Nordic European countries that always obtain the highest punctuations. Analyzing the economic aspect of these countries, the superior situation they hold over other countries is evident. These countries have the greatest GDPpc worldwide as well as considerably high punctuations in their GSMI, indicating the high Social Mobility in these states.
    c. Concerning the Inequality sphere, none of the countries included in Cluster 3 enjoy a great situation nowadays. Colombia is in the worst position both regarding its GDPpc and the Gini Index. However, all the countries in the cluster show very poor punctuations. This reflects the low income of the population as well as the huge Economic Inequality. This Cluster shows the lowest position on the GSMI, being the one with worse Social Mobility.
    d. Regarding Cluster 4, it is extremely worrying the punctuation Mexico and Saudi Arabia have in their Gini Index, as both countries almost reach the 50 points in this measurement. Undoubtedly, both countries have vast inequalities. Notwithstanding, the rest of the nations in this cluster have

better positions, especially Korea with a low value of 31,6. Analyzing this together with their Gini Index, the huge economic disparities in these countries are clear, what also reflects in their GSMI.

e. Notwithstanding, all the countries in the last cluster are European and as such are considerably developed and wealthy. All of them have a Gini Index below 40 points, reaching a punctuation below 30 in the case of some. Jointly, Cluster 5 has the best position regarding the Gini Index, meaning that these countries are the most equalitarian ones. On the other hand, the group is in the second position regarding the GSMI, but still showing a pretty good Social Mobility.

3) For the dependence analysis two different ANOVA of one factor are carried out. In both cases the null hypothesis is rejected. Consequently, belonging to one Cluster does influence the Social Mobility and Inequality. Indeed, the relationship is such that it can be stated that the Work Opportunities, Fair Wages and Working Conditions are essential drivers of the Social Mobility and Inequality levels in a country. Notwithstanding, it is necessary to provide several nuances:

   a. As it has previously been mentioned, Cluster 2 is above the average in all the variables of employment and industrial relations. Therefore, it is expected that it has great punctuations in the variables related with Inequality and Social Mobility. Indeed, these countries are the ones showing a better Global Social Mobility Index (GSMI).

   b. Although Cluster 5 has some variables over the average, it is on the average for several of the principal components and it even presents a quite low punctuation on the salary impact on wealth. This cluster presents quite good results too, being the best one according to the Gini Index, despite statistically being very similar to that of Cluster 2. If we pay attention to the GSMI, Cluster 2 underscores by itself over the other clusters.

   c. Regarding Cluster 1, it seems slightly useless to have a great punctuation in Collective Worker Rights if the punctuation in the unemployment level is incredibly bad. In the end, this causes the cluster Gini Index and GSMI to be quite resemblant to that of Clusters 3 and 4. The low values obtained in unemployment level and labor incentives trigger Cluster 1 to be in that position.

d. Clusters 3 and 4 are in a very similar situation. This last one has considerably good numbers in employment, but it has no rights or equality on salaries what causes an unequal share of the wealth (Gini Index) and a low position in the GSMI.
e. Finally, Cluster 3 presents the worst position. In this case, the cluster presents a decent punctuation regarding salary impact on wealth but considerably bad levels in everything else. Consequently, both its Gini Index and GSMI show very poor punctuations.

Overall, the superiority of the countries included in Cluster 2 in comparison with the other clusters presented in the study is clear. Except for Cluster 5, which has an unexpected position. Although it does not show the same positive punctuations in all the factors being studied, it is indeed the most equal according with the results obtained from the Gini Index. This leads us to think that some of the variables included in the study might have a greater impact on Social Mobility and consequently, decrease Inequalities. Undoubtedly, this provides very interesting information to the clusters in worse positions who might focus on improving those specific factors in order to improve their Social Mobility and Inequality. Ultimately, the labor market and industrial relationships are variables related to Social Mobility and Inequality that can in turn impact economic growth.

5. BIBLIOGRAPHY

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