

Poverty Risk Rate for employed people and the impact of different social economic indices

VDP | GROUP 1

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Introduction	3
Datasets	3
Preprocessing.....	4
Results	5
“Portuguese social economic indices between 2005 and 2021: the effect of major events”	5
Goals and initial questions	5
Methods.....	6
Observations and conclusions	6
New questions	6
“Portugal vs. Europe : comparison of poverty risk while employed over time”	7
Goals and initial questions	7
Methods.....	7
Observations and conclusions	8
New questions	8
“Portugal vs. Europe : comparison of housing overburden over time”	8
Goals and initial questions	9
Methods.....	9
Observations and conclusions	9
New questions	9
Conclusions	10
References	10

Introduction

Portugal is a country considered as a good choice for expatriates to find opportunities of work and high standards of living conditions. In the Global Passport Index (1), an index that includes migrant acceptance and quality of life, Portugal placed in the 12th position, behind other European countries. However, is it really a country where every worker has a good living condition? Is it really worth working in Portugal? In order to analyze this, data from Portugal and Europe were compared in order to paint a clearer picture of the conditions of those who work in Portugal.

Major events were also objects of interest such as: the worldwide Global Recession in 2008, that led to the country being unable to repay its government debt without the assistance of third parties (2), that led to a period of austerity policies between 2010 and 2014 in order to pay its international bailouts, that is going to be referred as Portugal Financial Crisis. Also, the COVID-19 pandemic and its effects on the workers' life.

Datasets

The search for datasets was made on the PORDATA website, considering the time period of 2005 to 2021. They are namely:

- **Inflation Rate (Growth Rate - Consumer Price Index) (3)**
 - The indicator wanted was the “Total Consumer Prices index”.
 - The inflation can be defined as the increase in the general price level of goods and services. It represents the value of money and when there is an increase in inflation, the same set amount will buy fewer goods and services than before. The inflation rate is the percentage change in the price index for a given period compared to that recorded in a previous period.
 - The Consumer Price Index aims at measuring the price evolution in a set of goods and services considered representative of the consumption structure of the resident population in Portugal.
- **Unemployment rate: total and by age group (%) (4)**
 - The indicator wanted was the “Total Age groups”.
 - The concept of Unemployment Rate, according to the metadata, represents unemployed persons as a percentage of the civilian labor force. That is composed by all persons aged 16-89 years who made up the available labor force for the production of economic goods and services.
- **National minimum wage rate (5)**
 - The indicator wanted was the Rate of Change in the “General minimum wage”, for the monthly figure.
 - It is defined as: fixed at a monthly rate, the minimum wage is enforced by law. Minimum wages are gross amounts, that is, before deduction of income tax and social security contributions. The minimum wage is increased through legislation, with no fixed timeframe.
- **In work at-risk-of-poverty rate (6)**

- The indicator wanted was the “In work at-risk-of-poverty rate”
- It is defined as: share of persons with an equivalized disposable income below the at-risk-of-poverty threshold, which is set at 60% of the national median equivalized disposable income. Where the equivalized income can be defined as: measure of household income that takes account of the differences in a household's size and composition, and thus is equivalized or made equivalent for all household sizes and compositions.
- **Housing cost overburden rate, by tenure status (7)**
 - The indicator wanted was the “Total Tenure status”.
 - Is defined as the percentage of the population living in a household where the total housing costs (net of housing allowances) represent more than 40% of the total disposable household income (net of housing allowances) presented by accommodation tenure status.

Data Pre-processing

The sampling procedure for this dataset consisted on a selection of some economic indices of Portugal and European Union. The variables that were selected for Portugal are Minimum Salary Rate, Poverty Risk Rate for employed people, Inflation Rate and Unemployment Rate. For Europe, we decided to select two main indicators in order to see what is the position of Portugal compared to the other countries, which country has the highest rate in 2021 and also what was the rate in 2005.

Within the European countries datasets it is recognized that there are indeed some topics which are highly sensitive in some countries, such as Switzerland, Germany and Croatia. For these three countries there was a huge timeframe with missing observation so we could not use them.

Although, we had some missing values in the other countries, the percentage was not high so we used KNN with 2 Nearest Neighbors to fill them in R.

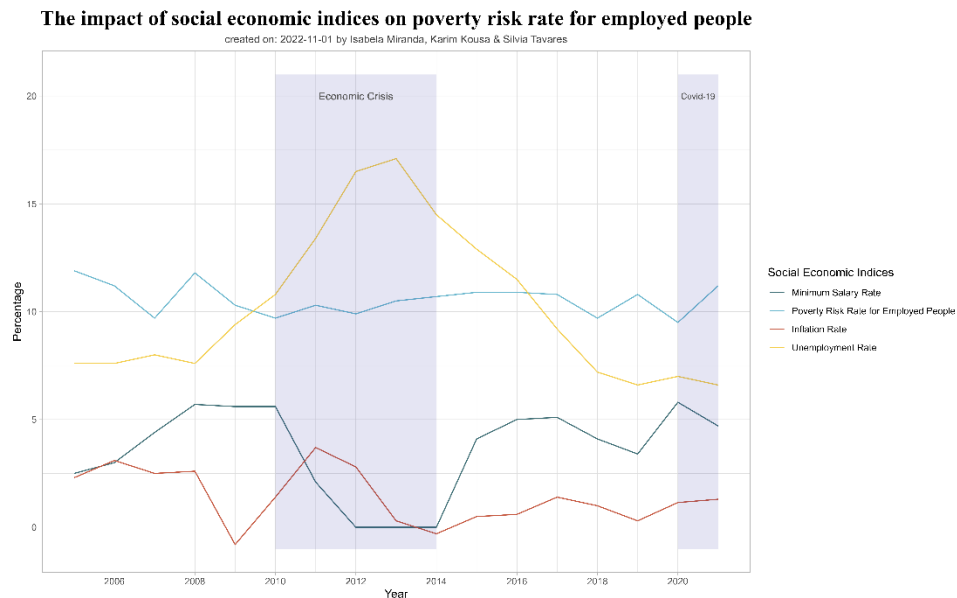
In Portugal, we only had one missing value in Inflation and we also used KNN with 2 Nearest Neighbors to fill it.

Having all this done, we started the data transformation in order to have the final structure of the table by using left joins, mutate, select, gather and some other instructions.

The next and final step was the creation of plot and adjustment of the overall look of the graphs.

Results

“Portuguese social economic indices between 2005 and 2021”



Goals and initial questions

The objective of this chart was to analyze how major events that affected the Portuguese economy influenced social economic indices and the relations with each other, between 2005 and 2021. The major focus was how the employed people were affected by this events, especially those in risk of poverty. To complete this goal, the following indices were picked from the dataset:

- minimum wage increase rate
- poverty risk rate (while employed) - for Portugal
- inflation rate
- unemployment rate

Some questions a priori were:

- What was the effect of the Portuguese Financial Crisis on the social economic indices?
- For this time period, is the minimum wage increase rate related to the rate of decrease of poverty risk while employed?
- For this time period, is the minimum wage increase rate related to the inflation rate?
- For this time period, is the inflation rate affecting the poverty risk rate while employed?
- For this time period, is the unemployment rate and poverty risk rate while employed related?
- What are the apparent effects of the COVID-19 pandemic to such indices?

Methods

To answer this question a line graph with the different social economics indices was plotted with a yearly timeline in the x-axis. The different indicators can be seen by the different colors in the legend. The two major events highlighted are the Portuguese Financial Crisis and the COVID-19 pandemic outbreak. The theme chosen consists of a light background to create a greater contrast with the highlighted areas.

Observations and conclusions

Some interesting observations were made based on the plot, according to the questioning:

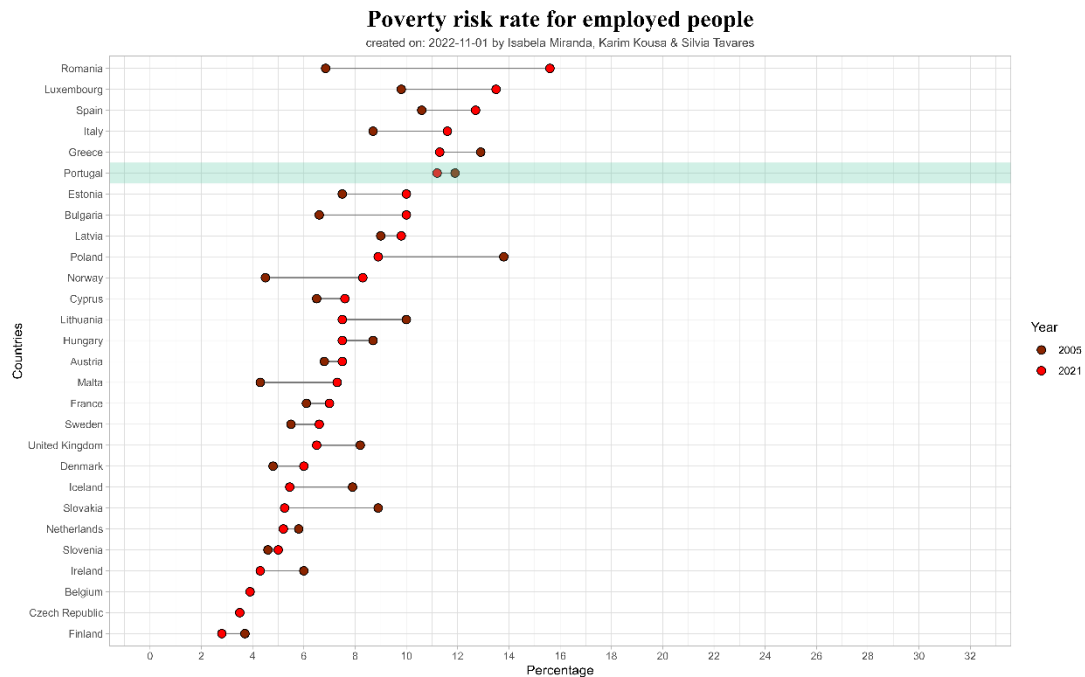
- During the Portuguese Financial Crisis there was a spike in unemployment and a stagnation of the minimum salary, resulting from the austerity policies of the time.
- There was not an observable relation between the minimum wage increase rate and the rate of poverty risk while employed. This is quite unexpected since the people employed with the lowest salaries should receive the minimum wage and so, being the ones with the highest risk of poverty while employed.
- It can be observed that during the highlighted period of the Portuguese Financial Crisis the inflation rate is higher than the rate of increase of the minimum salary. It can also be seen that the inflation rate is increasing and the rate of increase of the minimum salary is decreasing in the post 2020, showing a possible repetition of the same phenomena.
- The trend lines for the unemployment rate and poverty risk rate while employed are not same, however some interesting events can be inferred from this data. In 2008, there was an increase in unemployment as a result of the worldwide Great Recession, however there is a decrease in poverty risk while employed. This makes sense since once unemployed, someone would not be considered “at risk while employed”.
- Related to the years 2020 and 2021, there is a trend to an increase in inflation and a slower rate of increase in the minimum salary, also an increase in poverty while employed.

New questions and future work

Considering this analysis, some new questions can be made:

- The “Poverty risk while employed” seems to be somewhat steady throughout the time period analyzed, which raises the question of what is contributing to this number, and if there is no progress in reducing this index in the longer run. This inspired the creation of a second graph, to compare the evolution of Portugal with other European countries.
- As of the date of this report, it is known that the inflation rate reached 9.3% in September of 2022, not only as a result of the pandemic but also the Russian invasion of Ukraine. (8) (9) Once yearly data is available for the year 2022 and beyond, it is going to be interesting to once again look at the post pandemic workers condition.

“Portugal vs. Europe: poverty risk rate for employed people”



Goals and initial questions

The objective of this evaluation was to measure how Portugal compares to other European countries in terms of poverty risk while employed and how they are evolving.

For this some a priori questions were made:

- Is the stagnation of this index a Portuguese characteristic or, is a trend that can be found in other European countries?
- Which country have, in 2021, the lowest poverty risk while employed?
- Which country had the best decrease of poverty risk while employed?

Methods

To answer this question a “lollipop plot” (or “dumbell plot”) was made. This type of chart shows the relationship between a numeric (poverty risk while employed over time %) and a categorical variable (countries). In this case, it was compared two timestamps: 2005 and 2021. Each point in time is represented by a different color, and a line represents the variation. The countries were sorted based on their values in 2021, Portugal being highlighted by a horizontal colored bar.

We used serif, bold and black as font, face and color for the titles, while used the same font and face but different color which is gray25 for the subtitles of the plots.

We applied Theme_light for the overall look of the plots.

Observations and conclusions

Some interesting observations were made based on the plot, according to the questioning:

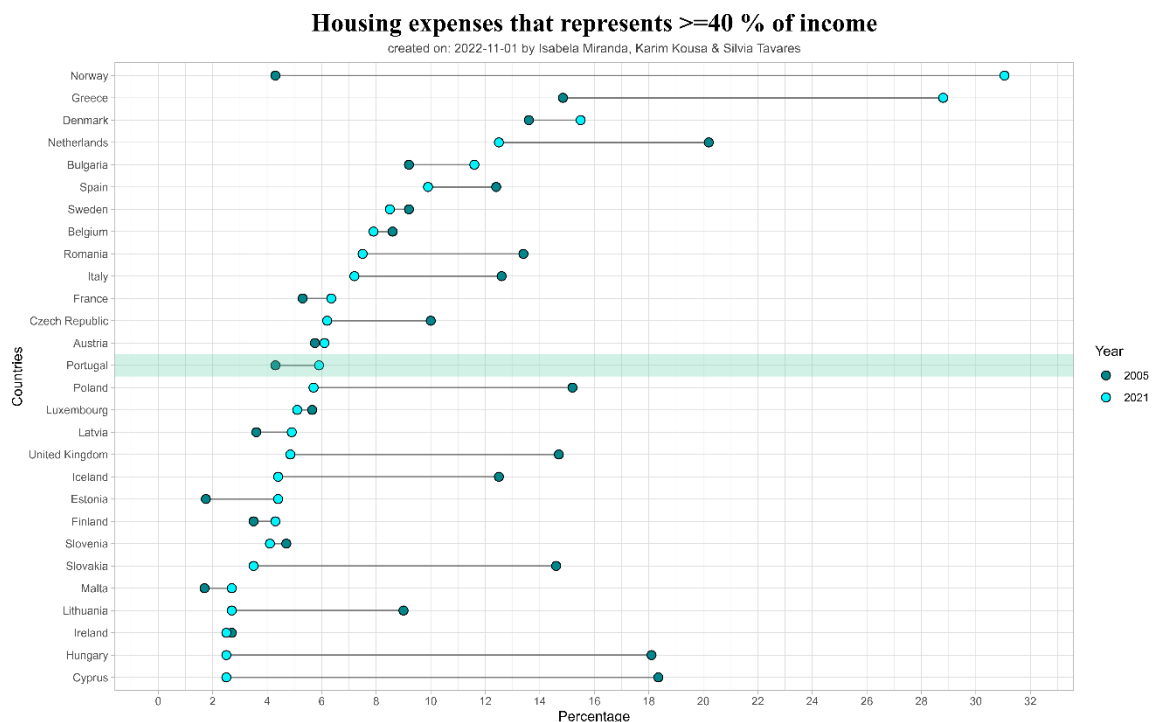
- Many European countries showed small increases in the poverty risk for people in work. Portugal, however, showed small progress. That can be a good indicator that, in the future, Portugal is going to be an even safer option for expatriates to choose to work.
- The lowest poverty risk while employed in 2021 in Finland.
- The biggest decrease in poverty risk, in the timeframe analyzed, is Poland.

New questions and future work

Considering this analysis, some new questions can be made:

- How come some European countries have an increase in risk of poverty rate? Was there an increase in the living costs of countries such as Romania, Malta and Norway? This inspired us to create a third plot, comparing housing costs between European countries.

“Portugal vs. Europe: housing expenses that represents $\geq 40\%$ of income”



Goals and initial questions

The objective of this evaluation was to measure how Portugal compares to other European countries in terms of housing (expenses including rent, water and electricity) costs that corresponds to 40% or more of the household income.

For this some a priori questions were made:

- Is Portugal a country where a good portion of people have disposable income? Are the housing costs in Portugal improving or getting worse?
- How it compares to other European countries?

Methods

To answer this question another “lollipop plot” (or “dumbbell plot”) was made. The relationship, this time was between housing overburden rate (numeric) and the countries (categorical). The same two timestamps: 2005 and 2021, were used. Each point in time is represented by a different color, and a line represents the variation. The countries were sorted based on the 2021 value. The theme chosen consists of a light background.

Observations and conclusions

Some interesting observations were made based on the plot, according to the questioning:

- In Portugal, the percentage of people where the housing costs is over 40% is of around 6% in 2021, with some increase in relation to 2005. That shows that for a majority of people these costs are not an overburden for their household.
- Portugal can be seen around the middle of the chart, however, with a concerning increase.
- Many countries showed a decrease in this overburden what can indicate a generalized effort to improve the quality of life of European citizens.

New questions and future work

Considering this analysis, some new questions can be made:

- Norway showed a big increase in house costs with over 40% rate, followed by Greece. Considering that Norway had an increase in poverty rate for those employed it is not surprising, but it would be interesting to see other socio economic indices of the country.
- Does this increase in the Portuguese rate of overburden housing costs is different for those there are renters and those that own their house?

Conclusions

During this work, the group elements were able to develop their thinking and technical skills. First, in the brainstorming of ideas and what was a common interest between members, to choosing the datasets and developing the R code that generated the final plots. It allowed insights into the socio economic situation if Portugal that otherwise would not happen.

References

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