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The role of inflation in shaping changes in the employment rate: evidence from the selected EU countries

Abstract

RESEARCH OBJECTIVE: The objective of the article is to empirically verify the fundamental relationship implied by the Phillips curve: the relationship between the dynamics of employment and inflation in selected European Union countries.

THE RESEARCH PROBLEMS AND METHODS: The research problem is to find out what effect inflation has on the evolution of the employment rate. The study was based on the scoping method used in the literature review. The empirical analysis used the distance-weighted least squares method and neural network analysis.

THE PROCESS OF ARGUMENTATION: The first part examines the literature on the relationship between inflation and the employment rate. This is followed by an analysis that identifies the role of inflation on the employment rate in selected European Union countries.

RESEARCH RESULTS: Our research has shown that changes in inflation can contribute to explaining the formation of employment in examined European countries. At the same time, the analysis revealed that the impact of inflation on the employment rate is relatively low.

CONCLUSIONS, INNOVATIONS, AND RECOMMENDATIONS: The implications of the Phillips curve with regard to the relationship between

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inflation and the labour market are present. However, the relationship itself described is relatively weak with regard to other factors. The labour market in the European Union is multi-dimensional and is shaped by a number of factors.

KEYWORDS:

employment, inflation, Phillips curve, European Union

INTRODUCTION

In view of a number of socio-economic changes, one of the observed trends is changes in the labour market (Maitah & Urbánková, 2015). Recent decades are associated with the process of globalisation, technological advances, as well as various shocks affecting the economies of individual countries. Developed economies tend to be affected by shocks that are widespread around the world, and the impact of these shocks is not homogeneous. Their conditioning depends on a wide variety of factors, including market institutions (Fedeli et al., 2015)

As of 2020, two exogenous shocks significantly affect the global economy (Caporale et al., 2022). The economic shock caused by the COVID-19 pandemic contributed to the recession of European economies. In view of the spread of the coronavirus worldwide, extensive measures were taken to limit the spread of the pandemic (Jestl & Stehrer, 2021). The blockades and social distancing restrictions put in place affected economic as well as social life, impacting on employment. In addition to the COVID-19 pandemic, the Russian-Ukrainian war also affected the labour market and inflation globally (Caporale et al., 2022; Topalova et al., 2023).

The purpose of this article is to empirically verify the fundamental relationship implied by the Phillips curve: the relationship between the dynamics of employment and inflation, and to answer the following research question: What role does inflation play in shaping changes in the employment rate? The study was based on triangulation of research methods, including the scoping method used in the literature review. The empirical analysis was based on the distance-weighted least squares method and neural network analysis.

While there are many studies in the literature and in practice on the relationship between employment dynamics and inflation, more

research is needed to better understand the effects and consequences of this phenomenon. This study contributes to the literature in several ways. First, our study presents the relationship between employment dynamics and inflation over the long term. Second, our study covers 19 European Union member states, so it provides a comprehensive analysis for countries with varying levels of socioeconomic development. Third, the study conducted analysis using the distance-weighted least squares method and neural networks. To the best of our knowledge, to date, these methods have not been applied to the study of the impact of inflation on the development of changes in the employment rate.

The article begins with an introduction of the research problem and an explanation of our contribution to the development of the research, followed by an explanation of the research methods used in the methodological section. The main part of the article consists of the process of argumentation and results of the empirical research. The discussion compares the results obtained with previous studies. The final section presents a summary of the results with an indication of research limitations and suggestions for further research.

RESEARCH METHODOLOGY

The main purpose of the article is empirical verification of the fundamental relationship implied by the Phillips curve: the relationship between the dynamics of employment and inflation. The study uses quarterly data for 2003–2022, describing the following indicators: GDP per capita, GDP rate, Inflation rate, Labour cost. The data used in the study is mainly from the dataset in the Eurostat and OECD database (download date: 10.10.2022).

The choice of this time frame was determined, first, by the research objective of analysing the relationship between employment dynamics and inflation over the long term, and second, by the availability of comparable data.

Finally, the study used a panel time series containing 1,482 observations each, referring to results from the following 19 countries: Austria, Belgium, Czechia, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland,

Portugal, Slovakia, Slovenia, Spain. The choice of countries included in the study was determined by the availability of comparable data.

From a methodological point of view, descriptive methods (including the distance-weighted least squares method, or selected statistical parameters) were used to describe the relationship between inflation and employment in the introductory section. In turn, the later part of the article presents the results of modeling the impact of inflation on employment, and an assessment of the relevance of inflation in this modeling, using analysis with the help of neural networks (these methods are finding increasing use in research in the field, e.g. (Angelini et al., 2008) The process of creating the final models is explained later in the paper.

In order to assess the quality of the research, the choice of research methods used in the article was determined by meeting two research criteria – reliability and validity. These criteria were met by the relevance of the selection of indicators and the use of publicly available data, which makes the research replicable. The use of research triangulation methods provided an answer to the research question of what role inflation plays in shaping changes in the employment rate.

THE PROCESS OF ARGUMENTATION

There are currently many changes of an economic nature taking place globally, and this is also affecting the European Union, which remains one of the fastest growing economies (Gricar et al., 2022; Maitah & Urbánková, 2015). The labour market is extremely important to the functioning of the economy, and the unemployment rate is ranked alongside the inflation rate, GDP and the balance of payments among the most important features of economic efficiency (Maitah & Urbánková, 2015). Unemployment therefore remains one of the key challenges in the economic dimension and is one of the main areas of economic policy, including in the European Union (Ho & Iyke, 2018). At the same time, it is indicated that price stability is an important element for sustainable economic growth and employment (Epstein & Yeldan, 2008). As Milton Friedman (1977) observed: “there is no stable trade-off between inflation and unemployment;

there is a “natural rate of unemployment” (UN) which is consistent with the real forces and with accurate perceptions; unemployment can be kept below that level only by an accelerating inflation; or above it only by accelerating deflation”. Similarly, Samuelson and Solow’s research saw a possible trade-off between inflation and unemployment. However, like Friedman, they pointed out that this trade-off is unsustainable (Samuelson & Solow, 1960). Furthermore, Samuelson and Solow indicated that when unemployment is low, it can be further lowered by reducing inflation (Berentsen et al., 2011; Hall & Hart, 2012; Samuelson & Solow, 1960).

A literature review of the relationship between inflation and the employment rate was conducted using the scoping method. This method is relatively new, but it is increasingly being used to broadly analyse the literature in a specific area (Daudt et al., 2013; Munn et al., 2018; Peterson et al., 2017; Pham et al., 2014). There is no formal definition, purpose or methodological framework for the scoping method in the literature (Daudt et al., 2013; Peterson et al., 2017; Pham et al., 2014; Tricco et al., 2015). However, the scoping method provides a broad and diverse overview of the topic under analysis, and also allows mapping the existing literature on the topic area (Peterson et al., 2017; Pham et al., 2014). In addition, it is pointed out that the scoping method, on the basis of defining the scope and design of existing research, enables the identification of research gaps (Arksey & O’Malley, 2005; Munn et al., 2018). Thus, the scoping method can be used to determine the significance of the relationship between inflation and the employment rate in the European Union member states studied.

To conduct a literature review through the scoping method, we used the SCOPUS publication database, which is a widely used publication database by researchers worldwide. In addition, the SCOPUS publication database is reliable and has a multidisciplinary profile (Parmentola et al., 2022).

The selection of literature used for the literature review was based on the following set of keywords: inflation and employment and European Union or EU or Europe. In order to achieve the research objective and make an appropriate selection of literature for analysis, the following research question was posed: What is the role of inflation in shaping changes in the employment rate?

In further, inclusion and exclusion criteria were defined and used to identify the literature for the literature review. The inclusion criteria included the fields of economics, econometrics and finance, as well as articles from peer-reviewed journals and review articles. Books, conference proceedings, book series and a professional journal were excluded from the literature review. In addition, only English-language texts were included in the literature review. Table 1. provides a complete list of the inclusion and exclusion criteria that were used in the scoping review.

Table 1. Inclusion and exclusion criteria used in the literature review

Selection steps for literature review	Comments	No.
Items identified during the initial browsing of the SCOPUS database	Scopus database were used	98
Application of inclusion and exclusion criteria	Inclusion and exclusion criteria included: a. Subject area: Economics, Econometrics and Finance b. Document type: Articles and Review articles c. Source: Journal d. Language: English	40
Duplicates removed	Two duplicates were identified and removed	2
Title and abstract review	At this stage, 17 articles with low contributions were excluded, and one report was removed, which was disclosed	17
Full-text review	The low contribution item has been deleted	22
Final review sample		9

Source: own elaboration

After applying keywords, 98 results were identified. The inclusion and exclusion criteria outlined above were then taken into account, which reduced the results to 40 publications. Among the results, 2 duplicates were found. A review of titles and abstracts revealed 17 articles that do not contribute significant insights to the topic under study, and it was decided not to include them in the literature review. In addition, a report was identified at this stage that was also excluded from further analysis. Based on the established inclusion and exclusion criteria, 22 articles were finally identified for inclusion in the study. The next step was to obtain full-text versions of the articles included in the study. Each of these articles was reviewed, and this

step allowed the identification of 12 low-contribution articles. In the end, 9 articles were included in the study, and during the analysis of these articles special attention was paid to the purpose of the study: the empirical verification of the fundamental relationship implied by the Phillips curve, i.e.: the relationship between the dynamics of employment and inflation.

When reviewing the research articles that were selected in the scoping review, it seems that the researchers focused on analysing the relationship between employment and inflation from different perspectives. Studies have taken into account the impact of significant economic experiences on long-term unemployment, wage flexibility, the impact of globalization on the labour market in terms of wage inflation, income inequality, political support, or the extremely important environmental aspect from the perspective of the EU economy.

In a research paper, Yong (2019) explains theoretically and empirically the period of impact of significant economic experience on long-term unemployment. The author referred to Fisher and short-run causation – inflation encourages the public to engage in profitable economic activity, which reduces the unemployment rate. At the same time, Yong noted that unemployment has fallen since 2014, while inflation has remained low. Thus, inflation was not a factor in the decline in unemployment. In addition, the analysis showed that unemployment is negatively related to inflation and real GDP. In further addition, the conclusion of this study is that the economy's exposure to changing economic conditions in the distant past is a kind of knowledge and learning process. The use of past experience and knowledge makes it possible to deal with current economic conditions, such as reducing the unemployment rate, even after a considerable time distance has passed. From the empirical results, a significant time distance is identified as even one decade, moreover, it was found that the duration of impact on unemployment is extended to a period of several decades.

At the stage of full-text review of scientific articles, it was observed that considerable attention was paid to the NAIRU unemployment rate. Fedeli et al. (2015) found that underlying net lending of government as a percentage of potential GDP (UNLG/pot. GDP) and an increase in the tax burden can increase NAIRU unemployment in the long run by studying 13 European Union member states and the United Kingdom. According to the Keynesian approach, market

economies are inherently unstable and cannot provide enough aggregate demand to guarantee full employment in the economy. An increase in the tax burden with unchanged UNLG/pot. GDP has a negative impact on unemployment. High taxes can burden employment both directly (through the fiscal wedge) and indirectly (taxing consumption, capital or businesses). In addition, high NAIRU unemployment is correlated with high long-term budget deficits.

In light of the increase in the unemployment rate in the European Union after the 2008–2009 financial crisis, the determinants influencing NAIRU unemployment in 14 European Union countries between 1985 and 2012 were examined (Heimberger et al., 2017). It was highlighted that there is a link between labour market rigidity and rising unemployment across Europe. In addition, it was pointed out that real estate booms and busts and capital accumulation should not be ignored when estimating NAIRU unemployment.

On the other hand, Pino and Soto (2014) analysed wage flexibility as a factor affecting inflation in 12 Eurozone countries. The study used the New Keynesian Phillips curve to calculate the equilibrium value for labour income share ratio (LISR). Unemployment NAIRU and LISR stabilize inflation, while wage inelasticity can account for the countercyclical behaviour of LISR. The long-run LISR is consistent with NAIRU unemployment or equivalently with the natural level of output. This enabled the authors to study the evolution of wage flexibility over time and identify countries with wage flexibility negatively affecting employment. The highest levels of wage flexibility among the countries included in the study were Austria, Ireland, Italy and Portugal. Thus, it turned out that high unemployment in Ireland, Italy and Portugal was not caused by wage flexibility, but by a decline in the competitiveness of these economies. Belgium, the Netherlands and Spain were shown to have the highest levels of wage rigidity. In addition, Spain had the highest increase in unemployment after the 2008–2009 financial crisis.

The impact of globalization on the labour market in terms of wage inflation and the distribution of activity across regions was examined by Demertzis et al. (2009). Their analysis focused primarily on the impact of aggregation in labour markets on the distribution of employment and inflationary pressures. They pointed out that European labour markets were characterized by low labour mobility,

wage inelasticity and high capital mobility. The study showed that the cost of reducing wage or price inflation for a country or region becomes greater as unemployment increases and the dispersion of unemployment rates decreases. It was pointed out that a flatter Phillips curve means lower inflation at each level of unemployment, as well as greater fluctuations in unemployment during the adjustment stage of the economy. The analysis also showed that during the period studied, i.e. 1984–2007, there was a trade-off between wage inflation and unemployment in Germany. However, after convergence, Germany no longer plays a dominant role in the way prices and wages are set across the European Union. In addition, differences in unemployment between EU member states will persist, as they depend on labour market institutions, wage sensitivity and cost structure.

From the perspective of the European Union, it is extremely important to reduce regional disparities and narrow the socioeconomic gap. As Čiegis et al. (2008), pointed out, reducing regional disparities, income gaps and effectively solving the problem of poverty is possible when steady economic growth is ensured. It is also important to overcome the problem of unemployment, since the unemployment rate is one of the indicators that most accurately depict inequality. Countries with lower unemployment rates have achieved a higher level of development and are able to reduce the growing income disparity among different social groups. In addition, the authors stress that inflation reduces the competitiveness of the economy and undermines public confidence..

The positive impact of inflation on income inequality was also demonstrated in a study by Thalassinos et al. (2012). Importantly, the study found that there is a negative relationship between employment and income inequality. However, income inequality and inflation lower the average per capita income in the European Union. Income inequality and inflation are important in designing stabilization programs. An increase in the unemployment rate tends to affect those classified in the lower end of personal income. Moreover, economies with higher levels of income inequality tend to have higher levels of inflation.

Building political capital and the impact of political support on the labour market and inflation have been proven by Friedrichsen and Zahn (2014). The authors emphasize that in the context of political support, employment policies are more important than economic

growth. An analysis conducted for 16 European countries using a log-it model proved that people with higher education and employment are more concerned about inflation than those who are not employed or unskilled. In addition, those with higher education and employment are able to accept higher unemployment rates in real terms. It is worth noting that the authors reason that preferences for revolution increase when the economy weakens. Thus, macroeconomic performance can increase an individual's satisfaction with democracy. This was reflected in Greece, Ireland, Italy, Spain and Portugal, which fell into recession during the 2008–2009 financial crisis. As a result of the deteriorating economic situation in all these countries, governments were removed from power.

An analysis of the relationship between GHG emissions, employment, inflation and GDP at constant prices was conducted by Gricar et al. (Gricar et al., 2022). Employment has been increasingly discussed in terms of its impact on GHG emissions. The study, which covered the EU-27, Iceland and Norway, was conducted using cointegration and Granger causality testing. The analysis showed that inflation affects employment; as a result, there is no direct relationship between the employment variable and GDP at constant prices. The average value of the relationship between inflation and employment was -29.22 for the EU-27 and 3.91 for Norway. Thus, high employment is beneficial for lower inflation, and vice versa for the EU-27 and Norway. Interestingly, this relationship does not apply to Iceland.

Given the results of research to date, it was decided to formulate the following research hypothesis:

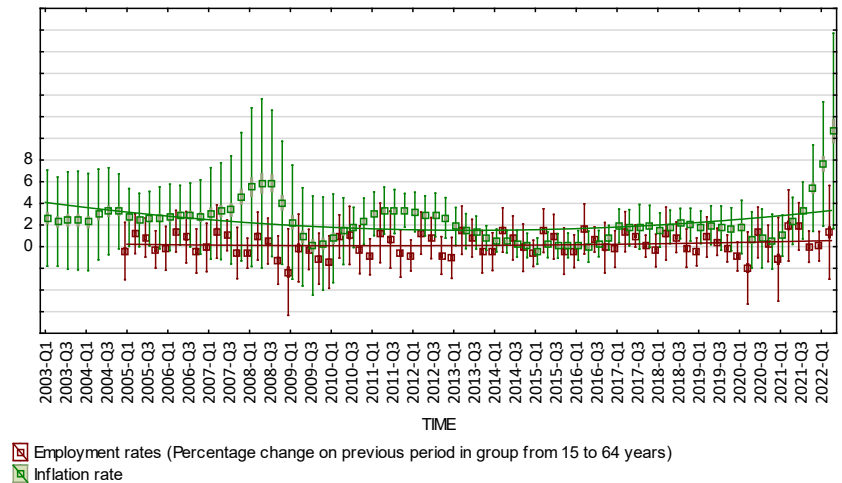
H: The impact of the inflation rate on employment dynamics in EU countries remains relatively low.

An empirical study verifying the above hypothesis was carried out in further stages of the work.

RESULT AND DISCUSSION

The relationship between the volume of employment and inflation is still under discussion, but in view of the goal of stabilizing the economy, both the employment rate and the inflation rate are important indicators (Alisa, 2015).

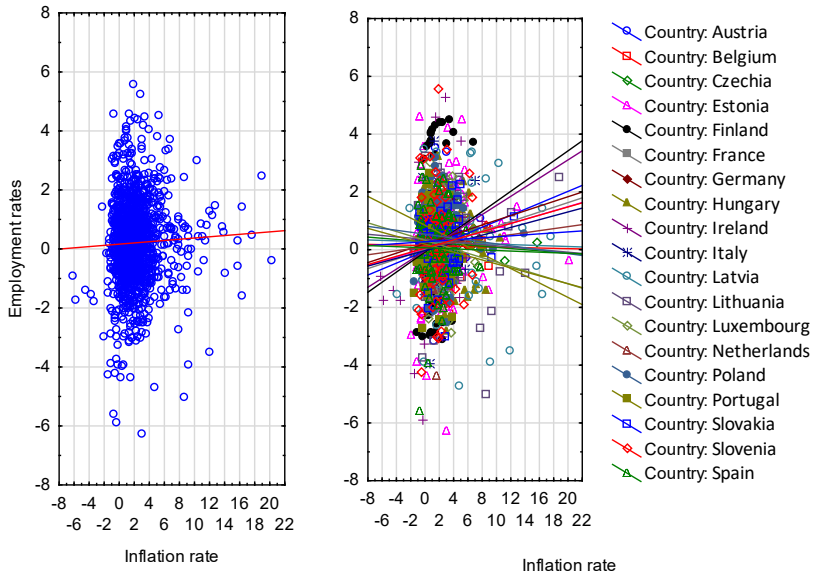
Figure 1. Development of values of Employment rate and Inflation rate indicators in selected time periods



Source: own elaboration based on OECD and Eurostat (available online 10.10.2022).

This topic is particularly relevant in view of the economic transition taking place in the 2021–2022 period due to the sharp increase in inflation rates in all European countries. As shown in Figure 1. (the points on the graph represent the average value for the countries studied in the period, while the whiskers represent the values of the standard deviation; to improve the visibility of the trend, a fitted polynomial trend was superimposed on the data) the value of inflation growth in the period 2010–2020, in the countries studied, oscillated on average between 0–2 percentage points, while from 2021 onward a sharp increase is observed (the highest increase, as of 2q2022, was observed in Estonia and amounted to 22%). The topic of the growth of the inflation rate is widely discussed in various economic perspectives (Afonso, 2023; Afonso & Pinho, 2022; Ball & Mazumder, 2021). The current period also provides an interesting observation in view of the previously discussed relationship between the inflation rate and the employment rate.

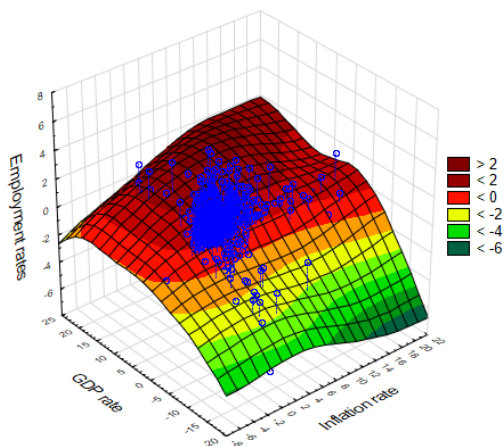
Figures 2–3. Scatter plots of Employment rate and Inflation rate in global and country perspective



Source: own elaboration based on OECD and Eurostat (available online 10.10.2022).

At the same time, the described “Phillips curve” relationship in simple terms (i.e. without taking into account time lags and additional macroeconomic variables) is not easily observable. As shown in Figures 2–3, a slight trend indicating the existence of a positive relationship between employment and inflation can be observed in the studied period of 2003–2022 in general. However, this relationship is noticeably weaker on an individual basis, and may indicate the presence of different vectors of this relationship (for example, trend matching for Finland’s data indicates a clear positive relationship, while Hungary’s data indicates a negative relationship).

Figure 4. Values of Employment rate, GDP rate and Inflation rate indicators



Source: own elaboration based on OECD and Eurostat (available online 10.10.2022).

The need to complete the analysis of the development of employment dynamics in relation to inflation was pointed out by Ball and Mazumder (2021). One of the primary variables introduced into models describing the development of employment, in addition to the inflation rate discussed above, is the GDP per capita and GDP rate. As shown in Figure 4, in a preliminary overall view (in order to preliminarily examine the relationship between the three indicators presented, a distance-weighted least squares smoothing method, commonly used in the field, was used, e.g. Banerjee et al. (2004), Tomala et al. (2021) – The points on the graph thus represent successive observations included in the study), it can be observed that it is indeed possible for employment growth to occur as a result of inflation growth, particularly in countries with higher GDP growth.

The preliminary approach presented also indicates a strong concentration of data around the 0 value for all three indicators. Therefore, the presented relationship can be considered apparent. As previously mentioned, subsequent authors indicate the need to expand exogenous variables in the study of the relationship between inflation and employment. Therefore, the study decided to introduce lags for the GDP rate and inflation rate indicators up to two

years, thus obtaining eight more indicators for each variable (since the data are quarterly). The introduced lags are due to indications that employment in the real economy is made using predictions of the economic environment by entrepreneurs based on past events (Ball & Mazumder, 2021; Beccarini & Gros, 2008). In addition, the level of employment, as well as its changes, will depend on the level of the economy and therefore the GDP per capita measure was also used in the final modelling (Correia & Carvalho, 2016; Fullerton et al., 2011; Huber, 2009).

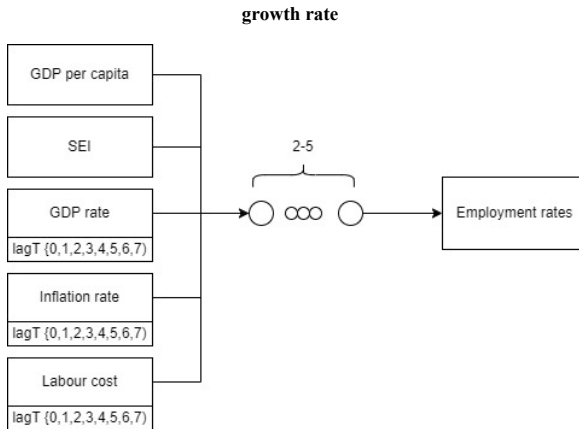
Another indicator included was the cost of labour, the inclusion of which stems from an attempt to take into account the diverse nature of the European economies studied. There is a diversity of development in Europe, which affects the structure of employment, which can be based, for example, on selected sectors, technology, or cheaper labour (Afonso, 2023; Akinsola & Odhiambo, 2017; Fullerton et al., 2011; Imdorf et al., 2017; Kyriazi, 2023; Núñez & Livanos, 2010). The last factor, in turn, strongly differentiates the countries studied in terms of the categorization of labour markets and can explicitly translate into the formation of employment (Kyriazi, 2023). In addition, the Simple Expectation Indicator (SEI) was included in the final modelling, which attempted to capture public expectations about the formation of the economy. The value of this indicator was developed based on a moving average, viz:

$$\frac{y_{t-1} + y_{t-2} + y_{t-3}}{3} \geq y_t \rightarrow SEI_t = 0$$
$$\frac{y_{t-1} + y_{t-2} + y_{t-3}}{3} < y_t \rightarrow SEI_t = 1$$

Where y_t is GDP per capita growth rate in period t , and SEI_t Simple Expectation Indicator in period t . The introduction of this indicator resulted from an attempt to take into account the assumption on expectations of future performance, which was signalled by Alon et al. (2020) and Mongey et al. (2021).

Neural network modelling was conducted to assess the impact of the usefulness of the inflation growth rate in assessing employment growth. The general architecture of the models eventually took the form shown in Figure 5 below.

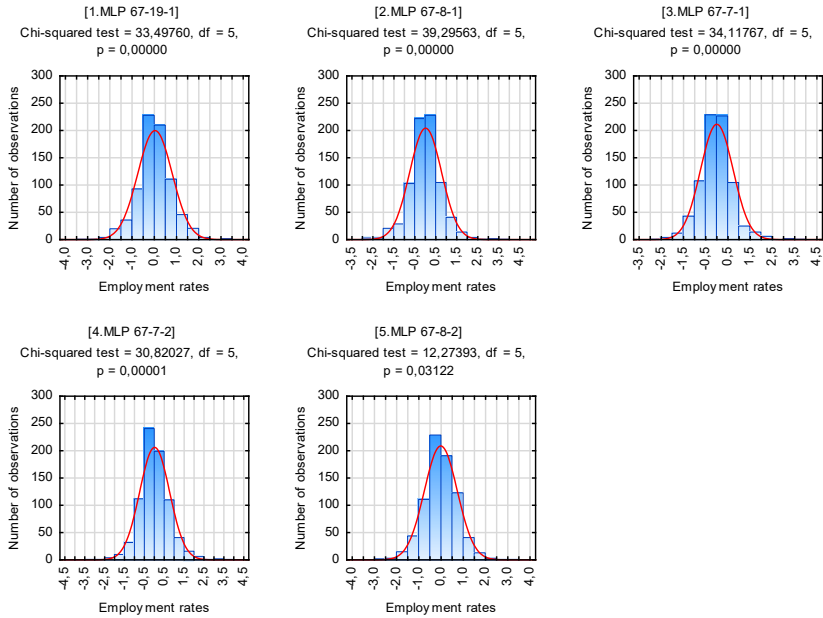
Figure 5. Theoretical architecture of models explaining the formation of the employment growth rate



Source: own elaboration.

The architecture shown in Figure 5. was the starting point in the approach used, which was based on the construction of another 500 neural network models using linear, logistic, tanh and exponential functions in the input, output and hidden layers (the number of which was determined in the range of 2 to 5). The dataset described in the paper was divided into three groups: teaching (70% of the data), validation (15% of the data) and testing (15% of the data). The selection of the best five models was dictated by minimizing the value of the sum of squares of model errors.

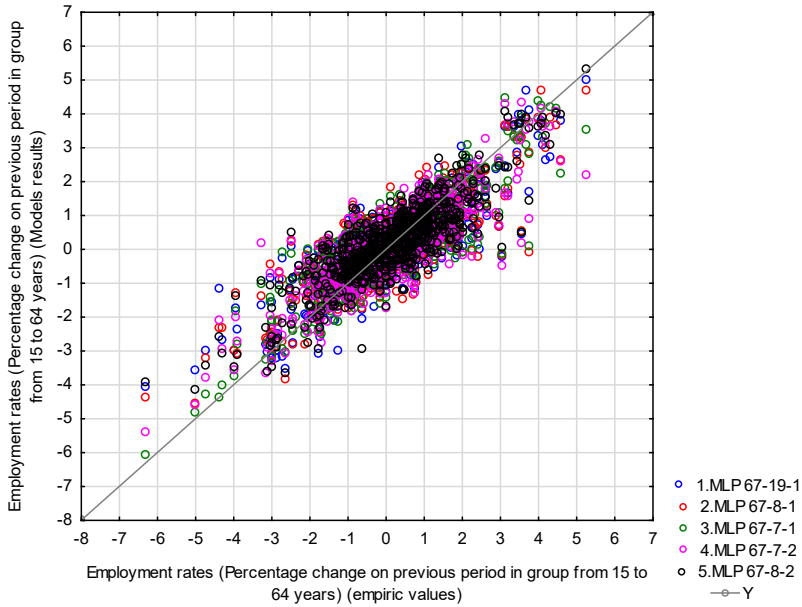
Figure 6–10: Distribution of residuals of models with the highest level of fit



Source: own elaboration.

As depicted in Figures 6–10, five more models were developed: MLP 67-19-1, MLP 67-8-1, MLP 67-7-1, MLP 67-7-2 and MLP 67-8-2, whose residuals took on the values of a normal distribution. At the same time, however, the range of this distribution oscillated around -2 to 2, which, in the perspective of the employment change rate in question, may indicate further room for improvement in prediction.

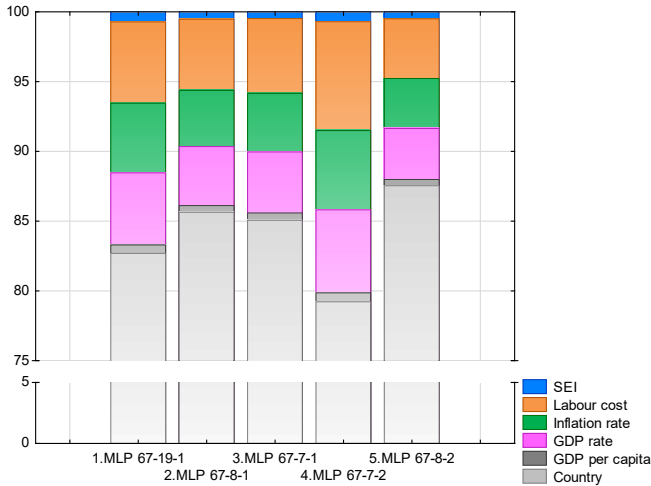
Figure 11: Distribution of observable to modelled employment rate values



Source: own elaboration.

Figure 11 shows the result of the modelling, where it is clearly indicated that the factors that were included in the modelling can serve to explain the formation of the value of employment changes. At the same time, as previously indicated, all five models indicate the possibility of improving the prediction by including additional factors that differentiate the results.

Figure 12. Sensitivity structure of models describing the formation of employment



Source: own elaboration.

The most relevant in the perspective of the entire work seems to be Figure 12, which describes the structure of the influence of each category of factors on the ability of the model to predict changes in employment. As we can observe, by far the greater part of the effectiveness of the models is based on the use of information about the diversity of the set in relation to the origin of the data (country). The remaining factors generate about 15% of model effectiveness. Indicators of changes in inflation are responsible for about 5% of the changes in the models performed (also after taking into account time-delayed series). As a result, therefore, it can be pointed out that the formation of this measure can be used in explaining the formation of employment in the European countries studied, but the impact of this factor is relatively low (in relation to the others included in the study). This therefore confirms the research hypothesis that the impact of the inflation rate on employment dynamics in the European Union countries remains relatively low. Consequently, the relationship described by Phillips, analogously, can occur in the real economy. However, it is not a relationship that determines the formation of the labour market in highly developed European countries.

Over the past several years, the behaviour of inflation in European Union countries has puzzled economists (Ball & Mazumder, 2021;

Yong, 2019). It was pointed out that inflation was falling as a result of the 2008–2009 global financial crisis and the 2011 European debt crisis. In addition, the oil sector and fluctuations in oil prices had an impact on headline inflation. Inflation in the European Union was also expected to be shaped by factors such as the development of the service sector and the globalization process (Ball & Mazumder, 2021). Currently, European Union member countries are experiencing high inflation rates like other economies, due to the economic slowdown following the outbreak of the COVID-19 pandemic, rising energy prices, and the war between Russia and Ukraine (Caporale et al., 2022; Ruiz Estrada, 2022). The COVID-19 pandemic led to an unprecedented and multidimensional impact on the economy, contributing to a jump in inflation (Caporale et al., 2022).

The shock of the COVID-19 pandemic more severely affected the economies of the southern part of the European Union – Greece, Spain, Portugal and Italy. The economies of these four countries shrank in 2020 by 10% (Greece), 11% (Spain), 7.6% (Portugal) and 8.8% (Italy), respectively (Afonso & Pinho, 2022). Tourism and recreation remains a very important sector in these four economies. Restrictions imposed due to the pandemic have contributed to rising unemployment, declining human capital, and declining investment and trade in the aforementioned countries (Afonso & Pinho, 2022; Ruiz Estrada, 2022; Vegas & Winthrop, 2020).

By contrast, the labour market in the European Union is characterized by multidimensionality, which is conditioned, among other things, by global economic cycles (Caravale, 1997; Ho & Iyke, 2018; Snieska et al., 2015; Stanila et al., 2014). In addition, the varying level of socioeconomic development of individual countries is also important (Čiegis et al., 2008). Technological advances, as well as an increase in R&D spending, have contributed to the narrowing of the technology gap, the positive impact of knowledge between sectors, and the relative increase in private sector wages (Afonso, 2023).

It is pointed out that another of the factors that affect the employment rate in European Union countries is education. The level of education affects the employment rate in most EU member states (Snieska et al., 2015; Stanila et al., 2014). When considering the importance of education level, it is worth noting the phenomenon of overeducation, which also affects many EU economies. Falling unemployment leads

to an increase in the number of people educated to a much higher level than necessary. Thus, over-educated people prefer to remain unemployed and look for jobs in line with their education rather than enter the labour market and work below their qualifications and skills (McGuinness et al., 2018).

The socio-economic changes that are taking place globally are contributing to changes in the labour market. In turn, inflation can affect all economic processes, including employment. Given this, inflation and the level of employment, as well as their economic effects, require constant research. This research contributes to the debate on the relationship between the employment rate and the inflation rate, as well as the development of economic policy research.

CONCLUSIONS

The purpose of the article was empirical verification of the fundamental relationship implied by the Phillips curve: the relationship between employment and inflation dynamics. The study carried out concerned selected member countries of the European Union.

The analysis conducted, as well as the results, allowed us to formulate several conclusions and identify limitations. First, the implications of the Phillips curve with regard to the relationship between inflation and the labour market are present. However, the relationship itself described is relatively weak with regard to other factors. Second, the labour market in the European Union is multidimensional and is shaped by a number of factors. These factors can include technological progress, level of education, varying levels of socio-economic development among EU members, or global economic cycles, among others. Thus, the unpredictability of inflation and general economic uncertainty can affect changes in the employment rate. Third, the expansion of the set of macroeconomic variables may further improve the explanation of the path of changes in the labour market. Fourth, Phillips inflation can be replaced by more specific indicators, particularly relating to the nature of inflationary changes, e.g.: inflation caused by wage-price spirals, inflation resulting from distorted production markets, which can contribute to a better understanding of the relationship.

In addition, further research on the relationship between employment and inflation can also be extended to all European Union countries. It is also worthwhile to focus on the factors affecting the employment rate in the European Union, especially since individual member countries have different levels of socio-economic development. It also seems necessary to frame the impact of the COVID-19 pandemic and the war between Russia and Ukraine in the context of the labour market and inflation. This is important because both the COVID-19 pandemic and the war have affected many aspects of economic and social life.

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