THE IMPACT OF UNEMPLOYMENT ON SOCIAL-ECONOMIC DETERMINANTS IN THE NATIONAL CONTEXT

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Abstract

This paper analyzes the impact of the unemployment rate on economic and social factors in Romania from 1990 to 2024. The main objective of this study is to identify whether economic growth, economic stability, the labor market, education level and migration influence unemployment at the country level. To study the causal relationship between variables, econometric models were used that allow determining the relevance of factors for time series regression. Static and dynamic approaches and Granger causality were used. The empirical results suggest a statistically significant relationship between gross domestic product and the inflation rate, which shows that the lower the gross domestic product, the higher the inflation rate. The research findings show a positive relationship between inflation, average net salary and the unemployment rate and a negative relationship between gross domestic product, education, emigration and unemployment in Romania.

Keywords: *unemployment; economic growth; economic stability; labor market; education level; migration; Romania.*

JEL Classification: *C58; E24; J10; O11; O12*

1. Introduction

Considered an imbalance in the labor market, unemployment has a major impact on the national economy as a whole. The economic and social aspects of unemployment are considered to be elements that highlight the critical role of those exposed to occupational risk. Based on the theories developed, the causes of unemployment are influenced by various factors such as changes in the economic structure and the difficulties of employees to adapt to these changes (M., Petrisan, 2008, 2), disparities between national labor markets that consist of very low salaries (Lucian, P., 2016, 292), the negative evolution of economic activities or the substitution of labor by capital (L. Ş., Ţoţan; B., Popescu; S. E., Cristache, 2013, 23), technological progress, the crisis and economic dynamics (V., Bejenari, 2009, 10), the redistribution policy practiced by governments (A., Olteanu, M.A., Radoi, 2009, 396-402). All these are just a few of the consequences that directly affect the active labor force.

Figure 1. Annual unemployment rate in each county - 2024

Source: Ministry of Labor, Family, Youth and Social Solidarity website, www.mmuncii.ro, item *Statistics-unemployment 2024*, accessed on 28.04.2025.

In the current context, according to Figure 1, the unemployment rate by county is observed, which in 2024 presents a developed local economic situation in the counties of the South, North-West, North-East and East of the country, compared to the counties of the West and Center of the country where economic difficulties and reduced investments are reported. The figure outlines the difficulties necessary for the academic, economic and social analysis regarding the impact of the unemployment rate on the causal factors.

The main objective of the research is to analyze the impact of the unemployment rate on economic growth, economic stability, the labor market, the level of education and migration by highlighting an applied research on Romania during the period 1990-2024. The longest available period identified was evaluated, from which 35 observations specific to the time series resulted.

The research contributes to the field by addressing a subject that always requires study due to continuous economic changes, thus improvements can be made to the specialized literature. The contributions made by the proposed empirical study refer to the temporal perspective through which the situation at the national level is presented, by presenting the link between the unemployment rate and key economic and social indicators. On the other hand, the approach undertaken involves the assessment of Romania's progress in terms of gross domestic product, inflation, average net salary, education level and emigration. The proposed form of analysis has been little explored in the economic literature until now.

The study of the paper for the following sections is organized as follows: section 1 presents the relevant theoretical considerations on the basis of which the working hypotheses are formulated according to the proposed theoretical model. In the following section 2 we design the methodology and data used, section 3 highlights the analysis of the results and discussions of the empirical findings, and finally the conclusions of the study and the limits of the researched paper are presented.

2. Literature review and Hypothesis

Unemployment is one of the challenges of today's world that continues to cause a major imbalance in the labor market. According to National Law no. 76 of 2002 on the unemployment insurance system and the stimulation of employment, a person is considered unemployed when he/she cumulatively meets the conditions referring to the state of health and physical and mental capacities; does not have a job, does not earn income or earn from authorized activities and is looking for a job since the age of at least 16; is available to start work in the immediate future and is registered with the National Employment Agency of Romania.

In a similar manner, the International Labor Organization shows that the total number of the active population who is without a job, but who is looking for a job are considered unemployed. This category also includes people who have left their job voluntarily.

The problem of unemployment is widely studied both at the national level (T. M. Cojocaru, 2021, 310-319; M. Zaharia, A. Bălăcescu, R. M. Gogonea, 2024, 36-46; A. Bîrcă, 2024, 34-44), and internationally (M., Stoian; G. R. Lădaru; F., Marin, 2017, 901-917; Y., Nademi; H. S., Kalmarzi, 2025; H., Ayad; A., Djedaiet, 2024; H., Tjahjanto; T., Tuhana; I., Mafruhah; N., Istiqomah; D., Ismoyowati, 2023) because it contributes negatively to the individual and to the national economy. Dismissal can be a stigma and a source of stress for the workforce concerned, which can cause emotional and physical suffering. On the other hand, the economic situation of a country is affected by periods of unemployment due to the reduction of incomes that lead to the creation of financial restrictions. Therefore, unemployment has consequences at both the microeconomic and macroeconomic levels, contributing at the same time to the sentiment of social exclusion.

According to researchers C. Anghelache, G. V. Anghelache, L. Prodan, A. Manole (2013, 39) the unemployment rate represents the ratio between the number of unemployed (registered with employment agencies) and the civilian active population (unemployed + civilian employed

population, defined according to the labor force balance methodology) (www.insse.ro). All member states of the European Union periodically report the unemployment rate to EUROSTAT, and at the Romanian level the data are identifiable at INSSE.

Studies on the influence of the unemployment rate on gross domestic product are numerous in the international literature and are based on quantitative data in various EU and non-EU countries. The literature shows the study of the correlation in OECD countries (E. D. Ülker, S. Ülker, 2020) using support vector regression, and in European Union countries (I. C. Iuga, 2013) shows links between the unemployment rate and GDP. H. Hjazeen, M. Seraj, H. Ozdeser (2021) in their work on Jordan used the distributed lag autoregressive model and found that there is a long-term relationship between the unemployment rate and economic growth. In Somalia (M. H. Mohamud, Faculty of Economics, F. A. Mohamud, A. Gul, A. A. Warsame, B. M. Osman, S. M. Ahmed, 2024), the relationship between GDP and unemployment is investigated using both frequentist regression and Bayesian approaches, and the results reveal a negative association between unemployment and GDP through both approaches. Recent approaches to the correlation are multiple – Ethiopia (Y. A. Shiferaw, 2023) where the results of the ARDL estimation showed that unemployment had a significant negative impact on GDP; in the Moravian-Silesian region (E. Kalinová, K. Kroutlová, 2023) a correlation was found between the unemployment rate and gross domestic product, which demonstrates the importance of the correlation. The USA (C. Mandel, P. Liebens, 2019; R. Patil, A. Kumar, 2024) approaches the degree of prosperity according to time series where a continuous negative correlation between GDP and unemployment is observed.

Based on the literature, the first hypothesis and research question is:

Hypothesis 1: *The application of the unemployment rate negatively impacts economic growth (GDP) in Romania*

Research question 1: Can economic growth explain the variations that may occur in the unemployment rate?

Studies on the influence of the unemployment rate on inflation present various spatial econometric approaches as shown in the empirical study in ASEAN-10 (N. Lisani, R. Masbar, V. Silvia, 2020) and it was found that unemployment responded to inflation shocks in a more significant percentage. Various conclusive studies show that inflation has no potential to reduce unemployment either in underdeveloped countries – Nigeria (U. D. Samuel, V. C. Israel, C. B. Chidubem, J. Quansah, 2021), Brazil (S. Demez, İ. H. Polat, 2021), Malaysia (A. Hashima, N. Rambeli, N. Abdul, E. Hashim, 2019), Romania (A. Moridian, M. Radulescu, M. Usman, S. M. Reza Mahdavian, A. Hagiu, L. Serbanescu, 2024), but not in economically developed ones (L. Pavlov, A. Vasilev, 2025).

The formulation of the second hypothesis and research question is configured as follows:

Hypothesis 2: *The application of the unemployment rate negatively impacts short-term economic stability (INF) in Romania*

Research question 2: Can inflation explain short-term variations in the unemployment rate?

The expected directions of the influence of the unemployment rate on the average net wage are presented by studies that have focused on empirical analyses because wages are considered to be determined by collective bargaining. P. Ranjan (2013) shows that in Sweden the calibration exercise predicts a non-monotonic relationship and a decrease in the cost of outsourcing that would reduce unemployment. In line with the theory that higher indebtedness should be paid to employees through higher wages, this is tested in the United States and the Netherlands (A. C. Akyol, P. Verwijmeren, 2013), and the results show a positive relationship between wages and unemployment rates. Empirical studies regarding this relationship are limited and with outdated and outdated statistical data, this relationship being debated mainly on theoretical reasoning.

Therefore, the following hypothesis and research question can be stated:

Hypothesis 3: *The application of the unemployment rate negatively impacts the labor market (NAW) in Romania*

Research question 3: To what extent do changes in the net average wage influence the unemployment rate?

The information used regarding the relationship between the unemployment rate and the level of education shows the importance of education in the modern world. The empirical research of I. Lavrinovicha, O. Lavrinenko, J. T. Treinovskis (2015) shows that in Lithuania the human capital theory, the theory of competition on the labor market and the dual theory of the labor market are taken into account in the empirical analysis, which results in a weak linear relationship, i.e. the higher the level of education, the higher the unemployment rate. The current wave of young people is studied in research from South Africa (G. Mpendulo, E. E. Mang'unyi, 2018) which shows that there is a weak linear relationship between the level of education and economic status, while approaches at the European Union level show the structure of unemployment depending on the level of education and the impact of the level of education on the unemployment rate (Z. Pozega, B. Crnkovic, Z. Stipetic, 2013), and the results can be used for decision-making in the development of higher education systems based on the efficiency criterion coherent with the factors influencing unemployment levels (V. Snieska, G. Valodkiene, A. Daunoriene, A. Draksaite, 2015).

Based on the literature, we propose the following hypothesis and research question:

Hypothesis 4: *The application of the unemployment rate negatively impacts the educational level (EDU) in Romania*

Research question 4: Can the level of educational training contribute to reducing unemployment?

The vast area of analysis of the relationship between unemployment and emigration shows the role of labor migration abroad, where in Slovakia different trends of economic development are observed from one period to another, between the link between the unemployment rate and migration flows (S. Vojtovich, 2013). Numerous empirical studies on EU member states demonstrate that the structural changes that have occurred in the economies in the last decade, emigration has indeed had a strong negative effect on unemployment in Central and Eastern European countries (Y. Pryymachenko, Y. Fregert, K. Andersson, N. G. Fredrik, 2011). According to the panel from Bulgaria, Estonia, Greece, Croatia, Latvia, Lithuania, Poland, Portugal and Romania (L. Skuflic, V. Vuckovi, 2018) emigration increases the unemployment rate showing positive effects in terms of decreasing unemployment.

Therefore, we evaluate the following hypothesis and research question:

Hypothesis 5: *The application of the unemployment rate negatively impacts short-term emigration (EMIG) from Romania*

Research question 5: Can emigration be considered a balancing factor in the evolution of the unemployment rate?

4. Data and Methodology of Research

Studying how the unemployment rate as the main statistical indicator regarding the labor market affects the explanatory variables is a concern of this research, being a dependent variable in a continuous knowledge with new elements from year to year. Annual data at the level of Romania between 1990-2024 were taken into analysis based on the free available data of national statistics. We considered this period of time appropriate to capture the economic situation from communism to the present. The post-communist transition periods (1990-2000), the global economic crisis (2008-2010), the crisis generated by the COVID-19 pandemic (2020-2021), the Russian invasion of Ukraine with global consequences (2022-present) and even the energy crisis (2022-present) were analyzed.

The unemployment rate UR (macroeconomic indicator) was chosen as a weighted endogenous indicator of the unemployed workforce, while the predictors addressed in this research are represented by the gross domestic product GDP, inflation INF (macroeconomic indicators), net average wage NAW (microeconomic indicator), graduates by level of education EDU and emigration EMIG (socio-economic indicators). These variables are considered to impact

unemployment as evidenced by the specialized literature studied in this research. According to the National Institute of Statistics (www.insse.ro), the regressors are defined as GDP is the main macroeconomic aggregate of national accounting and represents the final result of the production activity of resident production units, while INF expresses the average of monthly price changes and is calculated as a geometric mean of the monthly consumer price indices with a chain base from which the comparison base equal to 100 is subtracted. NAW is obtained by subtracting from the gross nominal wage earnings the mandatory social contributions of employees (social insurance contribution, respectively social health insurance contribution owed by employees) and the corresponding tax. Until 2018, the mandatory social contributions of employees included the employees' contribution to the unemployment insurance budget, the individual state social insurance contribution and the employees' contribution to social health insurance, while EDU are graduates who have passed the last year of study of a school/faculty, regardless of whether they passed or failed the graduation exam, baccalaureate, bachelor's degree, etc. The last independent variable EMIG are people (of Romanian citizenship) who emigrate abroad. Emigration is the action by which a person gives up their domicile in Romania and establishes their domicile on the territory of another state.

Figure 2 captures the theoretical model of the research through which the dependent variable UR is described with influences on the dependent variables GDP, NAW, INF, EDU and EMIG at the level of Romania, as well as the source of debts.

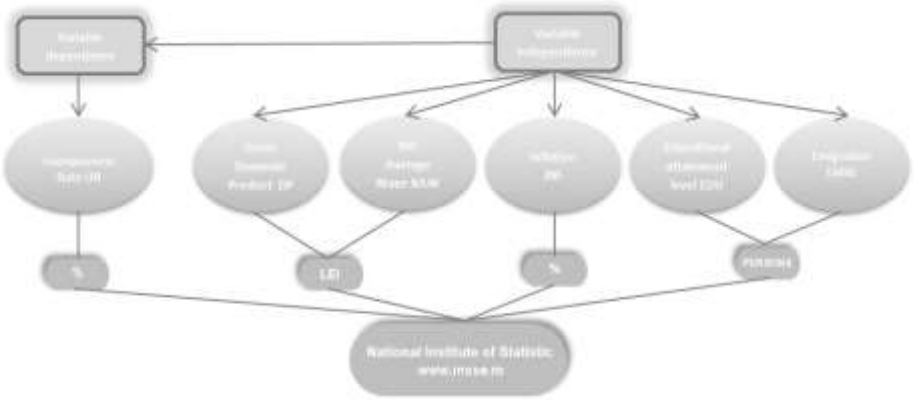


Figure 2. Theoretical model
Source: Author' processing

The resulting data series for the analysis was 34 observations resulting from annual time series, and the developed model is a multiple regression model through which 4 methods were applied at the level of Romania in order to determine whether the unemployment rate impacts the gross domestic product, inflation, average net salary, level of education and emigration. The fundamental bases in choosing the proposed analysis methods provide for the need to verify the heteroscedasticity aspects that offer the possibility of efficient management of the correlations between variables.

The role of introducing explanatory variables on the studied model is to impact the economic and social factors on unemployment in Romania, in order to provide relevant information for the formulation of public policies and for forecasting/simulations depending on the variations in the unemployment rate.

Table 1 presents the summary descriptive analysis of the data to identify the characteristics of the time series variables taken into study.

Table 1. Summary statistics

Variables	UR	GDP	INF	NAW	EDU	EMIG

Mean	6.13	531.33	138.34	679457.3	611041.6	23022.17
Median	5.40	507.90	109.00	3416.00	635361.0	18307.00
Max.	11.80	1605.00	356.10	5986386.	784958.0	96929.00
Min.	2.90	2.20	98.45	746.00	476557.0	7906.00
Std. Dev.	2.73	413.46	64.88	1486497.	86998.41	17426.94

Source: Author' processing in Eviews

Descriptive statistics include data on the study variables in order to evaluate their statistical characteristics. The results of basic summary statistics show positive values for all variables. At the same time, a relatively large dispersion of the dependent variable is observed, which suggests a significant heterogeneity within the time series. The proposed model does not present outliers because the variables have been winsorized.

The presentation of the correlations between the variables of the multiple linear regression model is presented in Table 2.

Table 2. Correlation Matrix

Variables	UR	GDP	INF	NAW	EDU	EMIG
UR	1	-0.699	0.467	0.347	0.401	-0.452
GDP		1	-0.556	-0.335	-0.679	0.412
INF			1	-0.064	0.282	0.057
NAW				1	0.259	-0.281
EDU					1	-0.250
EMIG						1

Source: Author' processing in Eviews

According to the matrix of correlates, there is no significant correlation between the analyzed variables. A positive correlation of the unemployment rate with inflation, average net salary and level of education is observed, and on the other hand, the unemployment rate presents a negative correlation with gross domestic product and emigration. A good correlation is also observed between gross domestic product and emigration. The low levels of the correlation coefficients raise some questions regarding the validation of the proposed hypotheses.

In order to detect the causal relationship between UR and the 5 control variables, GDP, INF, NAW, EDU and EMIG, in accordance with the analyzed literature (section 2), the following model containing time series was developed:

$$UR_i = \beta_0 + \beta_1 GDP_i + \beta_2 INF_i + \beta_3 NAW_i + \beta_4 EDU_i + \beta_5 EMIG_i + \varepsilon_i \quad (1)$$

In equation (1) i reflects the year, β_0 is the constant, $\beta_{1\to5}$ are the coefficients specific to the parameters, and ε is the error. The collected data are presented at the level of Romania during the period 1990-2024 and are econometrically processed using the EViews software.

5. Results and discussion

Testing the econometric model data also involved identifying the cross-sectional dependence between variables by checking homoscedasticity in the underlying data, for which the results presented in Table 3 were obtained.

Table 3. Results form Heteroskedasticity Tests

Test	F-statistic	Prob.
Breusch Pagan Godfrey	0.626	0.081
Harvey	0.631	0.077

Glejser	0.635	0.074
ARCH	0.660	0.022
White	23.541	0.000

Source: Author' processing in Eviews

According to the homoscedasticity tests in the data, it is found that the regression model does not present statistically significant heteroscedasticity. The robustness of the regressed research results shows that the variables are not dependent on each other, therefore there is no cross-sectional dependence. It is observed that the Breusch Pagan Godfrey, Harvey and Glejser test presents high relative probability values, therefore in these cases the alternative hypothesis is accepted, which shows a lack of heteroscedasticity in the residuals. On the other hand, the Autoregressive Conditional Heteroskedasticity and White test are contrary and can accept the null hypothesis, which shows the existence of heteroscedasticity in the residuals.

The stationarity of the data was tested by Unit Root Tests (table 4) to verify the time series and to be sure that no false regressions are obtained.

Table 4. Unit Root Tests

Variables	**ADF**		**DF-GLS**	**PPerron**	
	t-Statistic	*Prob.*	*t-Statistic*	*Adj. t-Stat*	*Prob.*
UR	-1.731	0.046**	-1.525	-1.947	0.037**
GDP	6.662	0.010***	-0.417	-0.083	0.043**
INF	-7.269	0.000***	-5.398	-2.374	0.056**
NAW	-2.241	0.196*	-2.225	-2.286	0.082**
EDU	-1.173	0.074**	-1.138	-1.139	0.088**
EMIG	-5.865	0.000***	-1.552	-4.945	0.000***

Notes: *, **, *** - signifies 10 %, 5 %, 1 % the p-value

Source: Author' processing in Eviews

Preliminary testing of the variables results in the stationarity of the data according to most of the results obtained. The Augmented Dickey-Fuller test treats the variables in a parametric way, but some variables are not without unit roots but in small NAW values, while the Phillips-Perron test by using the variables non-parametrically shows an appropriate short-term dynamics. In the case of all the tests applied, the null hypothesis is rejected for all variables.

The Skewness test was applied to the linear regression to verify the normality of the distribution of the residuals, and the results show that the distribution of the variables is not normal, therefore the alternative hypothesis is accepted.

Once the serial data are tested, we proceed to the development of linear regression models considered appropriate for the data described. The results of the static analysis of the impact of the unemployment rate on gross domestic product, inflation, average net wage, education and emigration are presented according to table 4.

Table 4. Linear regression results

Test	**Ordinary Least Squares**	**Robust Least Squares**	**Fully Modified Least Squares**	**Quantile Regression**
GDP	-0.002*	-0.004***	-0.002**	-0.004*
	(0.067)	(0.000)	(0.057)	(0.069)
INF	0.011	0.012**	0.012*	0.011
	(0.124)	(0.029)	(0.103)	(0.179)
NAW	2.980	1.850	2.660	3.450
	(0.243)	(0.361)	(0.247)	(0.344)

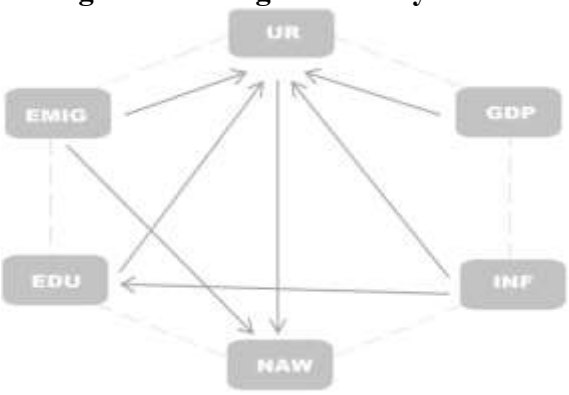
EDU	-2.670	-4.980	-2.340	-4.410
	(0.624)	(0.253)	(0.650)	(0.542)
EMIG	-4.130*	-9.900	-4.530	-1.180
	(0.088)	(0.601)	(0.296)	(0.692)
Constant	8.606**	9.830***	8.232**	9.430*
	(0.048)	(0.003)	(0.042)	(0.099)
R-squared	0.577	0.523	0.567	0.489

Notes: *, **, *** - signifies 10 %, 5 %, 1 % the p-value for the Z test
Source: Author' processing in Eviews

The classical assumptions of the regression model regarding multicollinearity, homoscedasticity and stationarity being fulfilled, the statistical analysis of the economic and social impact on the unemployment rate in Romania over a period of 34 years was performed. The results obtained show that through all 4 methods OLS, RLS, FMLS and QR from a statistical perspective there is an impact of the unemployment rate on the explanatory variables. In particular, the least squares method presents only a low statistical significance of the gross domestic product, emigrants and the constant, not identifying a strong statistical significance through this method. In the Robust Least Squares model, the gross domestic product and the constant are statistically significant, the same variables decreasing from the perspective of statistical significance in the Fully Modified Least Squares model. The examination by the Quantile Regression method shows that most causal variables are not statistically significant. Due to the statistical significance of the variables, the RLS model is considered appropriate in testing the hypotheses for which H1 can be accepted, and the others H2, H3, H4 and H5 are rejected because the coefficients and p-values are not consistent. This means that the application of the unemployment rate negatively impacts the short-term economic stability in Romania.

Granger causality is used in the regression model undertaken to test whether the variables of the model help in specifying another variable, the results of the predictive capacity are presented in figure 3.

Figura 3. Granger causality results



Source: Author' processing

The Granger causality results show the role of GDP, INF, EDU and EMIG in attracting UR, but not vice versa, on the contrary UR causes NAW. It is observed that EMIG causes NAW, and INF causes EDU, this being unidirectional, the relationships between them being predictable over time. The unidirectional causality of the variables shows the predictive and significant effect, but without being influenced in the same way by the respective variable. It is stated that it is methodologically sound because it reflects economic and social developments that affect the labor market.

6. Conclusions

This research study examined the influence of the unemployment rate on various predictors due to the constant novelties in this area that deserves to be studied continuously, constantly bringing elements of originality to the specialized literature. The availability of data constrained the research to a limited period of time, the years 1990-2024. The unemployment rate represented a prolific variant of econometric analysis because it helps to understand the conditions on the labor market. In future research it will be interesting to examine the unemployment rate at the level of the member states of the European Union, on continents or even depending on the standard of living, because according to the OECD and the European Commission it was found that in 2023 the unemployment rate for people aged between 15 and 74 reached a historical minimum of 6.1%, being the lowest rate recorded in the last 10 years.

Our results show a unidirectional causality between the factors, which shows that there is no complex relationship between the factors. By using linear regression models, the following answers to the research questions can be formulated:

Research response 1: Economic growth through the GDP variable is negative and statistically significant (RLS model), so it can be stated that it can contribute to variations, especially to the decrease in the unemployment rate. This suggests that economic expansion has an influence on job creation.

Research response 2: Economic stability through the INF variable is positive and is not statistically significant, therefore no statistically significant evidence was identified to support the relationship between inflation and the unemployment rate.

Research response 3: The labor market through the NAW variable presents a positive coefficient and no statistically significant relationship was found. This shows that changes in the average net wage do not obviously influence the unemployment rate.

Research response 4: The level of education through the EDU variable is negative, but does not present a statistically significant relationship. Although economic theory demonstrates that a high level of education leads to integration into the labor market and implicitly to a reduction in unemployment, the results of the models do not demonstrate this consequence, due to the probability associated with the coefficient which is high.

Research response 5: Migration through the EMIG variable presents a negative estimated coefficient, but with a high probability, which leads to the assertion that the relationship is not statistically significant. The results obtained according to the models show that emigration does not reduce unemployment by reducing the labor supply.

The research is relevant both from a theoretical perspective due to the imperfections present in the efficient functioning of the labor market, but also from an empirical, economic and social perspective, the paper highlights the impact of unemployment on some of the most important predictors. However, the paper presents limitations in the research, the most important being spatial. An expansion of the panel database would bring reliable statistical results by using linear regression models.

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Conflicts of Interest
No potential conflict of interest was reported by the author.

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