

GREECE vs. SPAIN: Similarities and Differences in the Evolution of Unemployment in the 21st Century

By M^a Jesús Arroyo Fernández^{*}, María-Carmen García-Centeno[±],
Inmaculada Hurtado Ocaña[°] & Pedro Fernández Sánchez[•]

Unemployment is one of the main problems facing today's economies. In the context of the European Union, it is the Mediterranean economies that have traditionally shown a less favorable evolution of unemployment. This paper presents an explanatory model of the evolution of unemployment in two of these Mediterranean economies, Greece, and Spain, since the launching of the European Monetary Union. These were two of the European economies hardest hit by the Great Recession of 2008 and subsequently by the pandemic in 2020, so it is interesting to study which economic factors would explain the evolution of their unemployment rates. For this purpose, economic variables such as GDP pc, the output gap, investment, deficit, the employment rate by educational levels, inflation, labour productivity, labour force and public spending as a percentage of GDP. On the other hand, it is interesting to note to what extent Greece and Spain have or have not shown similar patterns of behavior of their labour markets so far this century, and what kind of economic policy measures could be put in place to ensure that both countries cease to have one of the highest unemployment rates in the EU. Finally, it will be analyzed how they have been affected by the Great Recession and the covid health crisis.

Keywords: *unemployment rate, macroeconomic variables, labour market policies, Great Recession, COVID-19*

Introduction

Throughout the 21st century, the larger Mediterranean countries have undergone a drastic change in the behavior of their labour markets. Whereas until 2008 the countries of the East had higher unemployment rates, after the Great Recession it has been the countries of the South, and especially Greece and Spain, that have maintained a greater unemployment differential with the rest of their EU partners (Figure 1). Not only do they have higher unemployment rates, but also the effectiveness of their employment policies is proving to be lower. Greece reached

*Associate Professor, Department of Economics, Universidad San Pablo-CEU, CEU Universities, Spain.

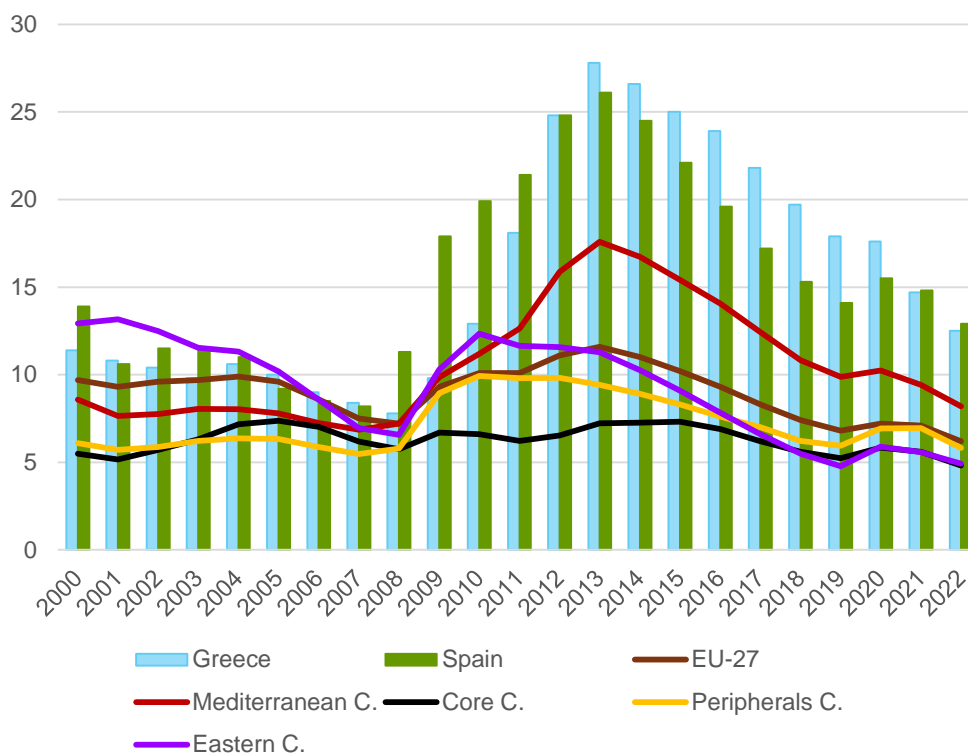
±Associate Professor, Department of Mathematics and Data Science, Universidad San Pablo-CEU, CEU Universities, Spain.

°Associate Professor, Department of Economics, Universidad San Pablo-CEU, CEU Universities, Spain.

•Associate Professor, Department of Economics, Universidad San Pablo-CEU, CEU Universities, Spain.

the highest level of unemployment in 2013 (27.8%), with Spain slightly below (26.1%). The EU-27 average in that year was much lower (11%). In 2022, although the differential has narrowed, the two Mediterranean countries are still above the European average.

Figure 1. Evolution of the Unemployment rate in the Member States by Groups of Countries (%)



Source: Eurostat (2023).

The unemployment rate of a country is usually a good indicator of its social and economic strength, since it shows its productive capacity and the quality or welfare of its people. For this reason, this paper analyzes the different economic and non-economic variables that can influence the evolution of unemployment in Greece and Spain. Specifically, the explanatory variables considered are GDP per capita (GDPpc), output gap (Out), investment (Inv), active population (PAT), real productivity per hour worked (RP), public deficit (DF), employment rate by educational level (up to secondary education, Em2, or with higher education, Em3), inflation based on the harmonized index of consumer prices (HICP), and public expenditure as a percentage of GDP (ExpGDP). Two dummy variables of the Great Recession and the effect of the COVID-19 pandemic have also been included, as both could have significantly affected the evolution of unemployment.

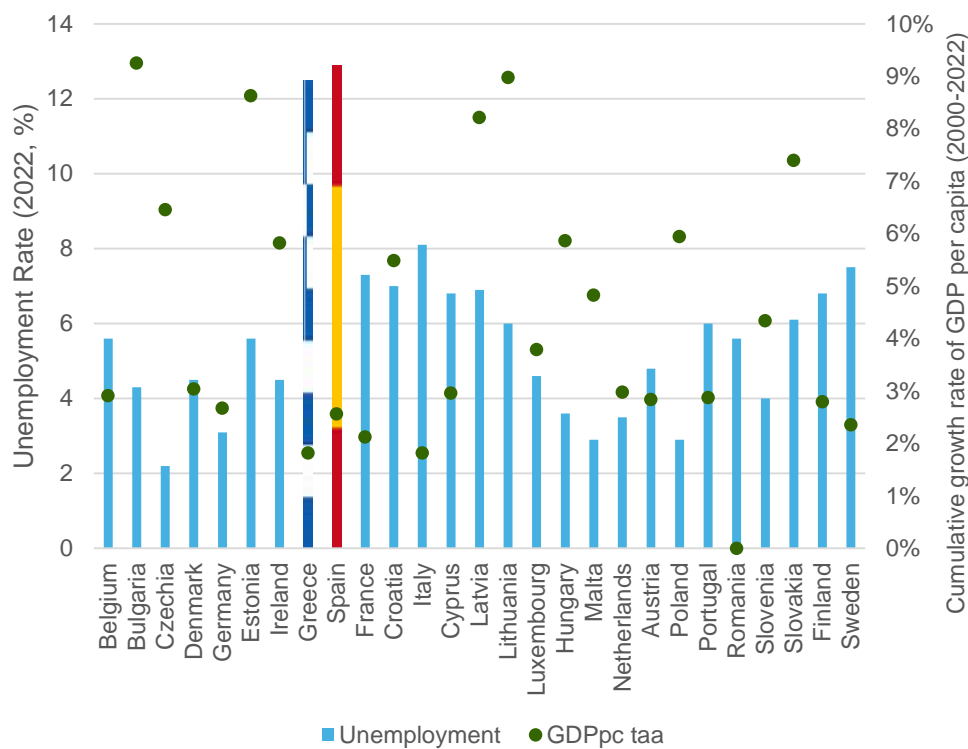
To carry out the analysis, the paper is structured in the following five sections. After this brief introduction, the second section justifies the choice of Greece and Spain as the countries under study and analyzes the evolution of both economies in terms of unemployment. The third section presents a descriptive analysis of each of

the variables and the methodology used in the study, followed by an analysis of the results of the econometric model in section four. Finally in the last section, the conclusions include economic policy recommendations based on the results obtained.

Greece and Spain: The Problem of Unemployment

The problem of unemployment is a matter of concern for all governments, especially those whose unemployment rates are difficult to control through national economic policies. In many cases this is a direct consequence of excessively rigid labour markets.

Figure 2. *Unemployment Rates and Cumulative GDP per Capita Growth in the EU*



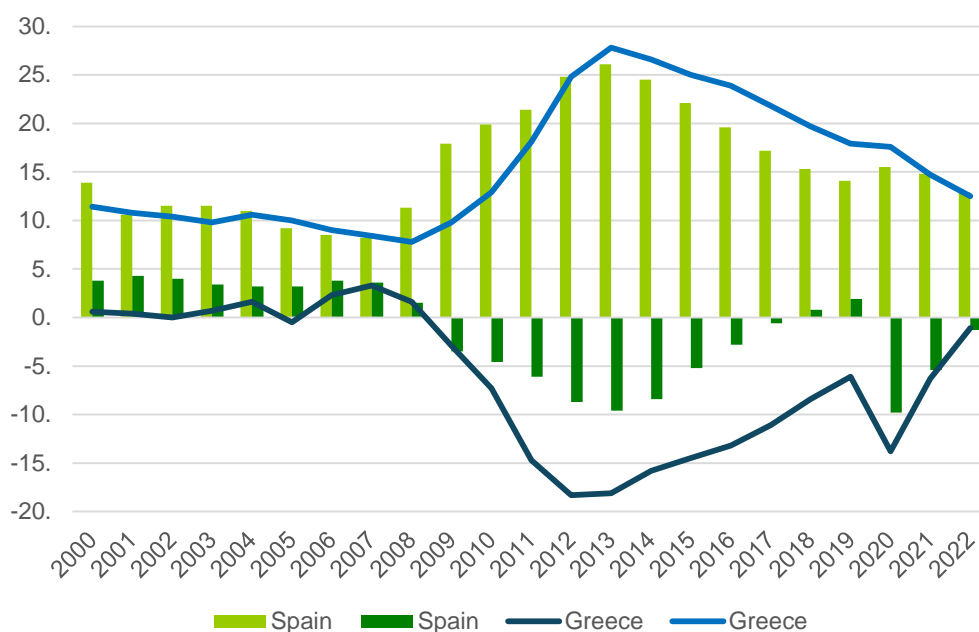
Source: Eurostat 2023.

In the context of the European Union, Greece and Spain have traditionally maintained high unemployment rates. As can be seen in Figure 2, these economies, despite showing cumulative GDP per capita growth rates between 2000 and 2022, like those of Germany, France, Belgium, Austria, the Netherlands, or Italy, nevertheless maintain high levels of unemployment. This indicates that individual income growth is not leading to lower unemployment rates, and growth in both countries may need to be higher to absorb the population that wants to work but

cannot¹. In fact, countries such as the Czech Republic, Malta, Poland, and Hungary have been able to maintain rates below 4%, with growth above 6% (Figure 2).

The importance of the study of GDP pc growth in countries and its influence on unemployment is determined by their capacity to reverse the level of unemployment reached in periods of economic expansion during periods of crisis. As can be seen in Figure 3, both for Spain, but above all for Greece, a clear countercyclical character can be observed. In fact, since the exit of the Great Recession, in 2013, the decrease in unemployment rates has been 13.2 percentage points in Spain and 15.3 in the case of Greece; when the cumulative growth since that year had been 2.7% and 2.0%, respectively.

Figure 3. Output Gap and Unemployment Rate in Greece and Spain



Source: Ameco and Eurostat 2024.

It is therefore necessary to analyze the behavior of the main variables that are affecting the evolution of unemployment in both economies. Only in this way will the economic authorities be able to act effectively to prevent them from continuing to be the countries with the highest unemployment rates in the EU.

For this purpose, the economic variables that, according to the economic literature, may be related to the evolution of unemployment have been considered.

Firstly, the evolution of GDP pc as discussed above, given the relationship between its evolution and unemployment. Secondly, the output gap (Out) has been considered since it shows the difference between the real output of the economy and its potential output. The larger the output gap, the lower unemployment will be, since the economy is producing above its potential, either because there are highly productive resources or because they are used efficiently.

¹Such dynamics potentially reflect variations in Okun's Law across different national contexts.

Productive investment (Inv) has also been considered. Higher levels of investment will allow for greater productive capacity of companies. This will lead to greater job creation, provided that the investment is not a substitute for the labour factor. Therefore, it is also necessary to include the labour force variable (PAT), because it gives us the determination of the labour force to join the labour market and its possibility of finding or not finding employment.

On the other hand, it is necessary to consider real labour productivity (RP), to check whether productivity improvements in Greece and Spain result in a lower unemployment rate.

Other variables that have also been included in the analysis are those related to public expenditure, either through the public deficit (DF) or through unemployment expenditure as a percentage of GDP (Exp/GDP). The purpose of this is to contrast whether higher deficit levels or spending on unemployment have made it possible to reduce it.

The extent to which increases in the minimum wage may affect unemployment levels continues to be a matter of controversy. An increase in the minimum wage could lead to an increase in unemployment, as companies would have to reduce their workforces to meet higher wages. On the other hand, it could have a positive effect by increasing the purchasing power of consumers who will demand more products.

Along these lines, wage levels could be linked to the educational levels of those hired. For this reason, we have included as reference variables employment at higher levels of education, specifically up to secondary (Em2) and tertiary (Em3). In this way, the aim is to estimate to what extent higher employment at these educational levels has an impact on lower unemployment rates.

Finally, inflation (HICP) has been incorporated into the model. The aim is to contrast whether the fight against price increases by the European Central Bank can lead to an increase in the unemployment rate.

Having considered the variables that could explain the evolution of unemployment in Spain and Greece, the following section will carry out a descriptive analysis of each of these variables. In addition, the main similarities, and differences in the evolution of these variables in both countries will be established, as well as the possible relationship between each of these variables and the evolution of the unemployment rate during this century.

Variables and Methodology

Descriptive Analysis of the Independent Variables

To have a descriptive view of the variables that will be used in the model and that may influence unemployment in Greece and Spain, Table 1 shows their main descriptive statistics. As can be seen, although the average unemployment rate in both economies is the same, the same is not true for their maximum and minimum values. Thus, the lowest and highest values of the unemployment rate have occurred in Greece. The Hellenic country reached the minimum in 2008 (7.8%)

and the maximum in 2013 (27.8%). In Spain, the minimum unemployment rate, 8.2%, was reached in 2007 and the maximum in 2013, which amounted to 26.1%.

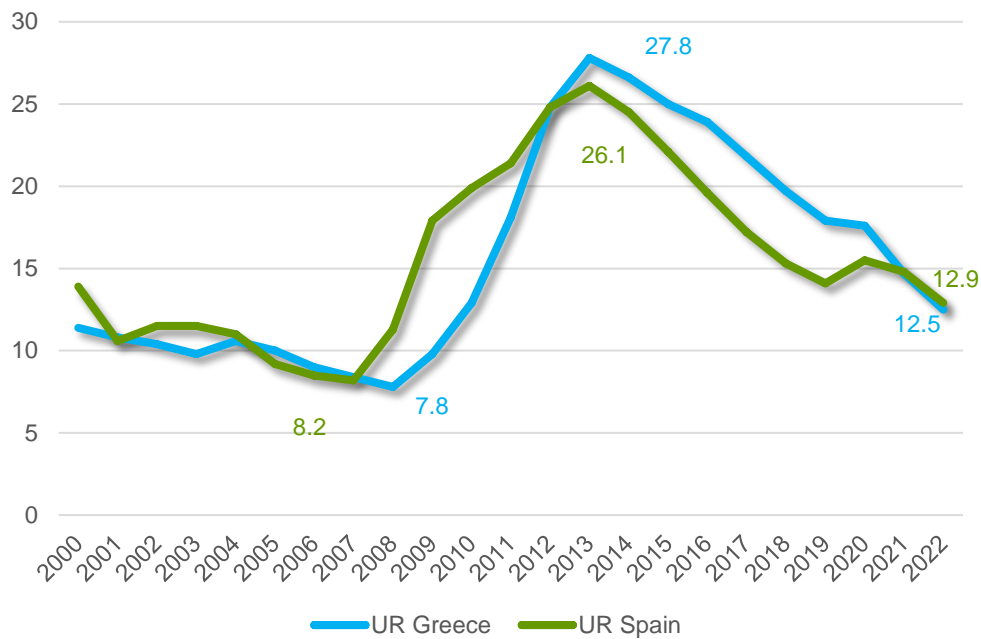
Table 1. Descriptive Analysis of the Variables (Sample Period 2000-2022)

Country	Variables	Minimum	Maximum	Mean	Std. Devn.	Pearson VC	Skewness	Excess Kurtosis
Greece	UR	7.8	27.8	15.7	6.4	0.4	0.5	-1.18
	GDPpc	13230	21840	17463	2234.3	0.1	0.3	-0.6
	Out	-18.3	3.1	-6.1	7.2	1.2	-0.3	-1.4
	Inv	11.9	27.4	18.8	5.9	0.3	0.1	-1.6
	PAT	1046	1112	1089	1650	1.5	-0.5	-0.7
	PR	87.8	122.5	105.2	9.9	0.1	0.2	-1.2
	DF	-15.2	0.9	-6.4	4.3	0.7	0.1	-0.6
	SMI	533.9	876.6	710.4	93.9	0.1	0.1	-0.7
	Em2	13.2	32.8	22.9	5.8	0.3	0.1	-1.2
	Em3	39.3	62.1	49.2	6.5	0.1	0.2	-1.3
	HICP	-1.4	9.3	2.1	2.4	1.1	0.2	-1.3
Exp/GDP	0.5	1.2	0.7	0.2	0.3	0.4	0.1	
Spain	UR	8.2	26.1	15.7	5.3	0.3	0.4	-0.9
	GDPpc	15970	27870	22545	2871.4	0.1	-0.5	-0.1
	Out	-9.9	4.0	-1.4	4.8	3.4	-0.4	-1.3
	Inv	17.2	30.6	23.2	4.3	0.2	0.3	-1.4
	PAT	4047	4743	4517	2284	0.5	-0.9	-0.6
	PR	89.5	101.3	94.9	4.4	0.0	0.2	-1.6
	DF	-11.6	2.1	-4.2	4.2	1.0	-0.2	-1.1
	SMI	495.6	1166.7	753.1	191.8	0.3	0.7	-0.3
	Em2	16.9	39.4	26.1	6.9	0.3	0.6	-0.8
	Em3	35.8	59	48.5	6.1	0.1	-0.2	-0.6
	HICP	-0.6	8.3	2.3	1.9	0.8	0.8	1.9
Exp/GDP	1.4	3.8	2.2	0.8	0.4	0.6	-1.2	

Source: Eurostat 2023.

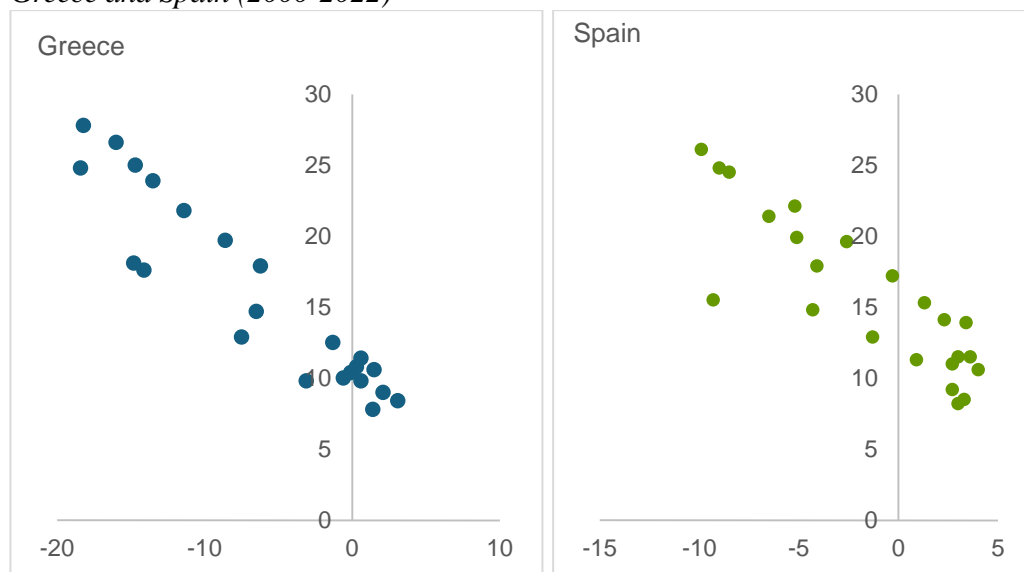
In all the variables analyzed, except for the output gap, labour force, deficit, and inflation, it can be stated that their means are quite representative, since the relative dispersion measured by Pearson's coefficient of variation is small and close to zero.

Observing the evolution of the unemployment rates of both countries, it can be stated that the behavior is quite similar for both economies (Figure 4). Since the beginning of the 21st century, unemployment has been on a downward trend in both countries. However, the abrupt change in trend affected Spain a year earlier than Greece (2008 vs. 2009). This increase in unemployment rates continued until 2013, after which it declined. In the years 2021 and 2022 both are very similar again, although they have not yet reached pre-crisis levels. Unemployment rates are positively asymmetric and platykurtic, which implies that there are more values concentrated at the extremes than around the average unemployment rate, with a greater number of values on the far right, i.e., there are more unemployment rates above than below their average.

Figure 4. Unemployment Rate Evolution in Greece and Spain (2000-2022)

Source: Eurostat 2023.

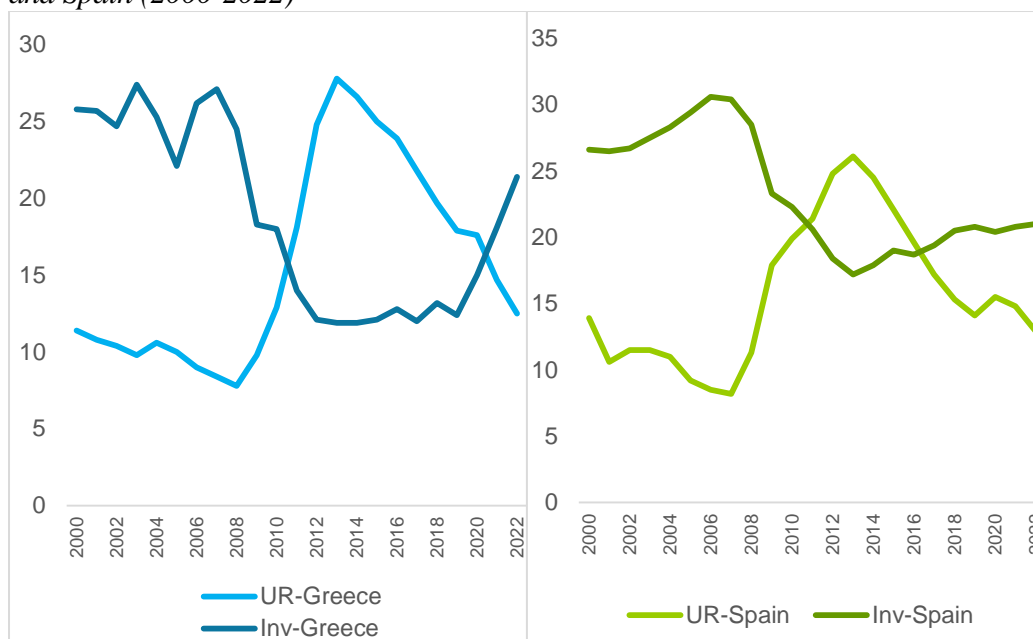
With respect to the output-gap and based on the descriptive data shown in Table 1, the lowest value is negative (in Greece -18.3 in 2012 and in Spain -9.9 in 2013). The maximums however are positive: the highest in Spain of 4.0 in 2001 versus the highest Greek of 3.1 in 2007. Figure 5 shows an inverse relationship between the output gap and the total unemployment rate for the two Mediterranean countries.

Figure 5. Relationship between the Unemployment Rate and the Output Gap in Greece and Spain (2000-2022)

Source: Eurostat 2023.

The behavior of investment (Inv), which is related to productive activity and the capacity to generate employment, is very similar to GDPpc, with higher minimum, maximum and average levels in Spain than in Greece. Also, in both cases investment is positively asymmetric, with a greater number of periods in which investment exceeds its mean (or is higher) and platykurtic (as the excess kurtosis is negative, it indicates that there are fewer values of investment that are concentrated around its mean). Figure 6 shows how, as in the case of the output gap, there is an inverse relationship between investment and the unemployment rate.

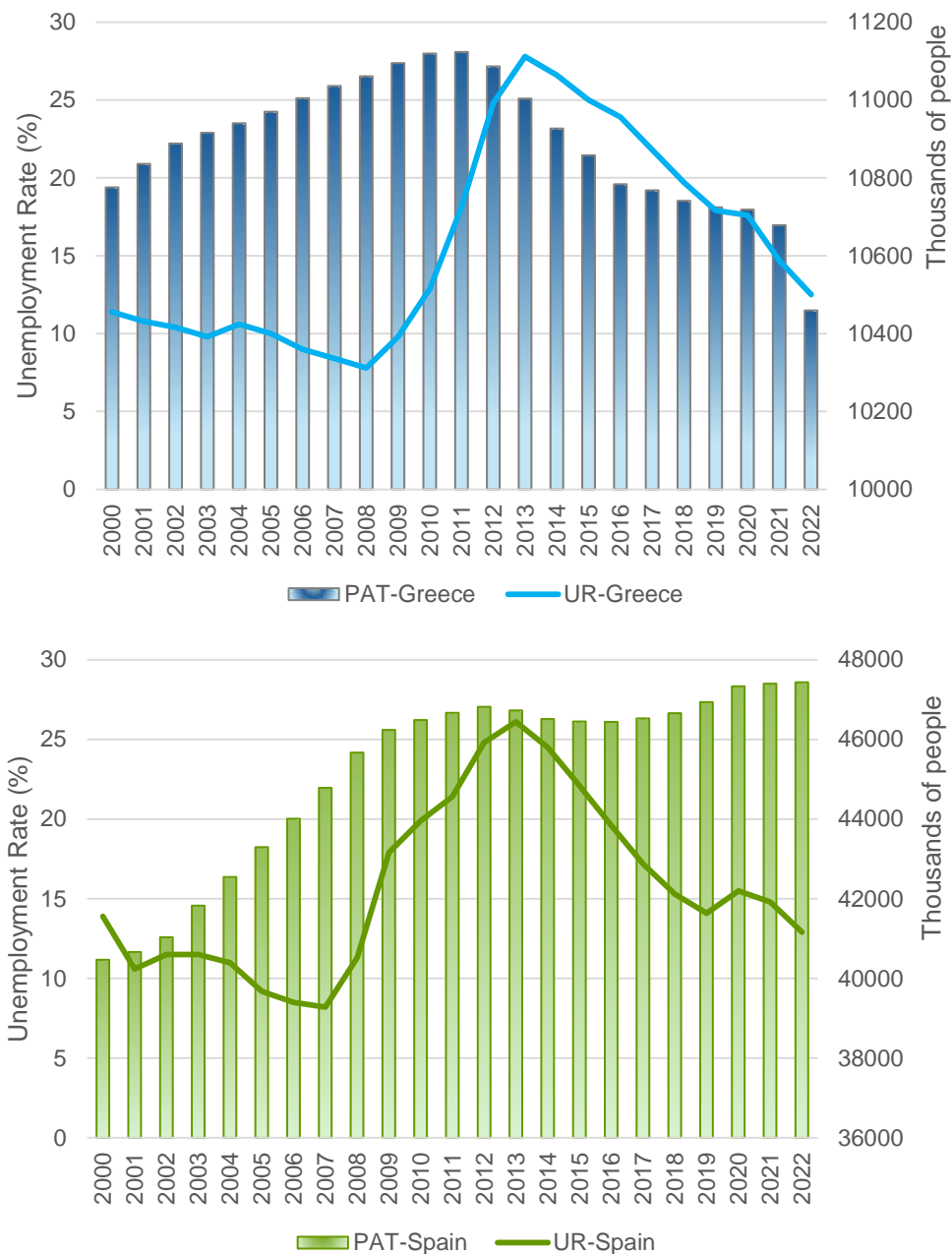
Figure 6. Relationship between the Unemployment Rate and Investment in Greece and Spain (2000-2022)



Source: Eurostat 2023.

Being a larger country, Spain has almost four times more active population (PAT) than Greece, which is why its maximum, minimum and average values are higher. Thus, for example, while the average labour force in Greece is slightly over one million people, in Spain it is over 4.5 million people. The labour force includes employed and unemployed persons between the ages of 15 and 64. Figure 7 shows that until 2011 there was a growth in the labour force in both economies (although this growth was higher in Greece than in Spain). On the other hand, the total unemployment rate in both countries decreased until the beginning of the Great Recession and then increased, this growth being higher than that of the labour force. Since 2013 the evolution of the PAT in both economies has been different: while in Spain it has slightly increased, in Greece it has shown a decreasing trend.

Figure 7. Relationship between Unemployment Rate and Total Labour Force in Greece and Spain (Sample Period 2000-2022)

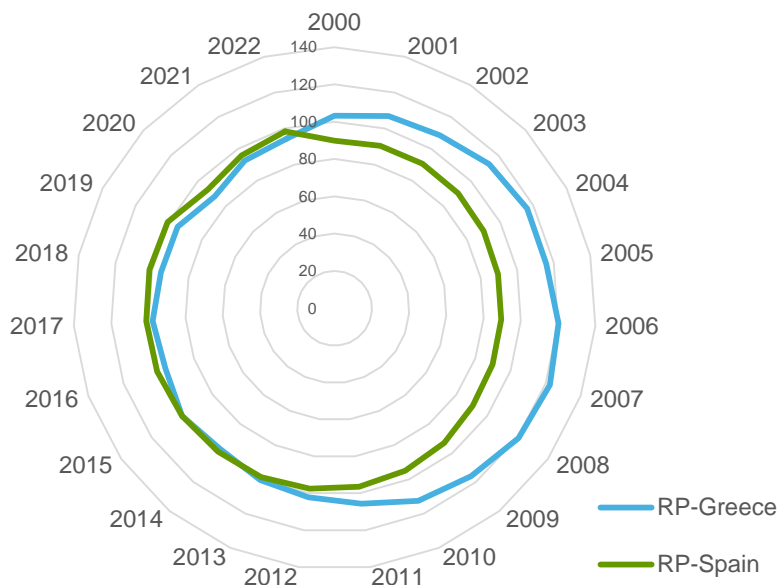


Source: Eurostat 2023.

Labour productivity shows the amount of goods and services produced per unit of labour. It reached its lowest value in Greece in 2020 (87.8) and its highest value of 122.5 in 2007. The average productivity in Greece was 105.2, compared to Spain (94.9). In both countries the asymmetry has been positive, implying that there have been more years in which productivity has exceeded the average than those in which it did not. Figure 8 shows how in the sample period prior to the

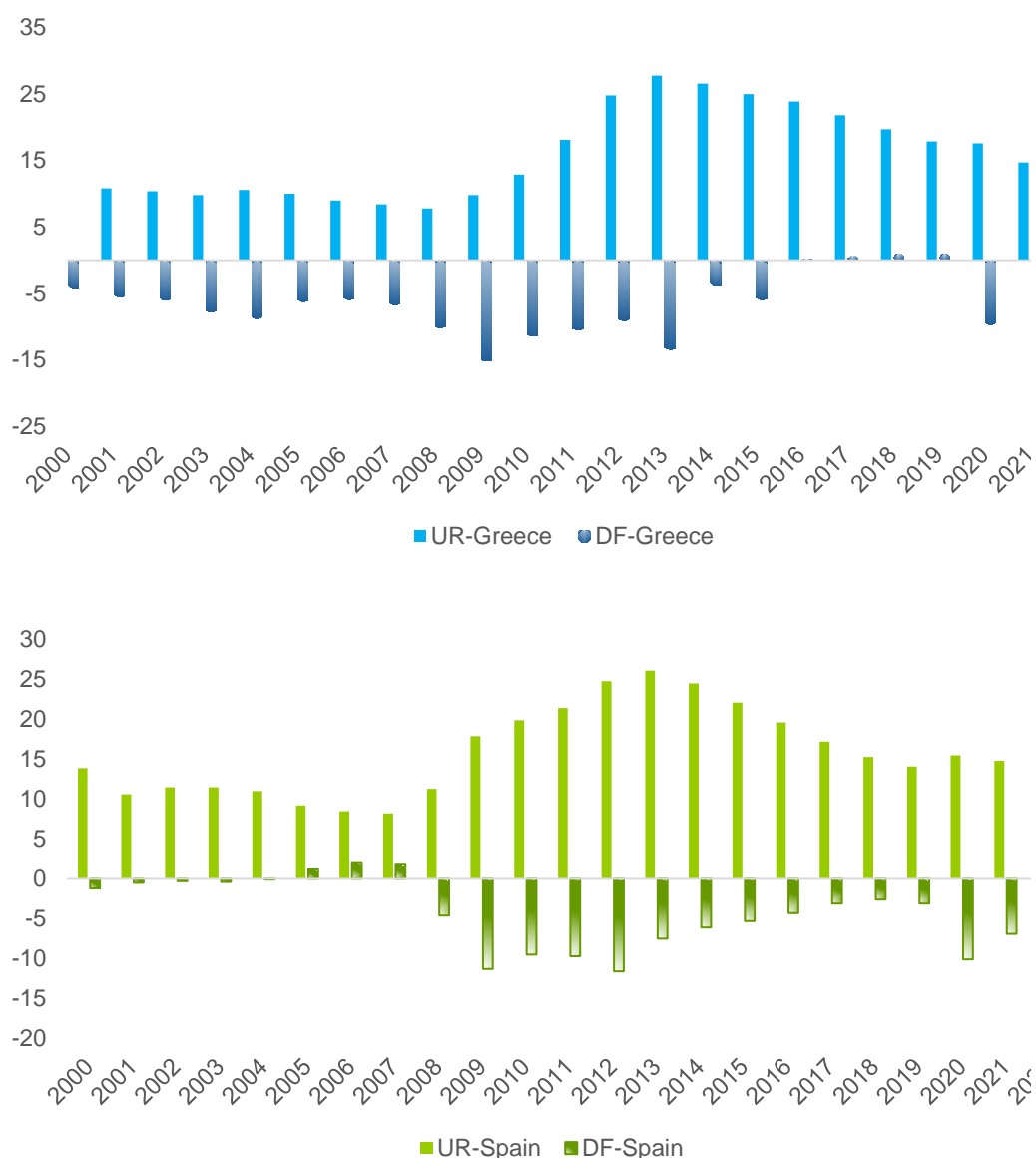
crisis, Greece's productivity was higher than Spain's, while, from 2013 onwards, the productivity of both countries tended to equalize. Since 2016, Spanish productivity has slightly surpassed Greek productivity.

Figure 8. *Productivity in Greece and Spain. Sample Period (2000-2022)*



Source: Eurostat 2023.

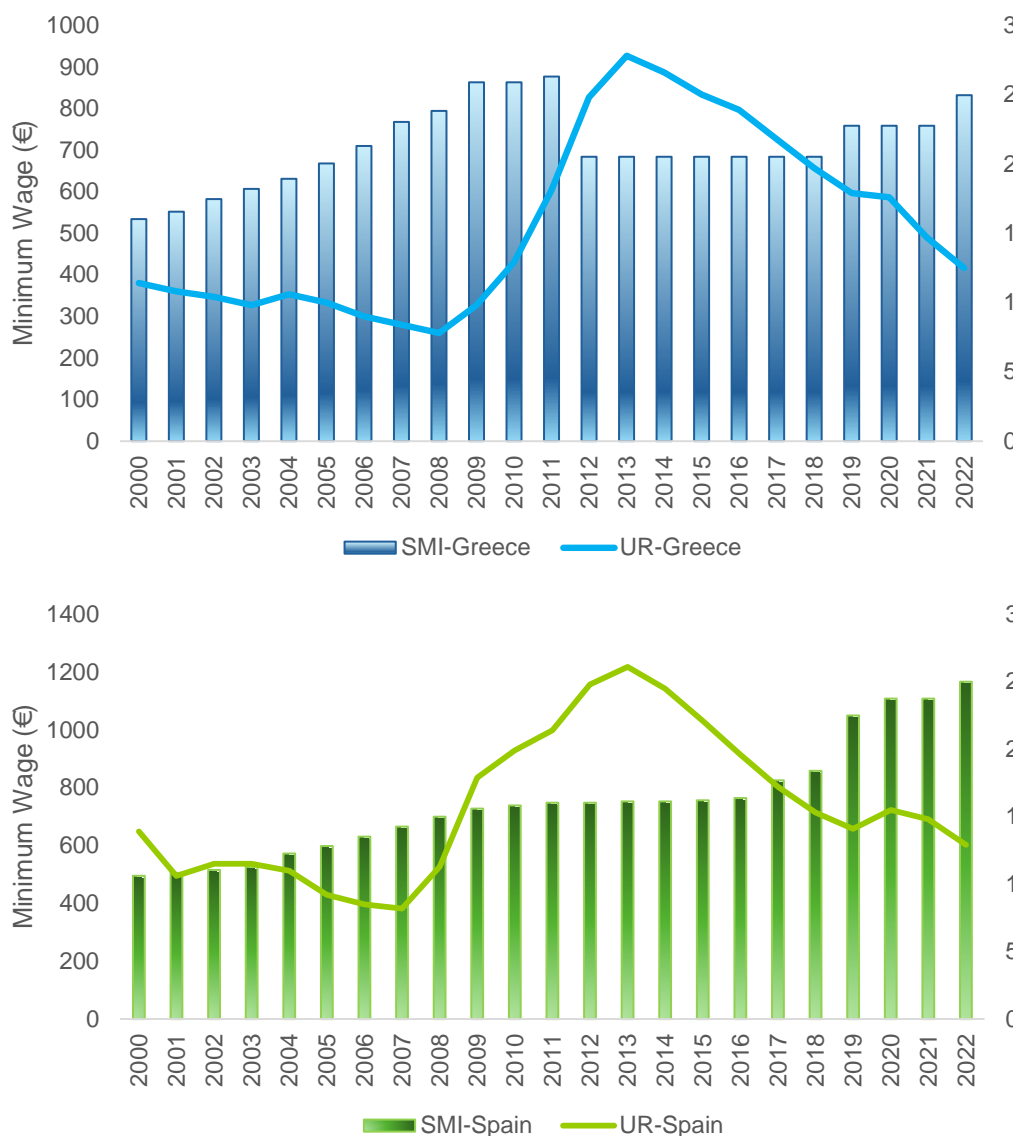
The minimum values of the deficit (variable that measures as a percentage, the negative difference between the revenues and expenditures of the total general government during a fiscal year over GDP) in Greece and Spain were -15.2 in 2009 and -11.6 in 2012 respectively. As for the highs of 0.9 in 2018 and 2.1 in 2006 of 0.9 in 2018). The average deficit has been higher in Greece (-6.4) than in Spain (-4.2). Figure 9 shows the behavior of the deficit and the total unemployment rate in both countries. It can be seen how there are years in which high deficit levels correspond to higher levels of unemployment (mainly the years covered by the financial crisis). This would be consistent with the implementation of expansive economic policies to alleviate the ravages of the crisis, which coincide with lower tax revenues because of economic paralysis.

Figure 9. Evolution of the Unemployment Rate and Deficit in Greece and Spain (2000-2022)

Source: Eurostat 2023.

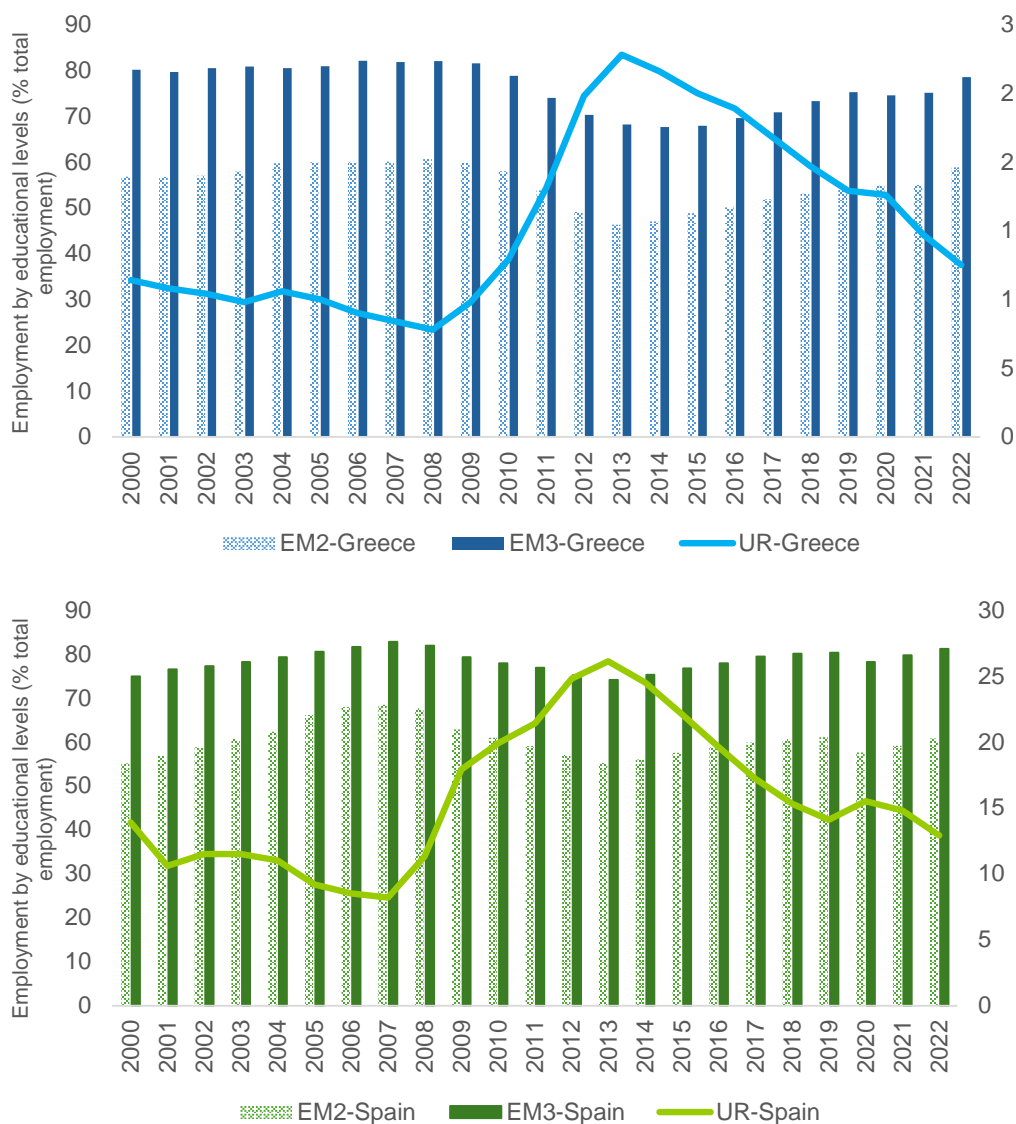
The evolution of the minimum interprofessional wage is shown in Graph 10. This variable measures the amount established by governments to determine the minimum amount of gross annual salary that workers should receive. Looking at the statistics in Table 1, the minimum wage had its lowest value in both countries at the beginning of the 21st century (€33.9 in Greece and €49.6 in Spain). Since then, it has increased, reaching €31.8 in Greece and €166.7 in Spain in 2022. Therefore, while in Greece it has grown by approximately 56%, in Spain its growth has been much higher (133%). When compared with the evolution of unemployment, in principle, there is not much relation between the behavior of both variables, as can be seen in Figure 10.

Figure 10. Evolution of the Unemployment Rate and the Minimum Wage in Italy and Spain (2000 and 2022)



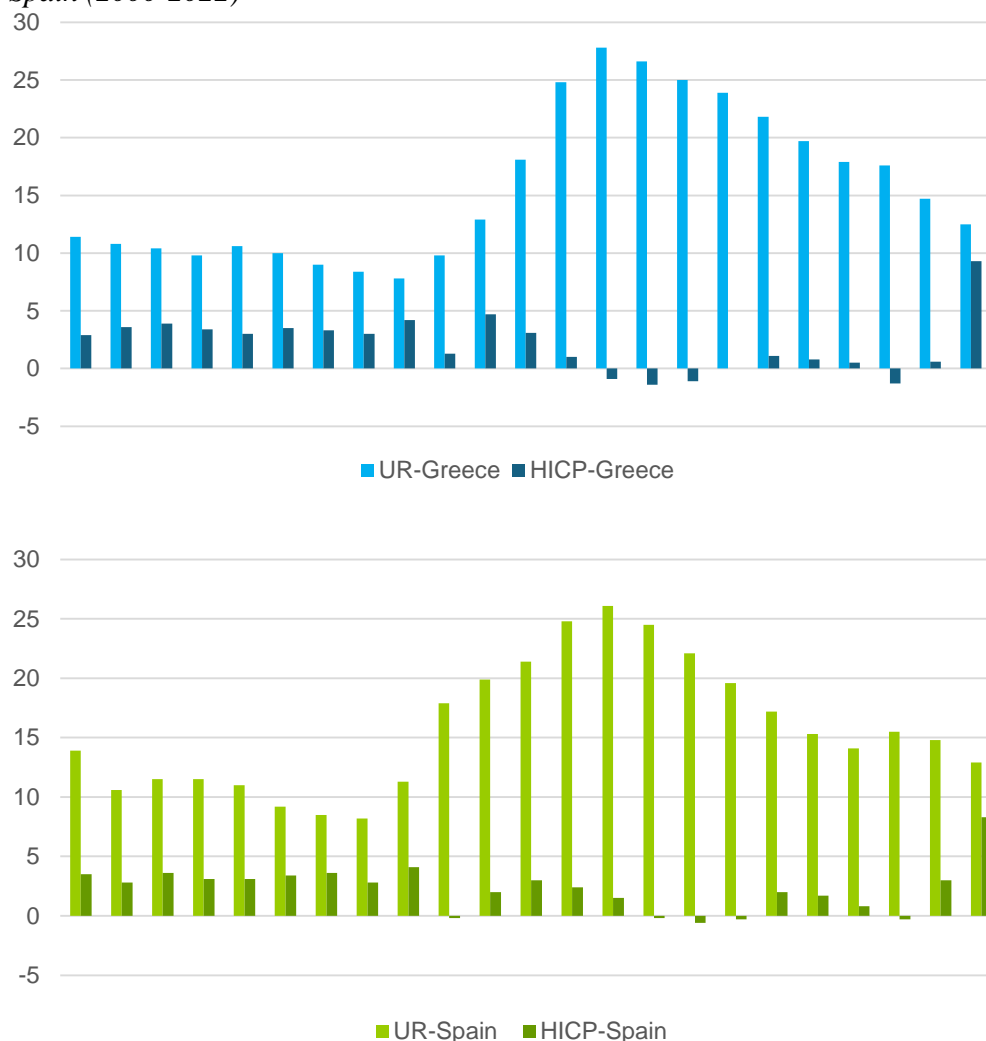
Source: Eurostat 2023.

As for the levels of education, for the two countries the maximums occur in tertiary education, university, doctorates (Em3), whose values are 62.1% (Greece) and 59% (Spain). Figure 11 shows the existence of some common pattern of behavior in these countries. Thus, for example, in both countries the Em3 level is higher than Em2 (secondary and post-secondary non-university level of education) and so is its average. During the period of the Great Recession, employment at these levels of education declined. Although they increased again after the crisis, they have not yet reached pre-financial crisis levels. In addition, it is observed that, in general, there is an inverse relationship between the unemployment rate and employment by the levels of education considered.

Figure 11. Evolution of the Unemployment Rate and Education Levels in Greece and Spain (2000-2022)

Source: Eurostat 2023.

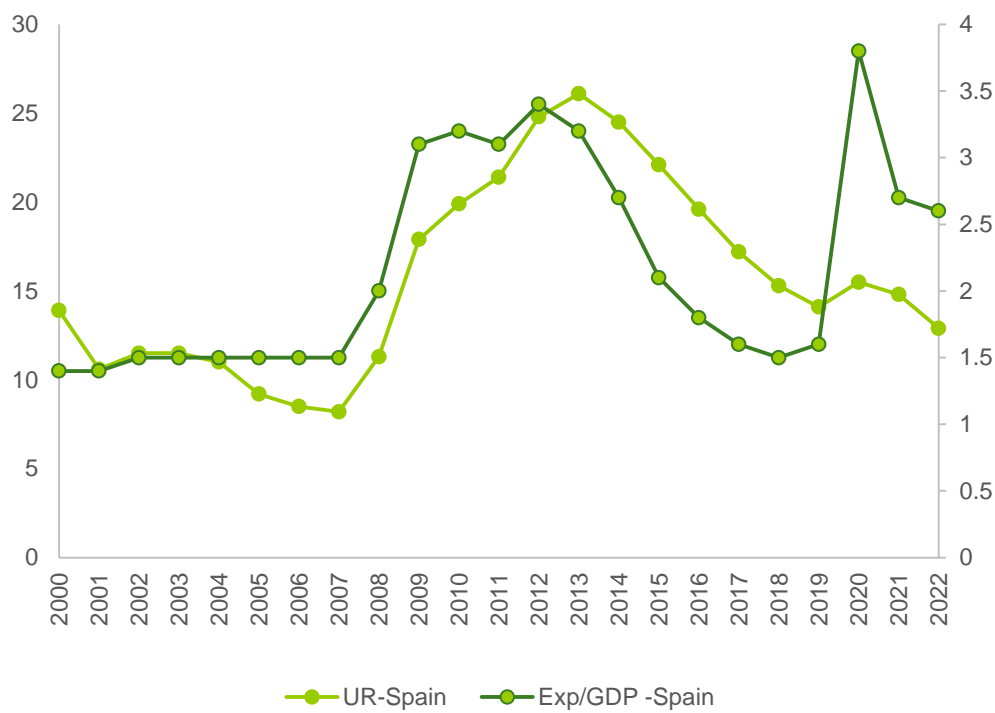
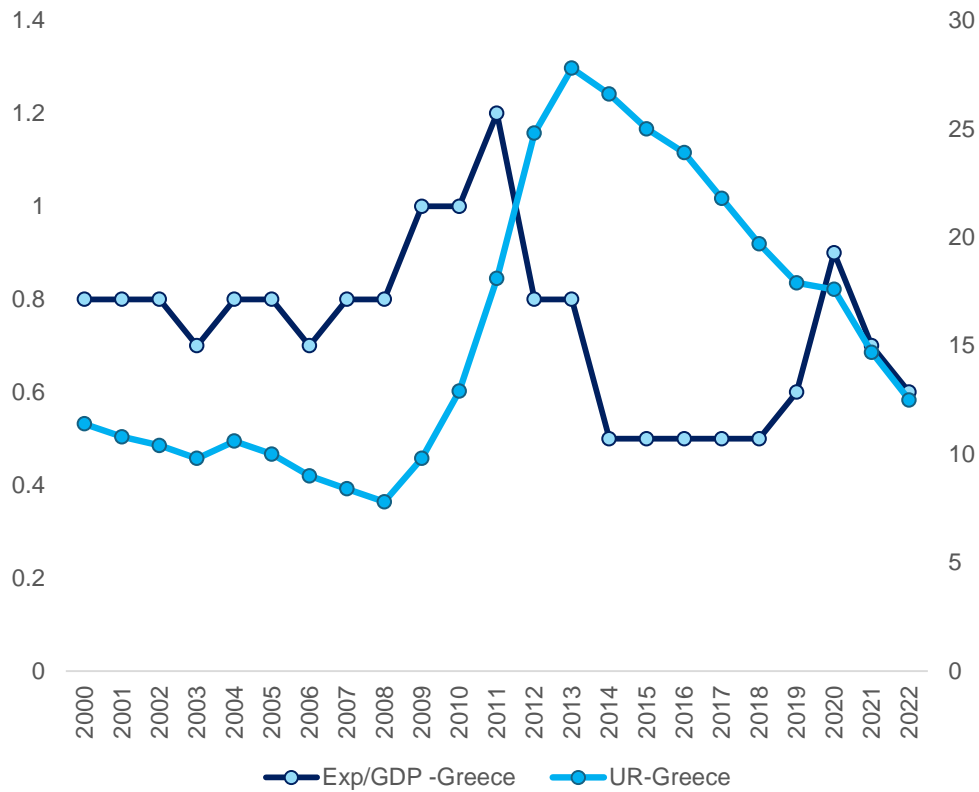
Regarding inflation measured through the harmonized index of consumer prices (HICP), the minimum of -1.4 was reached in Greece in 2014, and in Spain in 2015 of -0.6. The maximums were reached in 2022 (9.3 in Greece and 8.3, in Spain). Average inflation has been quite similar in the two countries slightly exceeding 2%. In both countries inflation is positive asymmetric, which implies that there are more periods with above-average inflation. Figure 12 shows how some periods of high inflation are accompanied by low unemployment rates (as in the last six years) and others when they are not (as can be seen in the first values of the series).

Figure 12. Evolution of the Unemployment Rate and the HICP in Greece and Spain (2000-2022)

Source: Eurostat 2023.

Finally, with respect to unemployment expenditure as a percentage of GDP (Exp/GDP), it should be noted that according to the values observed in Table 1 and Graph 13, Spain's expenditure is higher than that of Greece. Thus, for example, the average expenditure on GDP in Spain is 2.2% while that of Greece is 0.7%. In both countries this expenditure is positively asymmetric, which implies that there are more periods in which the expenditure exceeds the average or that the dispersion of this expenditure with respect to its average is greater than in those in which it is less. In addition, Figure 13 shows that in the pre-crisis periods, when public spending as a percentage of GDP was higher, unemployment rates were lower. However, after the crisis and up to 2019, when Exp/GDP decreased, unemployment rates increased. In the year 2020, because of the COVID health crisis, the considerable increase in unemployment expenditure over GDP can be seen, reaching in Spain its maximum value (3.8%).

Figure 13. Evolution of the Unemployment Rate and Unemployment Expenditure/GDP in Greece and Spain (2000-2022)



Source: Eurostat 2023.

Methodology

To explain which variables are most influencing unemployment in Greece and Spain, a balanced panel data model² will be estimated. This model allows us to express the unemployment rate of the country Greece or Spain at instant t , given by y_{it} , as a function of the characteristics of these countries in the sample period from 2000 to 2022, a time-stable idiosyncratic country component α_i and a random noise u_{it} . Under the assumption of temporal and spatial uncorrelation, linearity and absence of heteroscedasticity of the random noise, the general equation of the model can be expressed as follows:

$$y_{it} = x'_{it}\beta + \alpha_i + \mu_{it} \quad \mu_{it} \sim N(0, \sigma^2), \text{Cov}(\mu_{it}, \mu_{js}) = 0 \quad \forall i \neq j, t \neq s \quad (1)$$

where i refers to Greece or Spain; t represents year. X_{it} are the explanatory variables. The idiosyncratic component is considered as a constant parameter to be estimated, that is, a different constant intercept for Spain or Greece if a panel data model with fixed effects is estimated. Whereas, if the model were random effects, then the noise of the model would be random, i.e., $\alpha_i + u_i$, (Wooldridge 2006, Baltagi 2013, Pinzón 2015, Kripfganz 2016).

To determine whether there is a correlation between the regressors and α_i and, therefore, to decide whether it is more appropriate to estimate a panel data model is with fixed or random effects, under the null hypothesis of random effects (RE) versus the alternative of fixed effects (FE), the Hausman statistic (quotient between the square of the difference of the two estimators and the difference of their variances) converges to a χ^2_{NT} . This statistic is given by the following expression,

$$Q_{FE,RE} = (\widehat{\beta}_{FE} - \widehat{\beta}_{RE})' (\widehat{\sigma}^2_{\beta FE} - \widehat{\sigma}^2_{\beta RE})^{-1} (\widehat{\beta}_{FE} - \widehat{\beta}_{RE}) \sim \chi^2_{NT}$$

Finally, the Wooldridge (2006) test allows us to test the existence of first order autocorrelation and the Arellano and Bond (1991) test the hypothesis of no second order autocorrelation in the disturbances. If autocorrelation exists, it would be necessary to estimate a dynamic model. The Sargan test will also be used to check if the equations are correctly identified.

Analysis of Total Unemployment Results for Greece and Spain

When analyzing the results of the Hausman test, Table 2, it is observed that the p-value < 0.05 , which implies that the null hypothesis is rejected and, therefore, the most efficient estimator is the one obtained using fixed effects.

²Stata was used to estimate the panel data model following the methodology proposed by Arellano and Bond (1991).

Table 2. Different Contrast for Total Unemployment

	Statistician [p-value]
Hausman's test for fixed or random effects	chi2(12)=30.70 [0.0022]
Wooldridge	F(1,1)=2.172 [0.3795]
Arellano-Bond	AR(1): -1.3737 [0.169]. AR(2): -1.1741 [0.240].
Sargan Test	χ^2_{29} = 78.903 [0.0001]

The autocorrelation test (Wooldridge test) in which the H_0 is that there is no AR(1), indicates that there is no autocorrelation, since the p-value > 0.05. Similarly, the Arellano and Bond autocorrelation test shows that there is no autocorrelation either of order one or order two, which implies that it is not necessary to estimate a dynamic model.

Finally, the Sargan test indicates that there is no over-identification in the estimated equations since at p-value <0.05.

Considering these contrasts, a balanced panel data model has been estimated as in equation (1) based on the Arellano and Bond method corrected for heteroscedasticity.

The results of the model estimation (see Table 3) corresponding to the unemployment rate for these two countries show that variables that are not exerting a significant influence on it are: productivity, public expenditure or educational levels.

Table 3. Results of the Estimated Panel Data Model for Unemployment in Greece and Spain

Variable	Coef.	Std. Error	z	P> z	[95% Conf. Interval]
OUT	-.3278313	.1405266	2.33	0.020	-.6032583 -.0524043
Inv	-.3974305	.1311013	-3.03	0.002	-.6543844 -.1404767
LPAT	4.41979	2.338932	1.89	0.059	-.1644332 9.004013
RP	.0799558	.0487677	1.64	0.101	-.0156271 .1755387
DF	.1319635	.1083399	1.22	0.223	-.0803787 .3443058
LMsi	-9.10126	5.025388	-1.81	0.070	-18.95084 .7483195
Em2	-.0999963	.1761809	-0.57	0.570	-.4453045 .245312
Em2	-.3657137	.2912963	-1.26	0.209	-.936644 .2052167
HICP	-.2274522	.1378633	-1.65	0.099	-.4976592 .0427548
ExpGDP	1.886101	.6361037	2.97	0.003	.6393612 3.132842
D2009	4589153	.9701081	0.47	0.636	-1.442462 2.360292
D2020	-3.618522	1.586468	-2.28	0.023	-6.727941 -.5091024
_cons	40.82931	22.11598	1.85	0.065	-2.51722 84.17584
Estimated covariances = 2		R-squared = 0.8511			
Estimated autocorrelations = 0		Wald chi2(12) = 863.86			
Estimated coefficients =13		Prob > chi2 = 0.0000			

However, increases in variables³ such as the output gap, investment, the minimum wage, or inflation (*ceteris paribus*), do contribute significantly to the decrease in the average unemployment rate. This may be because increases in investment or in the output gap may imply increases in economic activity that result in a decrease in the unemployment rate.

On the contrary, for example, if there is a 1% increase in the total active population, this implies that the average unemployment rate would increase by approximately 4.4% (*ceteris paribus*). This could imply that, as the population ages, the larger the active population becomes and the labour market does not have the capacity to generate sufficient employment (due to structural institutional factors such as the greater or lesser flexibility of the labour market, the selection of personnel carried out by companies that are uncertain about the correct performance of certain productive tasks).

Contrary to expectations, in this case, the level of education was not statistically significant. Even so, it is observed that the estimated parameters for the different levels of education are negative, with the one corresponding to the higher education level (Em3) being higher than the secondary level (Em2). This would imply that the higher the level of training or education, the higher the cognitive capacities to enter the labour market and, therefore, the lower the unemployment rate. For this reason, it is good to develop policies that favor the level of training and prevent school dropout.

The percentage of public spending as a percentage of GDP is significant, but its estimated parameter, contrary to expectations, is positive. This implies that the expenditures being made are not producing the expected results. However, it is necessary to find those measures that contribute to the generation of employment and therefore social welfare.

As for the behavior of the total unemployment rate in these two countries during the crises of the first decades of the 21st century, a different pattern can be observed. While during the Great Recession there has been an increase in the average total unemployment rate during the COVID, it has decreased by more than three percentage points. This may be because in these countries people who were in an ERTE situation have been counted as employed.

The estimated model is very reliable, since the estimated coefficient of determination is approximately equal to 0.85 (high and very close to 1).

Some Reflections on Unemployment in Greece and Spain

As already mentioned, Greece and Spain are the two countries that have recorded higher unemployment rates than the rest of the EU countries in recent years.

³Output and investment are statistically significant at a 5% significance level. If the significance level increases to 10%, then variables such as the minimum wage or inflation are also statistically significant.

The Greek unemployment rate is well above the European Union average due to a rigid labour market that makes the proportion of employed people lag far behind other European countries. The higher unemployment rate among young people and women is of real concern in Greece, despite the recovery in employment and the reduction in unemployment experienced after COVID-19.

In recent years, the Greek economy has been characterized by low private investment due to a shortage of financing, a high proportion of small businesses and limited dynamism which have contributed to the fact that, at present, the Greek unemployment rate does not fall below 9% (European Commission 2023). It is no less true that these high levels of unemployment in Greece should be subtracted from that part of the population that may be counted as unemployed but remains in the informal economy. In many cases, Greek workers choose not to join the formal economy because they do not want to pay taxes (Papanikos 2015).

Following the health crisis, Greece has been gradually recovering thanks to a strong rebound in investment, a revival in tourism revenues, increased household spending and improved foreign investment (Bank of Greece 2021). In addition, the government has implemented a major public support program and, above all, has launched a very ambitious reform and investment plan called the Greek Recovery and Resilience Plan 2.0 (2021-2026)⁴, which involves improving competitiveness by prioritizing the improvement of the business climate, advancing digitalization, supporting the transition to the green economy and improving Greece's human capital.

It has also continued its reform program to address many structural problems of the Greek economy in several areas, including labour, bringing the Greek unemployment rate back to pre-2009 financial crisis levels. Among the wide-ranging reforms already undertaken or underway are, among others, the following: digitization and administrative simplification of the public sector, support for the development of digital infrastructure and systems in the private sector, reduction of regulation to support investment in key sectors such as tourism and research, incentives for entrepreneurs⁵, labour law reform to support teleworking and other more flexible work arrangements, curriculum reform to strengthen work practices, and further digitization of the education system in the provision of educational services and content⁶.

⁴This plan includes 68 different structural reforms and 106 investment projects. Government estimates that, if fully implemented, the plan will raise annual GDP growth by 1.2 percentage points. By 2026, it estimates that the plan will increase production by 6.9%, private investment by 20% and employment by 4%. The Plan was one of the first to be submitted and approved for access to the NextGenerationEU Facility. See Ministry of Finance of Hellenic Republic (2022), Bank of Greece (2022a) and Bank of Greece (2022b).

⁵Regarding to incentives for entrepreneurs and the self-employed, it should be noted that although this is a measure proposed by many governments to reduce unemployment, for it to be effective, the tax system must be revised, given that tax evasion or corruption can be a determining factor in the increase of self-employed workers. For a more detailed study, see Papanikos (2024).

⁶See a detailed study of the reforms undertaken by the Greek government in the labour market since the 2010 financial crisis until 2018 in Gatopoulos et al. (2021).

These measures will improve the match between workers and employers, develop professional skills, attract groups that currently have low labour force participation rates, and maximize the contribution of foreign-born workers. In fact, the model shows that the higher the educational levels of the labour force, the lower the unemployment rates.

A more detailed analysis of the employment situation in Greece shows that the Greek labour market has one of the largest mismatches between the skills of workers and the needs of employers, especially in the information technology sector where there is a shortage of skilled labour. These mismatches are also present at the regional level. In addition, the groups that find it most difficult to access employment are young workers, women, and new entrants to the labour force. Due to the high youth unemployment rate, many young people, including the most educated, emigrate. Meanwhile, the working-age population is declining due to net outward migration and population aging, as fertility has been low for a long time and continues to decline (OECD 2020).

Youth unemployment is a serious problem in Greece, which already had high and constant youth unemployment, but which, after the 2009 crisis, experienced a dramatic rise. Following this crisis and its intense recovery during the last few years, the Hellenic country has achieved significant recovery effects in its youth employment to reduce its youth unemployment rate by 10 points to 23.3% between June 2019 and June 2023, according to Eurostat data. Of concern within this rate is the 25-29 age group which has even higher unemployment than the 15-19 age group (Dendrinos 2014). Moreover, gender differences are more marked in Greece than in other EU countries, in fact the female activity rate is systematically lower compared to the male one and the unemployment rate is higher for women than for men in the Greek labour market (Bell and Blanchflower 2015). It should be noted that young Greeks delay their exit from the family nest, as do other young people in countries such as Spain and Portugal, which mitigates the costs of unemployment, but which in turn may restrict mobility leading to longer duration of unemployment (Tubadji 2012).

Like Greece, the Spanish economy has managed to gradually reduce the unemployment rate from the peak reached during the 2009 crisis, and after suffering the adverse effects of the pandemic, to close 2023 with an unemployment rate of 11.3%.

The Spanish labour market is also characterized as a dual market, represented by a group of workers with permanent contracts and high social protection and another group of temporary workers. Temporary workers have fewer rights and less job stability than workers with permanent contracts. In addition, temporariness can be an obstacle to the productivity and competitiveness of firms (although in the model it comes out with little significant influence on the unemployment rate), as temporary workers tend to have less training and experience than permanent workers, but also tend to be less motivated, and access less training within the firm (Damiani et al. 2017). The high temporality rate mainly affects young Spaniards. According to the OECD (2023) in 2021, seven out of ten under the age of 25 found a temporary job and this is even though the situation has improved after the last labour reform of Pedro Sánchez's government. Before this reform, Spain had

the highest rate of temporary contracts among young people in Europe, which reduces training opportunities for young people without allowing them to progress to better jobs. Many young people work part-time not always by choice but because of the difficulty of getting a full-time job or because of the sector in which they work, where this type of part-time contract predominates, such as the restaurant and hotel industry. However, Spain has one of the highest rates of people between 25 and 34 years of age with tertiary education in Europe (OECD 2023).

To combat the high unemployment rate of the Spanish economy, the Government carried out a labour reform in 2021 as a condition for accessing European funds. This reform had several objectives, one of the most important being to reduce the segmentation and duality of the Spanish labour market by introducing changes in collective bargaining where sectoral wage agreements prevail over company agreements and to improve the flexibility and capacity of companies to adapt to adverse shocks. In fact, the model shows how increases in the output gap contribute significantly to the reduction of the unemployment rate.

The reform reduced the number of contracts to three, so that workers now have permanent contracts which include permanent but discontinuous contracts, temporary contracts where the duration must be justified and expressly established, and training contracts which include work and study training contracts, as well as those leading to a degree (Gobierno de España 2021). To reduce temporary employment, the reform imposed additional social security contributions for contracts of less than 30 days and increased fines for companies that abuse fixed-term contracts.

However, it is difficult to differentiate how much of the job creation is due to labour reform and how much is due to post-pandemic economic growth. In addition, it is not yet clear whether the increase in discontinuous permanent contracts will continue and translate into better quality jobs (Doménech 2022).

Another of the measures that have characterized the Government of Pedro Sánchez has been to progressively increase the minimum interprofessional wage in Spain. Thus, minimum hours have been increased by 47% during the period 2018-2023. There are several studies that suggest that increasing the SMI can reduce job growth and lead to a higher probability of losing jobs depending on the type of worker. In fact, young people, women, and workers on temporary contracts are particularly affected by a reduction in hours and a higher probability of losing their job, although wage inequality has decreased especially for workers under 30 years of age (AIREF 2020).

In conclusion, Greece and Spain have higher unemployment rates than the rest of the EU countries due to the fact that both have highly rigid labour markets which, together with other structural problems, highlight the need for their governments to implement reform policies aimed, among others, at promoting investment, creating greater business dynamism, improving the training of the unemployed and reducing the growth of inflation, as shown by the results obtained in the estimation.

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