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Unemployment transitions and the role of minimum wage: From pre-crisis to crisis and recovery

Abstract

During the last decade, unemployment in Greece climbed up to 28%, almost quadrupling due to the economic crisis that hit Greece. In the present paper, we examine the determinants of the unemployment dynamics and the impact of the minimum wage on the probability of making a transition into and out of unemployment. We use micro-level data from the Greek Labour Force Survey (LFS) of the period 2004 to 2019 and control for several demographic factors, macro-economic conditions, regional differences, and changes in the statutory minimum wage. The results suggest that individual-level characteristics play an important role in making a transition into or out of unemployment. Changes in the real minimum wage are estimated to have either a statistically insignificant or a very small impact on unemployment entries and exits. Further, the impact of economy's growth rate follows the theoretical predictions as higher growth rates increase unemployment outflows and decrease inflows, while the regional differences are also important. Our findings persist even when we split the sample in three periods (pre-crisis, crisis, recovery). The results have important policy implications. Given that the disemployment effect of the minimum wage seems to be very limited in the Greek labor market, while the socioeconomic characteristics and regional characteristics play an important role, improving the skills of individuals through the educational system and reskilling or up-skilling programs while targeting specific regions may facilitate labor market mobility.

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1 Introduction

In the last decades, the issue of mobility in the labor market has been the core of the policy-making agenda in terms of increasing flexibility and ensuring higher levels of labor market participation and employment. There are different types of labor market mobility that can be studied such as geographical mobility of workers, mobility across different sectors, changing jobs within the same sector, shifts from full-time to part-time and vice versa, as well as transitions from employment to unemployment or inactivity, and vice versa.

Particularly, in times of economic downturns, labor market flexibility is considered to be an important tool to decrease unit labor cost and restore competitiveness. This was the case of Greece during the recent economic crisis, as in the pre-crisis era wages grew faster than the productivity growth and much faster than the Euro area average.[1] Thus, already from the first economic adjustment program initiated in 2010, the implementation of labor market reforms to reduce rigidities in the labor market legislation and institutions was a priority. By increasing flexibility, along with the measures of fiscal consolidation,[2] it was expected that nominal wages and relative prices would adjust. In the absence of exchange rate and monetary policy tools due to the participation of Greece in the euro-area, the internal devaluation path, through suppressing labor costs, was the main option for correcting the large external imbalances. Labor market reforms were also expected to increase mobility in the labor market and in particular ease the entry of groups like women and the youth to the formal labor market and facilitate the transition from temporary to permanent contracts (see European Commission, 2010, p. 27).

The labor market measures pursued during the three bailout programs focused on the framework of collective bargaining,[3] the national minimum wage setting and the introduction of a youth subminimum wage, enhancing flexible forms of employment and easing firing protection,[4] tackling undeclared labor and to a lesser extent lowering nonwage labor costs[5] (European Commission, 2010, 2012, 2015). One of the most important policy changes concerned is the adjustment in minimum wage that took place in 2012, which foresaw the immediate reduction of the minimum wage level determined by the national general collective agreement by 22% across the board[6] and its freeze until the end of the program period, as well as the introduction of a sub-minimum wage for youth set 10% below the general statutory minimum wage.

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1   In particular, the wage growth consistently outpaced productivity gains (31.3% *vs* 6.8%) over the decade preceding the Greek crisis, in part reflecting spillovers from high public wage increases.

2   The most important measures on the expenditure side involved cuts in the wage bill, pension spending, purchase of goods and services, defence spending, and social protection (only in the first years of the economic programs, then the spending increase). On the revenue side, the measures concerned increases in income taxes, taxes on goods and services, taxes on property and other tax and non-tax revenues. The fiscal consolidation was significantly front-loaded and almost evenly spread between expenditure (54.9%) and revenue (45.1%) side over the 2010–2018 period. Stronger emphasis was given on expenditure in the first years and reversal toward the end of the programmes period. Total measures were estimated at 69 billion euros, i.e. at 30.6% of 2010 GDP.

3   The reforms related to collective bargaining included: (a) the reduction of length of collective contracts' validity and revisions of the "after effects" of collective contracts, (b) the removal of "tenure" in all existing legacy contracts in all companies, (c) the freeze of "maturity" until unemployment falls <10%, (d) the decentralization of collective bargaining even at individual level.

4   Reforms concerning the employment protection legislation included: (a) the elimination of workers' unilateral recourse arbitration, (b) the revision of firing rules and costs, (c) the extension of probationary period, (d) the revision of recalibration rules collective dismissal, (e) the revision of part-time and temporary work regulations in order to facilitate the use of part-time work.

5   Most of the reforms were legislated with omnibus laws, e.g., laws 4024/2011, 4046/2012, 4093/2012, 4172/2013, 4254/2014, and law 4583/2018 for subsidizing social insurance contributions for workers <24 years old.

6   The minimum wage used to differ based on seniority, marital status and between blue and white collar workers. The decrease that was introduced in 2012 concerned all categories.

Most of the labor market measures were front-loaded in the program period and in fact the liberalization of the labor market moved in a much faster pace than the product market deregulation. Despite the reforms undertaken, unemployment in Greece skyrocketed from 7.8% in 2008 to 27.5% in 2013, while the equivalized disposable income declined by 42%, much more than the decline in GDP per capita that was 26% in real terms[7] (Andriopoulou et al., 2019). In 2019, the minimum wage was increased back to pre-crisis levels (by 11%) and the sub-minimum wage for the youth was abolished.

The contribution of this paper lies in the fact that it studies unemployment exits and entries and identifies what are the determinants that could enhance or disrupt labor market mobility in a period that includes the unique Greek economic crisis, as well as the years preceding the crisis and the years of the recovery. The fact that, in this period, two large changes in opposite directions in the statutory minimum wage occurred, offers also the opportunity to examine whether the minimum wage plays a role as determinant of transitions from unemployment to employment and vice versa. We also contribute to the relevant literature by estimating individual transition probabilities using microdata from the Greek LFS which include a longitudinal identifier that can track individuals across waves, and not only the cross-sectional component which is more commonly used in methods that study the minimum wage effect such as difference-in-difference estimation. In this way, we also exploit the full sample of working age population and there is no need to restrict the sample into a treatment and control group. In addition, we analyze whether a change in the minimum wage level affects the probability of exiting or entering unemployment measured at the individual level, while at the same time controlling for a series of other determinants (individual characteristics, macroeconomic conditions, regional characteristics, etc.) as well as unobserved heterogeneity across individuals. Finally, the particular characteristics of the examination period allow us to split the sample in sub-periods defined by the growth rate of the economy and thus examine whether the effect of the traditional determinants such as age, gender, marital status, and educational endowment is differentiated during economic downturns and to what extent these determinants account for individuals' transition from employment to unemployment in comparison to reform effects such as the minimum wage changes.

The findings of this paper are useful for policy making not only at national but also at the EU level and can contribute to the on-going discussion on the Directive of the European Parliament and of the Council on adequate minimum wages in the European Union. In the legislative proposal, the European Commission (2020a) considers adequate wages an essential component of the EU model of a social market economy and presents a clear position that convergence among Member States in this area contributes to improving the fairness of the EU labor market, stimulating productivity improvements and promoting economic and social progress. It also states that the role of minimum wages becomes more important during economic downturns. As a reaction to the proposed directive, a general discussion has been stimulated, also by the IMF recommending wage restraint in countries with a weaker external position and sluggish productivity growth and faster wage growth in countries with a stronger external position to help the rebalancing process (Detragiache et al., 2020). This debate is

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7   The largest drop in disposable income was recorded between 2009 and 2014, while the largest drop in GDP was recorded between 2007 and 2013. Year 2007 is the last one with a positive growth rate before the crisis, 2009 is the year with the highest disposable income, while 2013 is the peak of the crisis in terms GDP drop.

highly relevant in the current period of the Covid-19 crisis, which has particularly hit sectors with a higher share of low-wage workers such as retail and tourism and has had a stronger impact on the disadvantaged groups of the population. It is also relevant for the post-Covid period, given that increased automation, digitization, and robotization are expected to contribute even further to job polarization in the EU, as a decline of employment in medium-paid occupations and a simultaneous increase in low and high-paid occupations is on-going (Sebastian and Biagi, 2018; European Commission, 2020b).

These considerations make the study of the Greek case even more interesting for estimating the effects of changes in minimum wage in different phases of economic cycles. The rest of the paper is structured in the following way: the Section 2 presents a literature review, while Section 3 presents the data and the methods used in the applied analysis. The results are outlined in Section 4 and Section 5 concludes.

2　Literature review

The paper touches upon two distinct fields in the literature of labor economics: employment/ unemployment dynamics and economics of the minimum wage. We combine elements of both fields to identify the determinants of mobility in the labor market from the perspective of identifying what are the factors that affect the individual probability of making a transition into or out of unemployment. The relevant literature includes studies focusing on individual characteristics such as education, gender, marital status, etc., as well as on macroeconomic and policy components such as the phase of the economic cycle, the impact of specific labor market institutions like the minimum wage and the unemployment benefits (Meyer, 1990; Atkinson and Micklewright, 1991; Michaud and Tatsiramos, 2005; Flinn, 2006; Tatsiramos, 2009; Murtin and Robin, 2018). Another stream of this field studies unemployment state dependence or duration dependence, i.e. the impact of past unemployment experience on the predicted unemployment probability, rather than individual characteristics (Akerlof and Main, 1980; Arulampalam et al., 2000; Arulampalam, 2002; Burgess and Turon, 2005).

Bradley et al. (2003) focus on skills and find that high-skilled workers are more likely to keep a "good" job, but unskilled workers seem to be trapped in a vicious cycle of employment in the low-skilled sector or inactivity. They also find evidence of scarring effect of past unemployment. Gangl (2003) confirms this for United States and Germany concluding that high-skilled workers experience shorter spells of unemployment. Uhlendoff and Zimmermann (2014) also focused on individual characteristics and especially on nationality, finding that despite the fact that there are no differences in the probability of exiting unemployment per se between migrants and native Germans, the latter are estimated to spend less time in job search. However, they detect variations in probability of exiting from unemployment across ethnicities.

Caliendo and Uhlendorff (2008) analyze the mobility between self-employment, wage employment, and unemployment. They find that being non-employed in the past increases the probability of being self-employed and vice versa. Also, other individual-based determinants such as marital status, disability, nationality, number of children, and the attainment of higher educational level are examined. The relevant results reveal that these characteristics significantly affect the probability of moving from wage employment to self-employment or unemployment. Cassandro et al., (2020) present a novelty by adding the routine-task intensity of the

occupation to the determinants of individual probability of getting unemployed. They find that workers employed in routine-intensive occupations do not display higher unemployment risk than the rest of the workforce. However, when cognitive and manual tasks are distinguished, it turns out that workers employed in occupations entailing a large proportion of routine cognitive tasks (such as workers employed in service occupations as cashiers or call-center operators) are in fact exposed to a relatively higher risk of becoming unemployed.

Apart from individual characteristics, a part of the literature has been dedicated to study the link between the phases of economic cycle and unemployment transitions. First, Cockx and Dejemeppe (2005) observe that exit from unemployment is significantly affected by seasonal and cyclical variations, but deterioration of skills and demotivation also play an important role on the unemployment probability. The relation between cyclical variations and unemployment transitions has also been studied by Shimer (2012) who realized that the workers' separation probability in the US was weakly countercyclical until the mid-1980s, while it has been almost acyclical during the last two decades. Furthermore, Nagore Garcia and van Soest (2017) use administrative data from Spanish Social Security in a dynamic analysis of unemployment. They find that unemployment to employment transition is pro-cyclical while the converse transition is counter-cyclical. Also, they argue that the crisis impact was stronger in the job finding rates and weaker in the separation rates, highlighting the importance of policies that connect individuals with the labor market during recession.

At EU level, Ward & Macchiarelli (2014) and Monastiriotis et al., (2019), both detected significant differences in unemployment transition patterns, especially between countries of Southern Europe and Nordic countries. Moreover, these transitions are found to be sensitive to economic conditions as also found by Fontaine (2016) in the case of France. Hence, higher economic growth implies higher job retention rates, i.e., lower probability of getting into unemployment or inactivity. On the contrary, in times of economic recessions, the probability of moving from employment to unemployment or inactivity increases as job matching is more difficult and labor demand lowers significantly.

Regarding the impact of minimum wage on labor market flows, most studies find that a minimum wage increase is followed by a decrease both in job separation and job retention rates. In particular, Portugal and Cardoso (2006) argue that the impact of minimum wage on labor market flows differs across wage distribution as lower wages imply lower retention rates and higher separation rates. They justify that the 1987 minimum wage increase in Portugal, which concerned a very specific group of youth, led to an increase in job attachment for low-wage youngsters, reducing in total the high job turnover that is characteristic of low-wage workers. This relationship between low labor market flows and minimum wage increase is confirmed by Brochu and Green (2013). They argue that higher minimum wages do not facilitate entry into employment due to higher labor cost. On the contrary, higher minimum wages imply higher job stability. These results are also confirmed by Dube et al., (2016) for US, which in addition find that the duration of non-employment for separations or hires is not affected.

Generally, the minimum wage effect on employment remains a research and policy question not only of high interest but also controversy. Researchers often disagree finding either a negative effect especially on specific population groups (Neumark et al., 2014) or a non-significant employment effect of the minimum wage (Card and Krueger, 1994, 1995, 2000). Schmitt (2015) reviews empirical evidence on the employment effects of the U.S. minimum

wage and concludes that there is little or no employment response to modest increases. Harasztosi and Lindner (2019) find a small disemployment effect, which is greater though in industries where passing the wage cost to consumers by price increases is more difficult. The increase in retail prices may occur though with a significant time-lag from the increase of minimum wage as Fougère et al. (2010) observe, thus the causality may be hard to identify in some cases if multiple policies are implemented in the same period.

In a recent meta-analysis, Neumark and Shirley (2021) conclude that there is a negative estimated effect of the minimum wage on employment of teens, young adults, and less-educated workers. Manning (2021) supports that a possible negative employment effect due to a minimum wage increase might be offset by a consequent increase in productivity or a turnover decrease leading to a non-robust overall effect. Dube (2019) presents a full discussion of the existing applied evidence to inform the UK Low Pay Commission on the assessed impact of minimum wages, concluding that existing research totally points to a muted effect of minimum wages on employment, which is close to zero when the study considers a broad groups of workers, while suggesting that minimum wages significantly increase the earnings of low paid workers.

Concerning minimum wage in Greece, Yannelis (2014) and Kakoulidou et al., (2018) focus on the 2012 minimum wage reform and its impact on employment and unemployment dynamics. A substitution channel between workers below and above 25 years is found by Yannelis due to the youth subminimum wage introduction. Hence, the latter led to a relative positive effect on employment for those aged <25 years in comparison with those >25 years. As for employment dynamics, the positive employment effect is through new hires, while there is no effect through job destructions. On the contrary, Kakoulidou et al., do not find significant changes in employment probability between two close substitute age-groups (22–24 and 25–27), but they find a positive impact on the job-finding rate and no significant impact on job losses. Kanellopoulos (2015) finds that minimum wages are closely related to developments in average remuneration in the private sector and that an increase in minimum wages results in substantial job losses.

A broader assessment of labor market reforms during the period of the Greek crisis, placing emphasis on measures related to wage setting, including the framework of collective bargaining as well as national minimum wage setting, is presented by (Gatopoulos et al., 2021). The authors consider year 2012 to be the critical year for labor market reforms as most of them were enacted at that time. They also explain that the rationale of the new mechanism of minimum wage setting was to strengthen evidence-based wage floor setting. In this respect, the reforms were aiming, inter alia, at removing automatic increases in bonuses and allowances that, over time, decoupled wages from productivity. Examining the presence of a wage curve in the Greek labor market, Daouli et al., (2017) find that a negative relationship between wages and regional unemployment emerged only in the period 2010Q2–2011Q4, apparently due to the restructuring of the collective bargaining regime and the reduction in the national minimum wages. On the contrary, Cholezas and Kanellopoulos (2015) provide evidence of a wage curve in Greece for the period 2004–2010 with a magnitude of the wage elasticity similar to that suggested by international evidence. Moreover, they prove that the negative relationship between wages and unemployment seems to have been strengthened by the labor market deregulation reforms of the economic programs.

Finally, Georgiadis et al., (2020) observe that wage and employment adjustments to the 2012 reduction of the minimum wage do not seem to be entirely consistent with a negative

relationship between wages and employment, as the competitive model of the labor market would predict. In particular, they find that in firms with a large share of youth employment, the share of youth did not change or even decreased despite the fact that youth wages decreased significantly. At the same time, these firms were characterized by higher decreases in adult wages and a higher probability that adult employees move to another firm. In a recent study, Bechlioulis and Chletsos (2021) also deploy the effects of the two opposite minimum wage changes (in 2012 and 2019) not on employment level but on the job search rate and on the job loss rate.[8]

By exploring the effect of the minimum wage on unemployment transitions and controlling for other socioeconomic, macroeconomic, and regional factors, the current study adds to the relevant literature. The key elements of the paper's contribution are the introduction of a minimum wage —related variable, individual characteristics and economic growth into a single model in order to estimate the effect of minimum wage on unemployment transition. Further the estimation is conducted for a long period including the unique deep and prolonged economic crisis period when the national minimum wage was abolished, and a youth sub-minimum wage was introduced and then abolished. Finally, the data used include a unique longitudinal identifier which enables the tracking of individuals across waves and helps the estimation of individual transitions' probability through logit model, thus avoiding to restricting the sample to treatment and control group.

3 Methodology and data

The analysis of this paper is based on quarterly microdata from Greek LFS between 2004 and 2019. The Greek LFS, produced by the Hellenic Statistical Authority (EL.STAT.) on quarterly basis, provides data on labor force participation of people aged >15 years. LFS dataset is a rotating panel dataset as one-sixth of the sample is replaced each quarter. Thus, each individual can participate in the survey for up to six quarters (q1–q6). In total, the pooled panel we use comprises of 4,320,662 observations corresponding to 832,542 individuals participating in the survey for at least one quarter. The dataset used in the logit analysis is the unbalanced one. Yet, for spell analysis the balanced panel is also used, which includes only those individuals who participate in the sample for six consecutive quarters. The balanced dataset includes 1,433,022 observations corresponding to 238,837 individuals. In the following analysis, both balanced and unbalanced datasets have been restricted to working age population (15–64 years old) in the private sector[9] and in particular to those who actively participated in the labor force, i.e.,

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8   Bechlioulis and Chletsos (2021) focus on the job searches and job losses. The current paper focuses on unemployment entries, which partially correspond to job loss as they do not include only firings, and to unemployment exits which correspond to finding a job not just searching for one. Also, Bechlioulis and Chletsos use a total different methodology with difference-in-difference estimation. In order to apply this methodology, they construct a treatment group of females aged 15–44 who attended at most secondary education (a low-wage group) and a control group of males aged 45–64 who completed at least the secondary education (a high-wage group). They also keep only the second quarter in order to control for seasonality. The estimation of individual probabilities through the logit model that we use gives us the opportunity to exploit the full sample, while using quarter dummies to control for seasonality. We also include in our analysis the pre-crisis period, and split the analysis into three periods (pre-crisis, crisis and recovery) in order to check the robustness of our results or possible differentiations across periods.

9   Public sector has been excluded as the public sector workers are protected towards unemployment and also the minimum wage changes do not affect the employment decisions for public sector entities. Thus, their inclusion could distort the results related to the minimum wage effect.

those who were employed or unemployed. Therefore, transitions from inactivity to employment and vice versa are excluded.[10]

One way to investigate unemployment transitions is through individuals' employment and unemployment spells (Kaitz, 1970; Akerlof and Main, 1980). An unemployment spell can be defined as a period during which the individual is unemployed and, thus, an unemployment spell in our analysis starts from the first quarter that the individual is unemployed to the quarter that he finds a job. In this way, the total period of survey for each individual is divided into smaller periods (spells into and out of unemployment). The study of frequency and duration of unemployment spells is important for policy making as it offers an indication of the size of mobility in the labor market and of the extent to which unemployment is transitional or more permanent. The main drawback of spell analysis is the problem of left and right censoring, caused by the fact that the length of spells is limited by the observation window of the survey (6 months in the case of the LFS).

Apart from studying the frequency, duration, and recurrence of unemployment through spell analysis, the determinants of transitions into and out of unemployment are examined focusing on the role of minimum wage, certain individuals' socioeconomic variables, and controlling also for macroeconomic, regional determinants as well as for the unobserved heterogeneity. The model used is a simple binary multivariate logistic model:

$$Pr(y_{it} = 1) = F(\beta x_{it}) = p_{it}$$

and

$$Pr(y_{it} = 0) = 1 - F(\beta x_{it}) = 1 - p_{it},$$

where y_{it} is the dependent variable capturing the transition in question (transition into or out of unemployment). $y_{it} = 1$ when the individual has a transition (enters or exits unemployment) and $y_{it} = 0$ when the individual is in the same status as in the previous period. F is the logistic distribution $F(z) = \frac{exp(z)}{1 + exp(z)} = \Lambda(z)$, x and β are vectors of explanatory variables and their coefficients, respectively. When we control for unobserved heterogeneity or frailty, an individual-specific unobserved characteristic u is added.

$$Pr(y_{it} = 1) = F(\beta x_{it} + u_{it}) = p_{it}$$

We estimate u using random effect techniques, in particular Gauss-Hermite quadrature, assuming that unobserved heterogeneity is identically and independently distributed over the individuals and follows a normal distribution.

In the tables, we present the standard deviation of the heterogeneity variance, "sigma_u," and "rho" which is the ratio of the heterogeneity variance to one plus the heterogeneity variance[11] and in a way indicates how much of the model variance is due to unobserved heterogeneity.

In the basic specification of the model for unemployment entry or exit, the estimated x is a vector including three groups of independent variables. One group contains variables related

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10   The share of active people did not significantly fluctuate during the 2004–2019 period. In 2004, 66.2% of total population actively participated in the labour force while in 2019 the respective share was 67.4%. Only for individuals aged between 55 years and 64 years, activity rates have been increased from 41.7% to 49.8% due to the increase of the statutory retirement age and the reduction of paths to early retirement during the period of the economic programs. Regarding transitions in and out from the labour force, it is observed that in most quarters less than 1% of individuals made a transition from/to inactivity.

11    $rho = \frac{(sigma\_u)^2}{1 + (sigma\_u)^2}$. If the hypothesis that rho is zero cannot be rejected then frailty is unimportant.

to the minimum wage (percentage difference of minimum wage level from year to year and interactions with age groups). A second group contains variables related to the socioeconomic status of the individuals such as age group, gender, marital status, and nationality. Finally, a third group contains variables capturing geographical regions, seasonality and the quarter-on-quarter (q-o-q) difference in growth rate.

It should be underlined that the given the limited length of the observation window (six quarters), the dataset includes both left-censored and right-censored cases, which contribute to the calculation of the relevant probabilities for as long as they are observed in the sample. Also, the unbalanced panel is used for the estimation of the logistic regression, and in that case right-censoring may be also due to attrition. Yet, given the rotational design of the LFS and its small length, attrition rates are low.

4 Results

4.1 Spell analysis results

In this section, a set of graphs is included presenting the main results of the spell analysis.

The evolution of the real minimum wage in the period under examination is illustrated in Graph 1 along with changes in the growth rate of GDP of the Greek economy in the examining period. As observed in the graph, the real minimum wage is steadily increasing from the beginning of the observation period (first quarter of 2004) until the second quarter of 2012, where it decreases by 22% in nominal terms and 23.4% in real terms, and it remains relatively stable (the statutory minimum wage does not change and inflation in this period is close to zero) until the second quarter of 2019 where it increases by 11%. The GDP growth rate is illustrated with the blue bars. Recession starts in 2008 and lasts until the first quarter of 2016. Thus, the three subperiods which we analyze following quarterly growth rate changes are: 2004q1–2008q3 (pre-crisis period), 2008q4–2016q1 (crisis period), and 2016q –2019q4 (recovery period).

Graph 1   The evolution of real minimum wage and GDP growth rate (q-o-q) in Greece for the period 2004–2019.
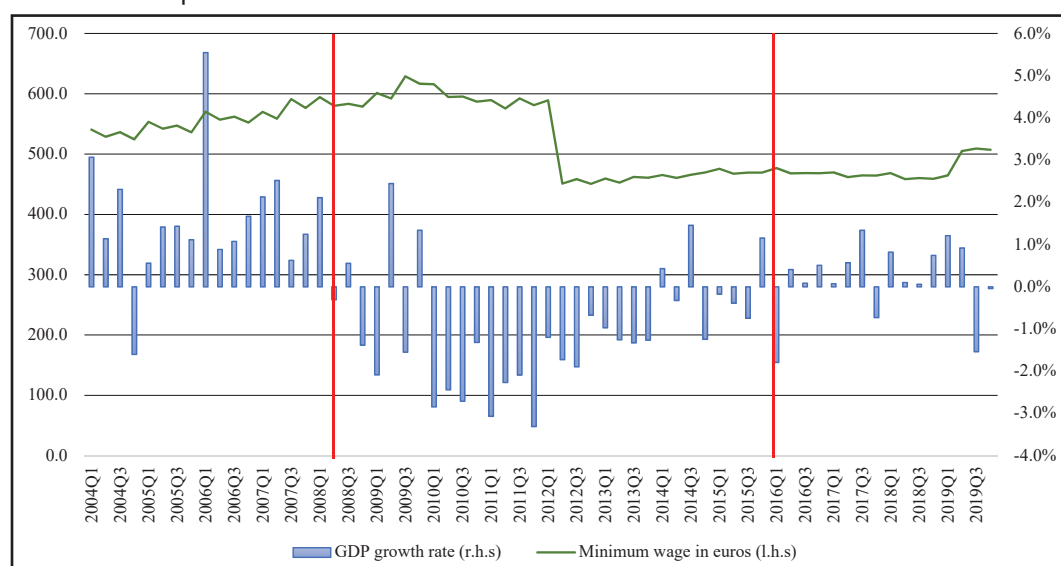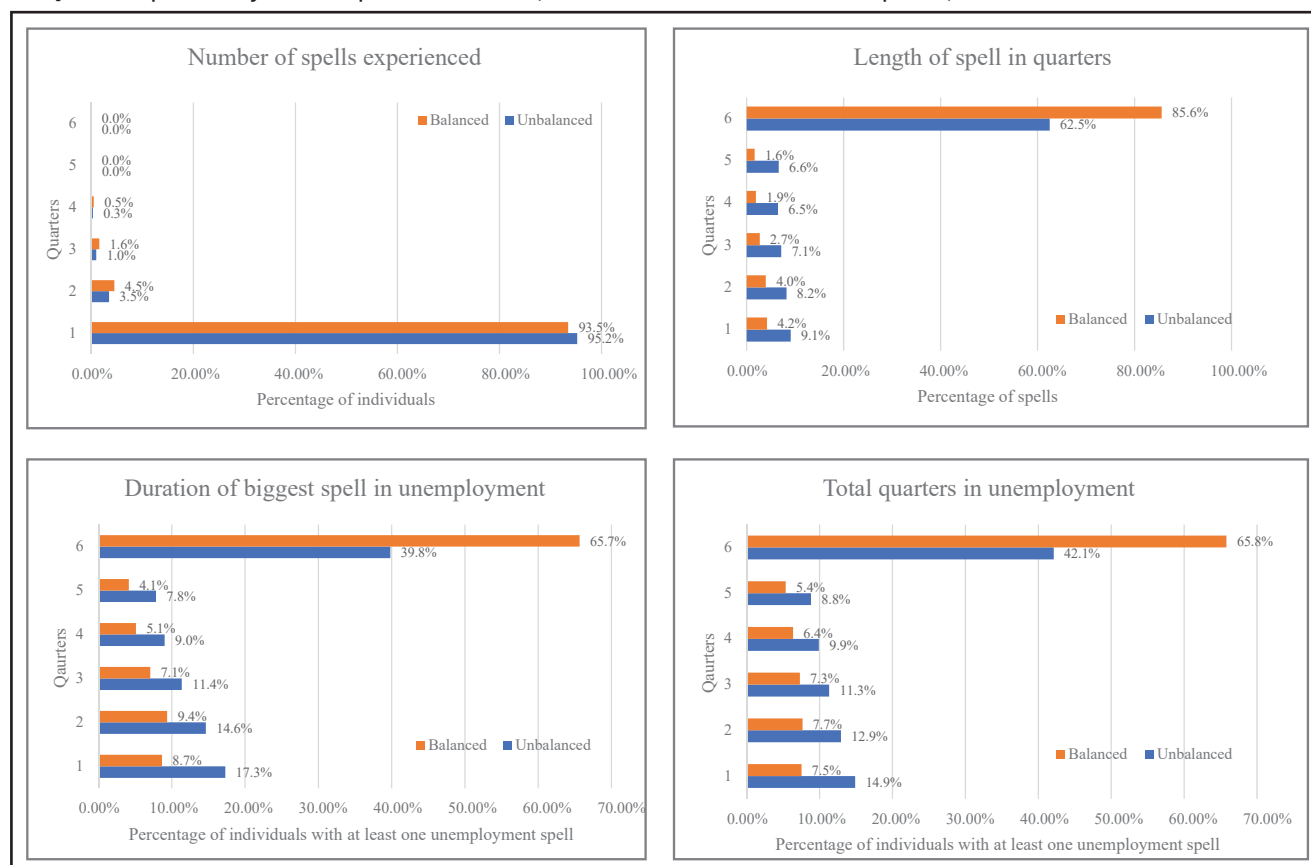

Data source: Hellenic Statistical Authority, Ministry of Labour.

Graph 2 illustrates several descriptive statistics using both the balanced and the unbalanced panel. First, the number of spells experienced by an individual is presented. The number of spells increases with labor market mobility. However, the majority of individuals (>95% using the unbalanced panel and >93% using the balanced) experience only one spell in employment or unemployment, offering a clear indication of low mobility.

The other dimension of labor market mobility is the length of spells experienced. The higher the length the lower the mobility as individuals stay in the sample for six quarters. Hence, a six-quarter spell means no transition between any of labor market statuses during the stay in the sample. Results indicate the low mobility model in the Greek labor market. Note that 85.6% of all spells observed in the balanced and 62.5% in the unbalanced panel (either in employment or unemployment) last at least for six quarters.

Considering those who experience at least one spell in unemployment, we focus on the duration of biggest spell in this status. The higher the duration of the biggest spell in unemployment the more persistent unemployment is. It is observed that the largest part of individuals in the sample both in balanced and unbalanced panel experience unemployment spells at their maximum duration, i.e., six quarters. As a result, unemployment seems to be persistent. So, if an individual moves into unemployment it is more likely to stay there for a long time. As expected, this persistence is smaller in the unbalanced panel. Further, 17.3% of individuals included in the unbalanced panel experience a single-quarter spell in unemployment. Low mobility is also confirmed by the number of total quarters in unemployment. It is found that

Graph 2   Spell analysis desriptive statistics (balanced versus unbalanced panel).

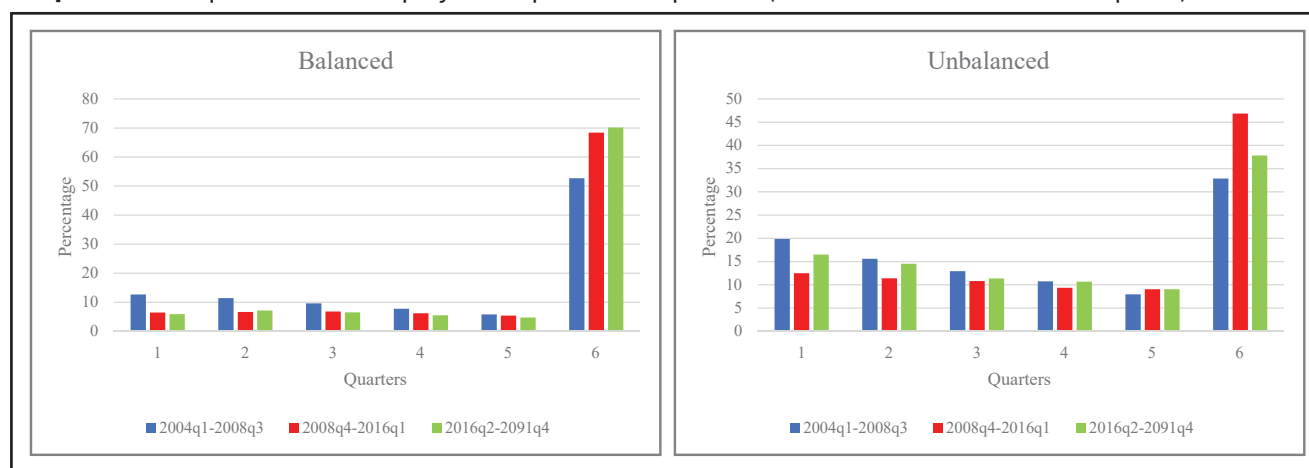*Data source*: Hellenic Statistical Authority, LFS, 2004–2019.

65.8% of individuals in the balanced panel and 42.1% in the unbalanced panel experience six quarters in unemployment in total.

Focusing more on time spent in unemployment, in Graph 3, the sample period is split into the three sub-periods described as earlier. The first period is the period just before the crisis that hit Greece in the end of 2000s. The second period is the "crisis period" while the third is the "recovery period" a period in which the economy started to recover after a deep and prolonged recession.

However, the same pattern is obtained again. Regardless the period, most of individuals experience six quarters of unemployment. Hence, the low mobility model persists even during the severe economic crisis that hit Greece. An interesting result from the unbalanced panel data is that the distribution of unemployment duration shifted slightly toward the right (higher duration) during the crisis period. At this period, more people moved into unemployment and stayed there for more time as job creation was low and unemployment was at unprecedented levels.

In relation to the above empirical findings, it should be noted that the long-term unemployment as percentage to total unemployment in Greece rises from 39% at the beginning of the crisis to 75% at the peak of the crisis.[12] Yet, despite the large increase of unemployment and long-term unemployment during the crisis, the number of individuals entitled to unemployment benefits was limited. In addition, from 2008 to 2013, when the unemployment rose >250% (from 7.8% to 27.5%), the total expenditure on unemployment benefits decreased by 15%. Expenditure on unemployment benefits increased by 25% only during the first 2 years of the crisis. Yet, as crisis was prolonged unemployed became long-term unemployed, and gradually lost eligibility to the unemployed benefits.[13]

Graph 3   Total quarters in unemployment split in three periods (balanced versus unbalanced panel).

Data source: Hellenic Statistical Authority, LFS, 2004–2019.

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12   See Eurostat, Labour Force Survey, Variables: LFSA_UPGAN, LFSQ_UPGAL.

13   Another point belonging to the area that labour markets and welfare state interact is the way the minimum wage relates to social benefits. In Greece, changes in the minimum wage affect some benefits' such as unemployment and maternity benefits, which are directly linked with the minimum wage. In particular, the unemployment benefit equals to 55% of the national minimum wage. Regarding maternity benefits, employed women receive a benefit equaling to the minimum wage as supplementary maternity provision. This benefit is paid for six months starting from the second month after the birth. As already mentioned, the number of unemployment benefit beneficiaries during the crisis was very limited in relation to the size of the increase of unemployment and the length of unemployment. Thus, the effect of interaction with minimum wage changes is limited.

Additionally, Greece was one of the last countries in the EU without a minimum income guarantee scheme, thus, there was a sharp increase in the contributions of groups of households with unemployed members to aggregate poverty, especially when indices sensitive to the existence of very low incomes (Andriopoulou et al., 2019). In 2013, a long-term unemployment benefit was introduced but with strict eligibility criteria and thus low coverage, while a guaranteed minimum income was introduced in 2017, after the end of deep crisis.

4.2 Logit regression results

The estimations presented have been conducted for the entire sample period (2004–2019), but also for three sub-periods. The explanatory variable of main interest is the percentage difference of the minimum wage from year to year.[14] The results are reported in odds-ratio.[15] The baseline group consists of observations of the second quarter of single males of Greek nationality, aged >50 years old that have completed secondary education and live in Attica region.

Regarding unemployment entries (Table 1), the percentage change of minimum wage is estimated not to have a statistically significant effect on them. The opposite would be expected, as unemployment entries equal to job losses (firing, quits, or contract terminations) and the increase of minimum wage would be expected to increase the probability of having a transition into unemployment. The same result is obtained in the model where interactions between the minimum wage change and several age-groups are introduced in order to examine whether the changes in minimum wage in the period of crisis had a different impact across age-groups (specification 2).[16]

The most important finding is that individual characteristics seem to play an important role on the transition probabilities. Starting from the age, the relative probability of entering unemployment decreases as age increases and for all age groups the probability to enter unemployment is higher than the baseline group (i.e., 50–64). This finding does not differ in the three periods examined: post-crisis, crisis, and recovery and is compatible with the theory that predicts higher mobility in younger groups (see Dorsett and Lucchino, 2018). The fact that the youngest cohort (15–24) exhibits the highest probability to enter unemployment is not a surprise given that the youth are more mobile since they are employed in various jobs, many of them temporary, and not necessarily related to their qualifications. In addition, young employees have less experience and specific human capital which is relevant to firms' activities. Therefore, young employees are more likely to be laid off first (Filinis, 2021).

Further, both women and unmarried individuals have higher probabilities of entering unemployment than men and married individuals in all examining periods. Also it is interesting to know that when we analyze the gender with marital status, the married women seem to have much lower probability to enter unemployment than the other groups as the odds-ratio

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14 We have tried various forms for this explanatory variable: the level of minimum wage, the log of minimum wage, the difference of difference. The various specifications produce similar results.

15 An odds ratio compares the relative magnitude of two complementary probabilities: the probability that an event will occur versus the probability that it will not occur: $odds = \frac{probability}{1 - probability}$.

16 Both the Akaike Information Criterion (AIC) and the Baysenian Information Criterion (BIC) are smaller in the first specification (for the same dataset used) indicating that the first specification fits better.

Table 1 Logit analysis of unemployment entries (transitions from employment to unemployment)

Dependent var: Probability to enter unemployment	Specification 1				Specification 2			
	Total Period	Period 1	Period 2	Period 3	Total Period	Period 1	Period 2	Period 3
Minwage (% dif)	1.00	1.05	0.98***	0.98	0.99	1.06	0.99	0.95
Minwage (% dif) # age group (15–24)					1.01	1.01	1.00	1.03
Minwage (% dif) # age group (25–34)					1.01	1.01	1.00	1.09*
Minwage (% dif) # age group (35–49)					1.00	0.99	1.00	1.02
Age groups—baseline: age group 50+								
Age group 15–24	3.81***	3.58***	5.96	4.12***	3.81***	3.77	5.19***	4.11***
Age group 25–34	2.63***	2.61***	3.62***	2.55***	2.63***	2.72***	3.25***	2.51***
Age group 35–49	1.85***	1.98***	2.16***	1.58***	1.85***	2.08***	2.04***	1.58***
Gender—baseline: male								
Female	2.24***	2.58***	2.30***	2.28***	2.24***	2.71***	2.13***	2.28***
Marital status—baseline: non-married								
Married	0.57***	0.45***	0.71*	0.46***	0.57***	0.44***	0.74	0.46***
Female # Married	0.78***	1.01	0.58***	1.04	0.78***	1.01	0.61***	1.04
Educational level—baseline: Upper Secondary								
Less than primary/primary	0.66	0.42***	0.82	0.67	0.66	0.41	0.84	0.66
Lower secondary	1.31	1.38	1.63	0.82	1.31	1.41	1.54	0.82
Post-secondary	0.15***	0.20***	0.11***	0.11***	0.15***	0.19***	0.14*	0.11***
Tertiary	0.78***	0.64**	0.99	0.57***	0.78***	0.64***	0.99	0.57***
Post-tertiary education	0.82***	0.69***	0.89	0.65***	0.82**	0.68**	0.90	0.65***
Nationality—baseline: Greek								
Immigrant	2.11***	1.06	2.38***	3.00***	2.11***	1.07	2.20***	3.01***
Regions—baseline: Attica								
Eastern Macedonia and Thrace	3.40***	4.76***	3.66***	2.51***	3.40***	5.08***	3.30***	2.52***
Central Macedonia	3.04***	3.82***	2.59***	4.41***	3.04***	4.04***	2.42***	4.41***
Western Macedonia	8.32***	9.30***	7.69***	13.62***	8.32***	10.26***	6.36***	13.64***
Epirus	2.52***	2.45***	2.66***	2.75***	2.52***	2.54***	2.48***	2.75***
Thessaly	3.61***	3.99***	3.68***	3.92***	3.61***	4.22***	3.31***	3.92***
Ionian Islands	12.12***	24.65***	10.79***	12.22***	12.12***	28.55***	8.73***	12.25***
Western Greece	2.71***	2.15***	2.70***	4.05***	2.71***	2.22***	2.50***	4.05***

(continued)

Table 1 Continued

Dependent var: Probability to enter unemployment	Specification 1				Specification 2			
	Total Period	Period 1	Period 2	Period 3	Total Period	Period 1	Period 2	Period 3
Sterea Ellas	3.05***	5.32***	2.66***	2.52***	3.05***	5.71***	2.48***	2.52***
Peloponnese	2.13***	2.58***	1.85	2.62***	2.13***	2.67***	1.79***	2.63***
Northern Aegean	4.22***	2.96***	3.13***	9.91***	4.22***	3.09***	2.87***	9.92***
Southern Aegean	14.66***	23.06***	15.13***	14.22***	14.66***	26.55***	12.04***	14.25***
Crete	8.45***	9.38***	9.77***	9.14***	8.45***	10.32***	7.95***	9.16***
Quarter—baseline q2								
q1	2.32***	1.84**	2.05***	2.90***	2.32***	1.88***	2.00***	2.93***
q3	1.02	0.86	1.15	0.96	1.02	0.84	1.19	0.97
q4	2.12***	1.99***	1.88***	3.28***	2.12***	2.01***	1.89***	3.29***
GDP (% dif qoq)	0.94***	1.13***	1.01	0.96	0.94***	1.14***	1.01	0.96
_cons	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
sigma_u	2.83***	2.95***	3.07***	2.99***	2.83***	3.15***	2.74***	2.99***
Rho	0.71***	0.73***	0.74***	0.73***	0.71***	0.75***	0.69***	0.73***
AIC	124,755	31,267	66,365	26,344	124,760	31,258	66,344	26,345
BIC	125,096	31,577	66,649	26,638	125,136	31,590	66,694	26,669

Data source: Hellenic Statistical Authority, LFS, 2004–2019

Notes:

1. Minwage % dif: percentage difference of minimum wage from year to year
2. #: denotes interaction between two variables
3. GDP (% dif qoq): percentage difference of Gross Domestic Product on a quarter-on-quarter basis
4. sigma_u: standard deviation of the heterogeneity variance
5. rho: the ratio of the heterogeneity variance
6. AIC: Akaike Information Criterion
7. BIC: Bayesian Information Criterion

$*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

drops significantly less than one. When we split the whole period into the three sub-periods, it is observed that this effect occurs mainly from the period of crisis. This finding is particularly interesting because it means that married women sustained their jobs during the crisis much more than the men or unmarried women and it could be attributed to particular unobserved skills of married women or favorable treatment from the employers, as well as differences in sectoral composition of employment.

As for education, a negative relationship between the level of education and unemployment entry probability would be expected. Yet, this pattern is not "linear." In both specifications, graduates of lower (less than primary/primary group and secondary education attendants) do not have significantly different odds of getting into unemployment than the baseline group (upper secondary). Yet, we do find a strong protective effect for postsecondary graduates, which are usually skilled in technical fields. These individuals have much lower probability to move into unemployment than the baseline group and all other groups in all periods. As expected, higher educational levels decrease the probability of entering unemployment in both specifications estimated. The pattern is the same in all periods examined,[17] with the exception of the crisis period when the effect is not statistically significant. A similar finding for lower protection of higher education toward unemployment, poverty, and inequality during the period of crisis compared to other periods is found also in other works (Filinis et al., 2018; Andriopoulou et al., 2019; Andriopoulou et al., 2021). Yet, the result is reversed in the recovery period with the odds being much lower for tertiary and post-tertiary graduates.

As expected, for immigrants the probability of entering unemployment is statistically higher. However, it should be highlighted that immigrants usually work in more flexible types of jobs and they are more likely to work in the informal sector. These two features make them attractive to employers offering low-skilled jobs (especially in agriculture and tourism), and thus make them also more mobile. The same pattern has also been observed in Italy after the 2008 crisis, where there was growth of low-technology- and low-knowledge-intensive sectors which account for the entry of low-skilled and high-routine workers into the Italian labor market (Céline et al., 2019; Cassandro et al., 2020).

Unemployment transitions are more likely to happen for individuals living in all other regions than in Attica. The main reason for that might be the high mobility observed in all regions. Higher mobility may be attributed mainly on seasonal tourism-related activities, like accommodation, restaurant sector, etc. Hence, people working on these sectors move into unemployment after the so-called tourist season. Higher coefficients implying higher mobility are observed in more touristic areas such as the Aegean islands (particularly the region of Southern Aegean), the Ionian Islands, and Crete.

In addition, the effect of growth rate of the economy, as depicted in the q-o-q difference, on the probability of entering unemployment is mixed. In the total period (2004–2019), it is estimated that this probability decreases with the growth rate of the economy. This finding is compatible with the theoretical predictions. However, the effect differs when estimations are done for different time periods. For the first period, before the crisis onset in Greece, higher growth rate is estimated which imply a higher probability of entering

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17   We have also tried various interactions of education and age, or gender but the model's explanatory power did not improve.

unemployment in contrast with what would be expected. Finally, the unobserved heterogeneity, as measured by sigma_u and rho, is significant at the 0.1% level of significance. This practically means that there are unobserved characteristics across individuals, such as skills (not captured by education), capabilities, or commitment, which affect the probability of exiting unemployment.

The other side of mobility includes transitions from unemployment to employment, i.e., unemployment exits or, equally, job findings, the result of which are presented in Table 2. It would be expected that minimum wage increases will lower exits from unemployment as labor cost increases. However, the finding is the opposite. In almost all specifications, minimum wage increase is estimated to slightly increase the probability of exiting unemployment (as the odds-ratio is slightly >1). This slightly positively relationship between unemployment exits and minimum wage is present even during the period of crisis (period 2). This is a very interesting finding that needs further investigation particularly from the supply side of the labor market as it may capture the positive effects of increases in minimum wage on the labor market participation incentives of the individuals. Yet, it may also relate to the various forms of segmentation that exist in the Greek labor market, as well as to changes at the level of informality.

According to the mainstream economic theory, a minimum wage increase is expected to have a positive effect on entries to unemployment (or job losses) and a negative effect on exits from unemployment (or job findings). In the present paper, it is observed that a minimum wage increase has no significant effect on unemployment entries, but it has a positive effect on transitions from unemployment to employment. This result is partially compatible with Portugal and Cardoso (2006) as for job separation rates, but it is the opposite to that of job accession rates. Our results are also opposite to those of Brochu and Green (2013) who argue that higher minimum wages in Canada are associated to lower employment entry rates and to Dube et al., (2016) who find that a minimum wage increase in the United States has a negative effect on separations and new hires. The no statistically significant effect on unemployment entries is confirmed also by Jardim et al., (2018) who also found no effect on the probability of remaining employed after the increase of the minimum wage in Seattle in 2015. In comparison to other relevant studies for Greece, the present study finds similar effect of the minimum wage on unemployment entries just like Yannelis (2014). Regarding new hires (or unemployment exits) the findings remain the opposite. The result is in accordance also with the findings of Bechlioulis and Chletsos (2021) who find that a minimum wage increase is followed by a drop in the relative possibility of job loss in Greece by implementing a difference-in-difference estimation strategy.

Regarding age, all age-groups are more likely to move into employment in comparison with the baseline group (i.e., those aged >50 years), verifying once again the higher mobility across the younger cohorts. In particular, those aged 25–34 seem to have the higher probabilities of getting a job in all periods. However, the differences across groups are smaller and less significant in the pre-crisis period. The interactions between changes in the minimum wage and age do not have a statistically significant effect on the probability of exiting unemployment with the exception of the first period, up to 2008. In this specification, the effect of minimum wage change is not statistically significant, but all interactions are, implying a higher than the baseline probability.

Table 2 Logit analysis of unemployment exits (transitions from unemployment to employment)

Dependent var: Probability to exit unemployment	Specification 1				Specification 2			
	Total Period	Period 1	Period 2	Period 3	Total Period	Period 1	Period 2	Period 3
Minwage (% dif)	1.04***	1.07***	1.03***	1.04***	1.02***	1.02	1.03**	1.05**
Minwage (% dif) # age group (15–24)					1.03**	1.08***	1.01	1.00
Minwage (% dif) # age group (25–34)					1.02	1.05*	1.01	0.99
Minwage (% dif) # age group (35–49)					1.01	1.05*	1.01	0.99
Age groups—baseline: age group 50+								
Age group 15–24	1.51***	1.01	1.35***	1.76***	1.52***	0.99	1.36***	1.76***
Age group 25–34	1.71***	1.20*	1.61***	1.91***	1.71***	1.19*	1.62***	1.92***
Age group 35–49	1.48***	1.16*	1.49***	1.60***	1.48***	1.15	1.50***	1.61***
Gender — baseline: male								
Female	0.71***	0.50***	0.76***	0.92	0.71***	0.50***	0.76***	0.92
Marital status—baseline: non-married								
Married	1.72***	1.74***	1.62***	1.89***	1.72***	1.74***	1.62***	1.89***
Female # Married	0.54***	0.54***	0.53***	0.49***	0.54***	0.54***	0.53***	0.49***
Educational level—baseline: Upper Secondary								
Less than primary/primary	1.30***	1.56***	1.25*	1.10	1.30***	1.56***	1.25*	1.10
Lower secondary	1.31	2.57***	0.99	0.28*	1.31	2.56***	0.99	0.28*
Post-secondary	1.10	1.29	1.02	0.52	1.10	1.28	1.02	0.52
Tertiary	1.33***	1.34**	1.37***	1.24**	1.33***	1.34**	1.37***	1.25**
Post-tertiary education	1.12**	1.42**	1.08**	1.00	1.12**	1.42**	1.08***	1.00
Nationality—baseline: Greek								
Immigrant	1.91***	1.98***	1.91***	2.36***	1.91***	1.98***	1.91***	2.36***
Regions—baseline: Attica								
Eastern Macedonia and Thrace	2.54***	2.17***	2.96***	2.28***	2.55***	2.17***	2.96***	2.28***
Central Macedonia	2.30***	2.11***	2.16***	2.74***	2.30***	2.11***	2.16***	2.74***
Western Macedonia	1.79***	1.30*	1.87***	2.13***	1.79***	1.29*	1.87***	2.14***
Epirus	2.11***	1.05	2.84***	2.39***	2.11***	1.05	2.84***	2.39***
Thessaly	3.00***	1.77***	3.87***	3.04***	3.00***	1.77***	3.87***	3.04***
Ionian Islands	26.76***	11.17***	22.41***	67.17***	26.74***	11.14***	22.38***	67.25***
Western Greece	2.31***	1.67***	2.88***	2.25***	2.31***	1.67***	2.88***	2.26***

(continued)

Table 2 Continued

Dependent var: Probability to exit unemployment	Specification 1				Specification 2			
	Total Period	Period 1	Period 2	Period 3	Total Period	Period 1	Period 2	Period 3
Sterea Ellas	2.41***	2.32***	2.17***	2.87***	2.41***	2.32***	2.17***	2.87***
Peloponnese	2.51***	2.02***	2.51***	3.02***	2.51***	2.02***	2.52***	3.02***
Northern Aegean	3.37***	2.46***	3.55***	4.73***	3.37***	2.45***	3.55***	4.74***
Southern Aegean	21.05***	16.01***	19.25***	27.92***	21.06***	15.92***	19.25***	27.91***
Crete	10.45***	11.82***	7.79***	15.58***	10.44***	11.80***	7.79***	15.58***
Quarter—baseline q2								
q1	0.36***	0.38***	0.36***	0.30***	0.36***	0.38***	0.36***	0.30***
q3	0.76***	0.58***	0.82***	0.72***	0.76***	0.58***	0.82***	0.72***
q4	0.55***	0.57***	0.58***	0.49***	0.55***	0.58***	0.58***	0.49***
GDP (% dif qoq)	1.19***	1.11***	1.07***	0.99	1.19***	1.11***	1.07***	0.99
_cons	0.01***	0.04***	0.01***	0.01***	0.01***	0.04***	0.01***	0.01***
sigma_u	1.50***	1.15***	1.49***	1.67***	1.50***	1.15***	1.49***	1.6685
Rho	0.40***	0.29***	0.40***	0.46***	0.41***	0.29***	0.40***	0.4583
AIC	95,863	25,065	46,559	23,429	95,861	25,059	46,564	23,435
BIC	96,182	25,333	46,859	23,706	96,211	25,353	46,893	23,739

Data source: Hellenic Statistical AuthorityLFS, 2004–2019

Notes:

1. Minwage % dif: percentage difference of minimum wage from year to year
2. #: denotes interaction between two variables
3. GDP (% dif qoq): percentage difference of Gross Domestic Product on a quarter-on-quarter basis
4. sigma_u: standard deviation of the heterogeneity variance
5. rho: the ratio of the heterogeneity variance
6. AIC: Akaike Information Criterion
7. BIC: Bayesian Information Criterion

$*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

The results for unemployment exit probability confirm the lower mobility for women, as the estimated coefficient for unemployment exits is negative, implying that women are less likely to find a job probably due to family reasons. This finding is even stronger during the period of crisis. On the contrary, married individuals are more likely to find a job. This might be attributed to higher economic needs, resulting in higher labor supply. For married women, the probability of finding a job is lower, depicting the possible bias effect of family obligations.

Mixed results are obtained regarding the effect of education on transition out of unemployment, which also vary across the different periods. When the sample is pooled the probability of exiting unemployment seems to be higher for the very low-skilled individuals (those that have completed primary or less than primary education), as well as high-skilled individuals (having completed tertiary or post-tertiary education) as compared to the baseline group (upper secondary education). On splitting the sample into the three periods the results become slightly differentiated. In the pre-crisis period, the low-skilled (less than primary, primary, and lower secondary), as well as the very high-skilled (tertiary and post-tertiary) have higher probabilities of exiting unemployment. During the period of crisis, the significance of the positive odds drops for the very low-skilled and is non-significant for the lower secondary graduates, so it practically restricts to higher skilled, but also with lower significance. Finally, in the recovery period the effect is non-significant for the very low-skilled and is reversed (negative) for secondary level graduates, while it remains positive but with lower significance for higher education. This effect probably signals a changing role of formal education in protecting people from unemployment and enhance job finding, as also found by Filinis et al., (2018). The result is similar to findings from income distribution studies for the period of crisis concluding that changes in relative group incomes and population shares result in a very substantial decline in the contribution of inequality "between" education groups (Andriopoulou et al., 2018; Andriopoulou et al., 2021).

Given the higher mobility of immigrants observed in unemployment entries, the estimated odds-ratio for getting out of unemployment is also higher for immigrants than Greeks.

The pattern of higher mobility in all other regions than Attica is present also for unemployment exits. Individuals living in these regions are more likely to find a job and the corresponding probability is many times higher in areas with high share of tourism-related activity similar to the regions of Southern Aegean, Ionian Islands, and Crete.

The estimations on the impact of growth rate are fully compatible with the theoretical predictions. Higher growth rate implies a higher probability of exiting unemployment, confirming what was expected. The estimated effect is not statistically significant only for the "recovery period" which may be related to the rate of the recovery of unemployment that might be higher in the initial years of recovery following a so long and deep recession.

Finally, it is rational to assume that the unobserved characteristics that affect the probability of exit may also affect the probability of entry. For instance, "more able" individuals are more likely to exit unemployment quickly and less likely to enter unemployment. Unobserved heterogeneity across individuals remains an important factor also for unemployment exits as verified by sigma_u and rho.

4.3 Average marginal effects

In this section of the results, we illustrate (in Graphs 4–7) the average marginal effects (AME)[18] related to the effect of specific variables (or combination of variables) used in the logit model estimated in Section 4.2 to examine in a comparative way their effects on the probability of entering or exiting unemployment. A positive AME implies a higher probability to enter/exit unemployment than the baseline group and a negative AME a lower one. In particular, Graph 4 presents the AME of entering and exiting unemployment based on gender and marital status by age. As already presented in Table 1, the left panel of the graph shows that females have higher probability to enter unemployment than men. The graph additionally shows that the result is persistent for all age groups and as age increases the difference is lower. On other hand, married individuals have lower probability to have a transition into unemployment than non-married, but this difference diminishes as age increases. As mentioned earlier, this may signal a self-selection process, in the sense that non-married individuals have less strict obligation and may afford an easier transition into unemployment. The unemployment exits, illustrated in the right panel of Graph 4, pinpoint toward the same direction. Females have now lower probability to exit unemployment than men and the difference is stronger for the age group 25–34. Married individuals have higher probability to exit unemployment than non-married but the difference does not vary significantly with age as for transitions into unemployment.

When examining the effect by educational level in Graph 5, we find that females have a higher probability to enter unemployment than men and a lower probability to exit unemployment in all educational levels. Yet, the difference between the two genders in stronger for lower secondary graduates. Married individuals have lower probability to enter unemployment and higher probability to exit than non-married also in all age groups.

Graph 4   Average marginal effects of entering and exiting unemployment based on gender and marital status by age (total period).
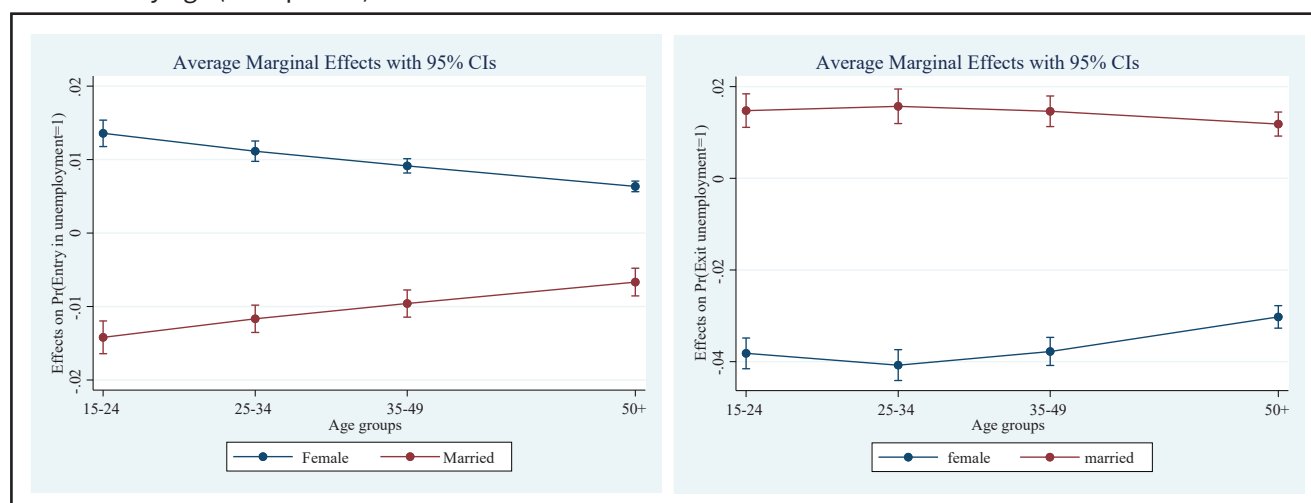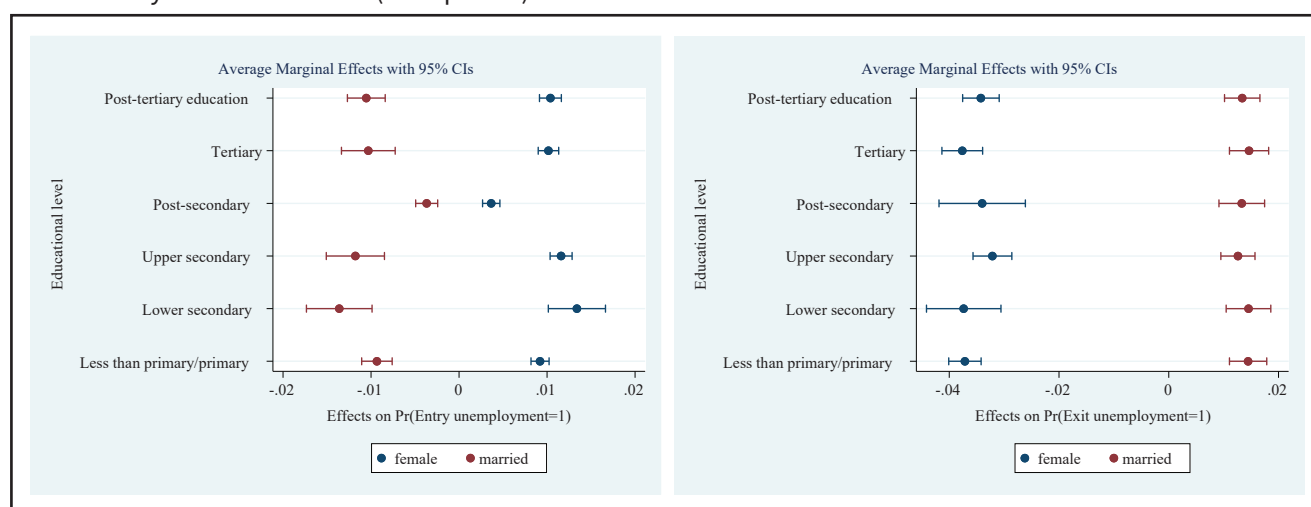

Data source: Hellenic Statistical Authority, LFS, 2004–2019.

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18   We have chosen to calculate average marginal effects (AME) and not marginal effects at means (MEM), in order to exploit all observations and not just the mean values. Given that the majority of our independent variables are categorical, we find that this is a better choice as mean values would not have a practical interpretation for most variables.

Strong regional differences are depicted in Graph 6. Compared to Attica, all regions have higher mobility. The fact that in "rural" regions a higher mobility is observed may relate to the nature and structure of employment in these regions that is composed of to a larger extent of seasonal and in some cases non-official work, in jobs of lower quality and remuneration (usually in the sectors tourism and agricultural activities). Indeed, the touristic regions (Southern Aegean, Ionian Islands, and Crete have both higher probabilities both for job separations as well as hirings, than all the other regions. An interesting finding concerns the region of West Macedonia, in which unemployment entries are high in the period under examination, while unemployment exits are low.[19]

Graph 5 Average marginal effects of entering and exiting unemployment based on gender and marital status by educational level (total period).

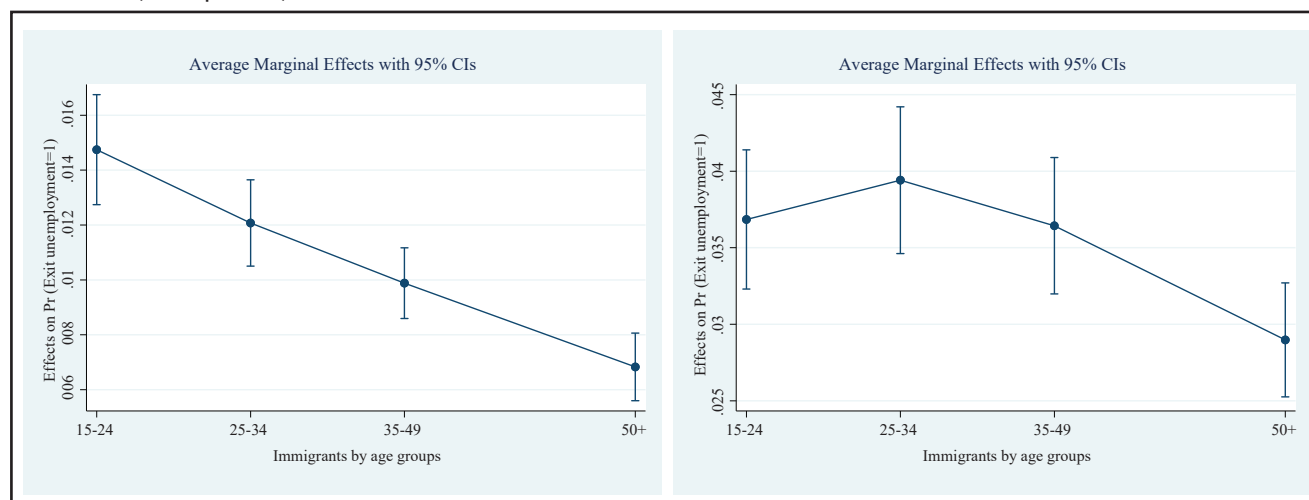*Data source*: Hellenic Statistical Authority, LFS, 2004–2019.

Graph 6 Average marginal effects of entering and exiting unemployment for different regions (total period).
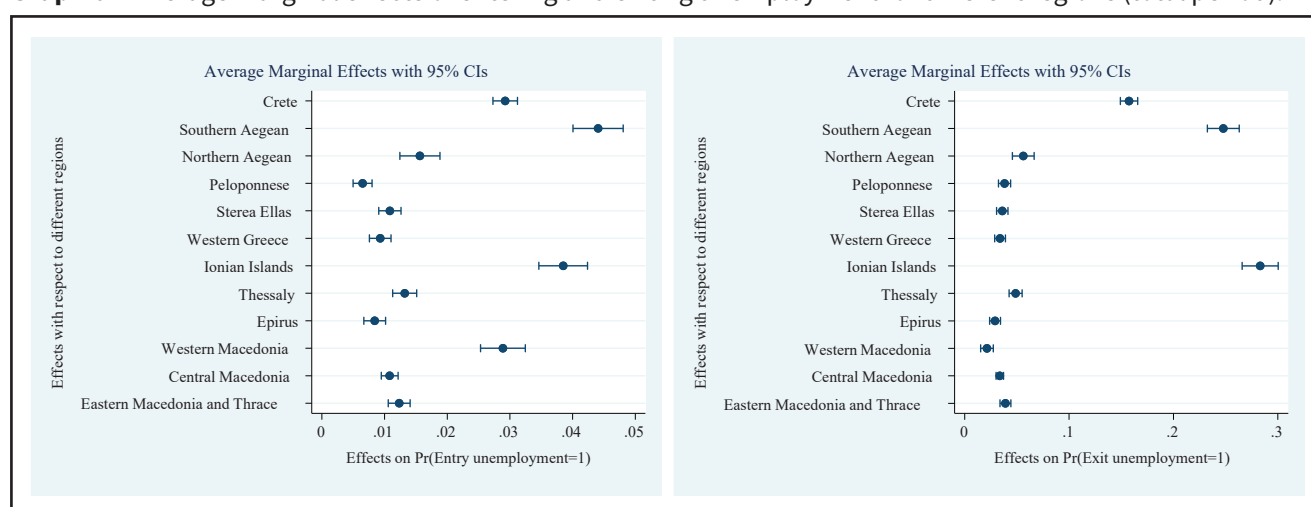
Data source: Hellenic Statistical Authority, LFS, 2004 – 2019.

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19 This is consistent with the pattern of unemployment in the region of Western Macedonia. It was 12.5% in 2009 (the highest across regions even before the crisis), skyrocketed at 31.6% (in 2013), and still remains close to 20% in 2019 (EUROSTAT, LFS, variable for regional unemployment: LFST_R_LFU3RT).

Graph 7   Average marginal effects of entering and exiting unemployment based on nationality by age (total period).

Data source: Hellenic Statistical Authority, LFS, 2004–2019.

Finally, Graph 7 illustrates that the probability of having a transition into unemployment is higher for immigrants in all age groups compared to Greeks, but the difference diminishes with age. As far as transitions into unemployment are concerned, the AME are also positive and the probability to exit unemployment is even higher for the age group 25–35, while the difference is lower for older cohorts for Greeks. This finding can be explained by the fact that young immigrants are the most mobile group in the Greek labor market (Filinis, 2021).

5 Conclusions and policy implications

In the paper, we examined the determinants of the unemployment dynamics and the impact of the minimum wage on the probability of making a transition into and out of unemployment. We used micro-level data from the Greek LFS for the period 2004–2019 and controls for several demographic factors, macro-economic conditions, regional differences, and the change in national minimum wage.

Overall, the findings suggest that there is no causal relationship between minimum wage changes and transitions into unemployment, while transitions out of unemployment seem to be slightly positively affected by increases in minimum wage, which is contrary to what we would expect particularly for the period of the economic crisis. Splitting the sample into three different periods does not alter this main finding. The results are also robust to different specifications of the model regarding the variable capturing the minimum wage as well as the insertion of control variables in the model.

The results also suggest that both observed and unobserved individual-level characteristics play an important role in making a transition into or out of unemployment. Age seems to be negatively related with the probability of entering unemployment, while on the other hand younger cohorts especially those aged 25–34 have the highest probabilities to find a job. Thus, it could be concluded that generally the youth experiences higher mobility in the labor market (in both directions into and out of unemployment) than the elderly in the examining period, which is consistent with the relevant literature and can be attributed both to employee and

employer choices. Another interesting finding relates to gender and marital status. Women have higher probabilities to enter unemployment and much lower probabilities to exit unemployment. Yet, married women have much lower probabilities to lose their job, but at the same time, they also have lower probabilities to find a job once they enter unemployment. A further investigation of these effects would be interesting to see whether it is the labor demand or supply side that drives what is observed. In a similar way, immigrants are estimated to have lower probabilities of finding a job revealing the lower access to employment compared to that of Greeks. But, given that they are employed, they have a lower probability to lose their job than Greeks. The effect of formal education seems to be mixed, signaling that the traditional protective effect of education toward unemployment is diminishing during periods of downturn.

As far as the regional variables are concerned, estimates reveal a higher mobility in all other regions than in Attica both for unemployment entries and exits, with the corresponding probabilities being higher in areas with high share of tourism-related activity as in the regions of Southern Aegean, Ionian Islands, and Crete. Further, the impact of economy's growth rate follows the theoretical predictions as higher growth rates increase unemployment outflows and decrease inflows.

In total, the paper findings indicate that the mobility in the Greek labor market remains low in all periods of examination, despite the numerous reforms that have taken place during the three economic adjustment programs in relation to labor market institutions and regulations toward increasing flexibility. The majority of individuals (>90%) have experienced only one spell in employment or unemployment, while most of the unemployed (65%) are unemployed for the entire observation period (1.5 years), which depicts the large increase of long-term unemployment during the crisis. Thus, it is not clear to what extent the reforms were successful in reducing inequalities between labor market insiders and outsiders and the fragmentation of the labor market.

The results have important policy implications, given that the disemployment effect of the minimum wage seems to be very limited in the Greek labor market, while the socioeconomic characteristics and regional characteristics seem to play an important role. The paper contributes to the on-going discussion on the adequate minimum wage in the EU, as it offers an indication that minimum wage increases do not induce unemployment entries and at the same time may be slightly related with higher exits from unemployment, particularly for the youth. Hence, this finding should be interpreted with care as it may be related to the high level of job informality and segmentation in the Greek labor market. It certainly offers a chance to re-think of the effectiveness and scope of sub-minimum wage policies. Also given that this argument cannot hold for the total wage distribution, another issue, as Manning (2021) purports is to address the question of the extent to which the minimum wage can be raised without the emergence of significant disemployment effects.

In addition, policies that improve labor market participation incentives for women and eliminate any differentiation in costs between genders for the employer may help reduce the adverse effects that are observed for females in relation to exiting unemployment. The large differences across regions in labor market mobility from the perspective of transitions into and out unemployment reveal that there is room for public policies to exploit the dynamics that exist in labor demand in the different regions. Although labor demand in these regions has, to a large extent, seasonal characteristics, an appropriate investment policy could lead

to the creation of permanent job positions. In addition, improving the skills of individuals through the educational system and reskilling or up-skilling programs, while targeting specific regions, may facilitate labor market mobility. Finally, interventions that will enhance labor market mobility across all dimensions, including different sectors, are important for the adaptation of skills and the reallocation that may be needed in order to face the new challenges of the automation and digitalization in the post-Covid era.

Declarations
Availability of data and material

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