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Working Paper

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

GLO Discussion Paper, No. 937

Provided in Cooperation with:
Global Labor Organization (GLO)

Suggested Citation: Andriopoulou, Eirini; Karakitsios, Alexandros (2021) : Unemployment transitions and the role of minimum wage: from pre-crisis to crisis and recovery, GLO Discussion Paper, No. 937, Global Labor Organization (GLO), Essen

This Version is available at:
https://hdl.handle.net/10419/241986

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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 for the period 2004-2019 and control for several demographic factors, macro-economic conditions, regional differences and changes in 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 labour 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 labour market mobility.

Keywords: minimum wage, unemployment transitions, labour mobility, Greek crisis
JEL classification: J08, J21, J38, I38

Acknowledgements: We are thankful to Panos Tsakloglou, Nikos Kanellopoulos, Lefteris Tserkezis for useful comments and suggestions.
Funding: The research has been financed by the Operational Program "Human Resources Development, Education and Lifelong Learning" and is co-financed by the European Union (European Social Fund) and Greek national funds.
Disclaimer: The views expressed in the article are those of the authors and should not be attributed to the Council of Economic Advisors or the Ministry of Labour and Social Affairs.

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1. Introduction

In the last decades, the issue of mobility in the labour market has been in the core of the policy making agenda in terms of increasing flexibility and ensuring higher levels of labour market participation and employment. There are different types of labour 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, labour market flexibility is considered to be an important tool in order to restore unit labour cost and 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 labour market reforms in order to reduce rigidities in the labour market legislation and institutions was a priority. By increasing flexibility, along with the measures of fiscal consolidation, it was expected that nominal wages and relative prices would adjust. In the absence of exchange rate and monetary policy tools, the internal devaluation path was the main option for correcting the large external imbalances. Labour market reforms were also expected to increase mobility in the labour market and in particular ease entry to the formal labour market for groups like women and the young, and facilitate transition from temporary to permanent contracts (see European Commission 2010, p. 27).

The labour market measures pursued during the three bailout programs focused on the framework of collective bargaining[2], the national minimum wage setting and the introduction of a youth subminimum wage, enhancing flexible forms of employment

[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 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 below 10 percent, d) the decentralization of collective bargaining even at individual level.

and easing firing protection[3], tackling undeclared labour and to a lesser extent lowering non-wage labour costs[4] (European Commission 2010, 2012, 2015). One of the most important policy changes concerned 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 percent across the board[5] 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.

Most of the labour market measures were front-loaded in the program period and in fact the liberalization of the labour 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[6]. Yet after 2013, the rate of decrease in unemployment was much higher than the rate of increase in the mean equivalized disposable income and GDP per capita (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.

Given all the above, we observe that the period of the Greek economic adjustment programs offers a unique case for studying the effect of labour market reforms

[3] 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.

[4] 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 below 24 years old.

[5] 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.

[6] The largest drop in disposable income was recorded between 2009-2014, while the largest drop in GDP was recorded between 2007-2013. 2007 is the last year 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.

including changes in the minimum wage on labour market outcomes such as employment levels and mobility. The current paper focuses on the examination of unemployment exits and entries and tries to identify what are the determinants that could enhance or disrupt labour market mobility. The fact that two large changes in the statutory minimum wage took place, actually pointing to opposite directions offers also the opportunity to examine whether the minimum wage plays a role as determinant of transitions from unemployment to employment and vice versa.

This question is particularly interesting given that a vast amount of empirical literature has explored the relationship between minimum wage and employment through aggregate data or employment data at firm level, but less attention has been paid to the possible effect of minimum wage to transitions from employment to unemployment and vice versa. We aim to fill this literature gap by analyzing 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. The particular characteristics of the examination period offer also the opportunity 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 paper findings 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 across Member States in this area contributes to improving the fairness of the EU labour 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 highly relevant at the current juncture 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 of 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 second section presents a literature review, while the third section presents the data and the methods used in the applied analysis. The results are outlined in the fourth section, while the fifth section concludes.

2. Literature review

The paper touches upon two distinct fields in the literature of labour economics: employment/unemployment dynamics and economics of the minimum wage. We combine elements of both fields in order to identify the determinants of mobility in the labour 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 labour 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, unemployment, or inactivity. They also find evidence of scarring effect of past unemployment. Gang (2003) confirms this finding 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 are examined like marital status, disability, nationality, number of children, and the attainment of higher educational level. 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 to the determinants of individual probability of getting unemployed the routine-task intensity of the occupation. 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 the link between the phases of economic cycle and unemployment transitions. Firstly,

Cockx and Dejemeppe (2005) find that exit from unemployment is significantly affected by seasonal and cyclical variations, but skills deterioration 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 find 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, 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 labour market during recession.

At EU level, Ward & Macchiarelli (2014) and Monastiriotis et al. (2019), both find 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 labour demand lowers significantly.

Regarding the impact of minimum wage on labour market flows, there is a number of studies focusing especially on this issue. All these 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 labour 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. The relationship between low labour market flows and minimum wage increase is also confirmed by Brochu and Green (2011). They argue that higher minimum wages do not facilitate entry into

employment due to higher labour cost. On the contrary, higher minimum wages imply higher job stability. These results are also confirmed by Dube et al. (2016) for US, which additionally find that the duration of non-employment for separations or hires is not affected.

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. 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 linked 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 labour 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 labour market reforms since 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 labour 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 labour 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 labour market would predict. In particular, they find that in firms with a large share of youth employment, the latter 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) deploy the effects of the two opposite reforms on the level of minimum wage (2012, 2019) not on employment level but on job search rate and on the job loss rate.

By exploring the effect of the minimum wage on unemployment transitions, controlling for other socioeconomic, macroeconomic and regional factors the current study adds to the relevant literature. The key elements of the present 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 cut, and a youth subminimum wage was introduced and then abolished.

3. Methodology & data

The analysis of this paper is based on quarterly longitudinal micro data from Greek Labour Force Survey (LFS) between 2004 and 2019. The Greek LFS, produced by the Hellenic Statistical Authority (EL.STAT.) in quarterly basis, provides data on labour force participation of people aged above 15 years and on persons that do not participate actively in the labour force. 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 to 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 analysis below, both balanced and unbalanced datasets have been restricted to those who actively participated in the labour force, i.e. those who were employed or unemployed. Therefore, transitions from inactivity to employment and vice versa are excluded.

One way to study unemployment transitions is through individuals' employment and unemployment spells (Kaitz 1970; Akerlof and Main 1980). An unemployment spell can be defined as a continuous period during which the individual is unemployed and, thus, an unemployment spell in our analysis lasts from the first quarter that the individual is unemployed until 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 labour 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 (six months in the case of the LFS).

Apart from studying the frequency, duration and recurrence of unemployment through spell analysis, we also examine the determinants of transitions into and out of unemployment, 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:

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

and

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

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.

$$Pr(y_{it} = 1) = F(\beta x_i + u_i) = p_{it}$$

We estimate u using random effect techniques, in particular Gauss-Hermite quadrature. 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[7] 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 to the minimum wage (percentage difference and interaction with age groups). A second group contains variables related to the socioeconomic status of the individuals such as age group, gender, marital status, nationality. Finally, a third group contains variables capturing geographical regions, seasonality and the difference in growth rate (q-o-q).

4. Results

4.1 Spell analysis results

In this section, a set of graphs is included presenting the main descriptives of the spell analysis. Graph 1 illustrates several descriptive statistics using both the balanced and the unbalanced panel. Firstly, the number of spells that an individual experienced is presented. The number of spells increases with labour market mobility. However, the majority of individuals (more than 95% using the unbalanced panel and more than 93% using the balanced) have experienced only one spell in employment or unemployment, offering a clear indication of low mobility.

[Graph 1 here]

[7] $rho = \frac{(sigma_u)^2}{1+(sigma_u)^2}$. If the hypothesis that rho is zero cannot be rejected then frailty is unimportant.

Another dimension of labour 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 labour market statuses during the stay in the sample. Results indicate the low mobility model in the Greek labour market. 85.6 per cent of individuals in the balanced and 62.5 percent in the unbalanced panel have experienced spells (either in employment or unemployment) that last six quarters.

Considering those who have experienced 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 the sample both in balanced and unbalanced panel have experienced 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. 17.3 percent of individuals included in the unbalanced panel have experienced a single-quarter spell in unemployment.

Low mobility is also confirmed by the number of total quarters in unemployment. It is found that 65.8 percent of individuals in the balanced panel and 42.1 percent in the unbalanced panel have experienced six quarters in unemployment in total. Thus, they have not experienced even the minimum employment spell during their stay in the sample.

[Graph 2 here]

Focusing more on time spent in unemployment, in Graph 2, we split the sample period into three subperiods following quarterly growth rate changes: 2004q1 – 2008q3, 2008q4 – 2016q1, 2016q2 – 2019q4. 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' as the economy started to recover after a deep and prolonged recession. However, the same pattern is obtained again. Regardless the period, most of individuals have experienced six quarters in unemployment. Hence, the low mobility model has survived even during the severe economic crisis that hit Greece. An interesting result from the unbalanced panel is that the distribution of unemployment duration moved slightly towards the right (higher duration) during the

crisis period, i.e., 2008q2 – 2016q1. At this period, more people moved into unemployment and stayed there for more time as job creation was low and unemployment was in unprecedented levels.

4.2 Logit regression results

The estimations presented in this paper 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[8]. The results are reported in odds-ratio[9]. The baseline group consists of observations of the second quarter of single males of Greek nationality, aged over 50 years old that have completed secondary education, 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[10]).

[Table 1 here]

The most important finding is that individual characteristics seem to play a more 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

[8] 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.

[9] 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: $odds = \frac{probability}{1 - probability}$.

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

and recovery and is compatible with the theory that predicts higher mobility in younger groups (see Dorsett and Lucchino 2018).

Further, women and unmarried individuals have higher probabilities of entering unemployment than men and married individuals in all periods under examination. What is interesting is than when we interact 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 drops significantly below one. When we split into the three sub-periods we observe 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. This could be attributed due to particular characteristics or skills of married women, favourable treatment from the side of 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. The results are quite surprising though. In most specifications, less than primary, primary, and lower secondary education attendants have not significantly different probabilities to move into unemployment in comparison with the baseline group (i.e., secondary education attendants). Post-secondary education attendants are less likely to move into unemployment than the baseline. As expected, higher educational levels decrease the probability of entering unemployment in most specifications estimated. The pattern is the same in all periods examined[11].

Surprisingly, probability of entering unemployment is not statistically different for immigrants. However, regarding immigrants, we should highlight that they usually work on more flexible types of jobs, and they are more likely to work in the informal sector. These two features make them attractive especially to employers offering low-skilled jobs (especially in agriculture), which probably protects them against getting unemployed, given that they are employed. This is also in accordance with the findings of Filinis et al. (2018) which demonstrate that during the crisis the low-skilled

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

individuals maintained their jobs as opposed to the medium skilled. 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 during the so-called touristic season. Higher coefficients implying higher mobility are observed in more touristic areas like 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. For 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 to imply a higher probability of entering unemployment in contrast with what would be expected. Finally, the unobserved heterogeneity, as measured by sigma_u and rho, is significant at the 0.l% level of significance. This practically means that there are unobserved characteristics across individuals such as skills (not captured by education), capabilities, or commitment that 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 labour 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 higher than 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 labour market as it may capture the positive effects of increases in minimum wage on the labour market participation incentives of the individuals. Yet, it may also relate to the various forms of segmentation that exist in the Greek labour market, as well as to changes at the level of informality. The result is in accordance with the findings of Bechlioulis and Chletsos (2021) who find, for the same period, 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.

[Table 2 here]

Regarding age, all age-groups are more likely to move into employment in comparison with the baseline group (i.e., those aged above 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 finding 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.

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 and especially for men higher labour supply. For married women, the probability of finding a job is even lower revealing the possible 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 education) as compared to the baseline group (secondary education). When splitting the sample into the three periods the results are differentiated. In the pre-crisis period, the low skilled (less than primary, primary and lower secondary), as well as the very high-skilled (post-tertiary) have higher probabilities of exiting unemployment. During the period of crisis, this positive effect restricts only to the very low skilled (primary or less than primary) and tertiary education and is not significant for lower secondary or post-tertiary education. Finally, in the recovery period most odds-ratio are not significant indicating that the educational level does not make a difference in the probability of exiting unemployment, excluding the lower secondary for which the probability decreases compared to the graduates of secondary education. This effect probably signals a changing role of formal education in protecting people from unemployment and enhance job finding. The result relates also to similar 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).

Nationality seems to be a decisive factor in exiting unemployment. Immigrants are estimated to have lower probabilities of finding a job revealing the lower access to employment compared to that of Greeks.

The pattern of higher mobility in all other regions than in Attica remains 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 like the regions of Southern Aegean, Ionian Islands and Crete. Finally, 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.

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 Labour Force Survey for the period 2004-2019 and controlled 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, we could conclude that the youth, in general, experiences higher mobility in the labour market (in both directions into and out of unemployment) than the elderly in the period under examination, 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 entry 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 in order to see whether it is the labour 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. Yet, 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 tradition protective effect of education towards unemployment is diminishing.

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 like 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 labour market remains law in all periods of examination, despite the numerous reforms that have taken place during the three economic adjustment programs in relation to labour market institutions and regulations towards increasing flexibility. The majority of individuals (more than 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 year), 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 labour market insiders and outsiders and the fragmentation of the labour market.

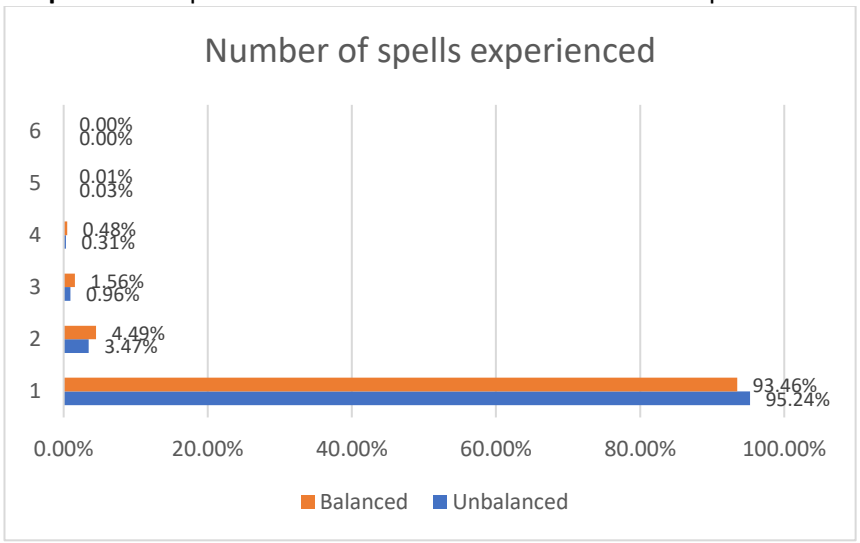
The results have important policy implications, given that the disemployment effect of the minimum wage seems to be very limited in the Greek labour market, while the socioeconomic characteristics and regional characteristics seem to play an important role. The paper contributes to the on-going discussion 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. Yet, this finding should be interpreted with care as it may be related to the high level of job informality and segmentation in the Greek labour market. It certainly offers a chance to re-think of the effectiveness and scope of sub-minimum wage policies. Also given that this observation cannot hold

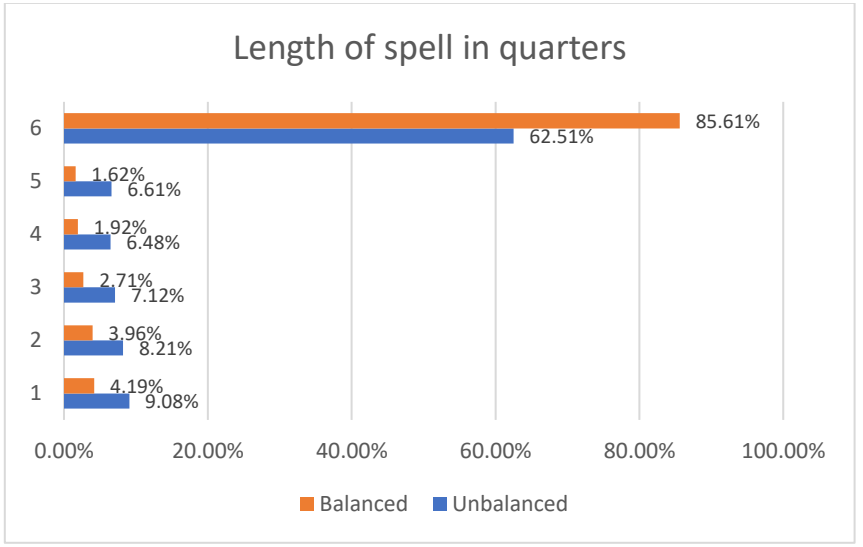
for the total wage distribution, another issue, as Manning (2021) purports is to address the question of the extent to which the minimum wage can be raised without the emergence of significant employment effects.

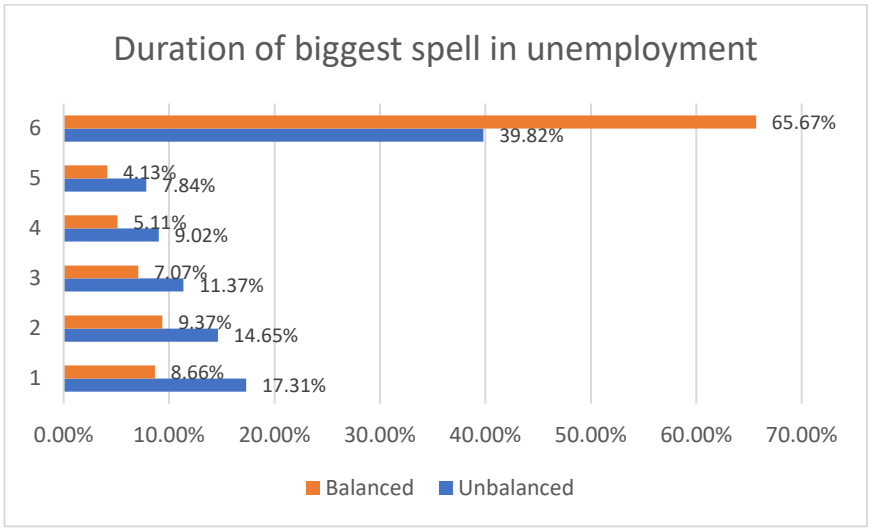
In addition, policies that improve labour market participation incentives for women and eliminate any differentiation in costs between genders for the employer may help reduce the adverse effects that we observe for females in relation to exiting unemployment. The large differences across regions in labour 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 labour demand in the different regions. Although labour 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 labour market mobility. Finally, interventions that will enhance labour 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.

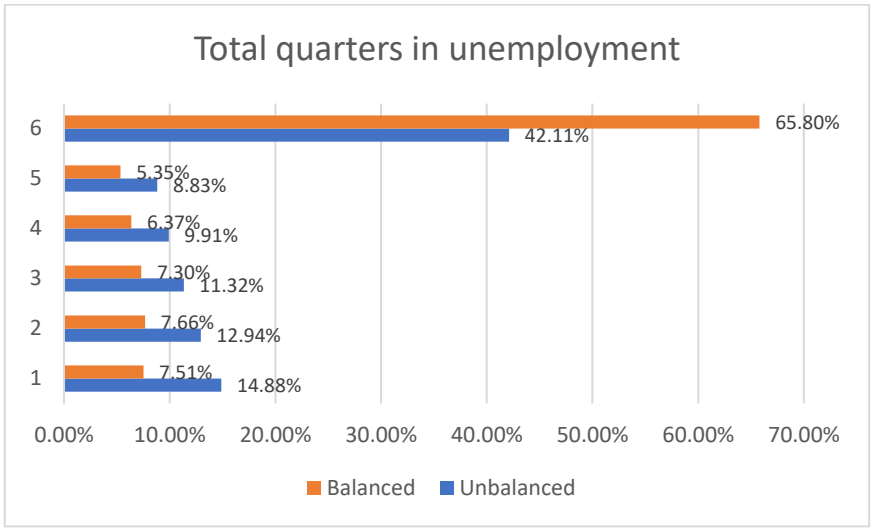
Annex

Graph 1. Descriptive statistics of unbalanced and balanced panel



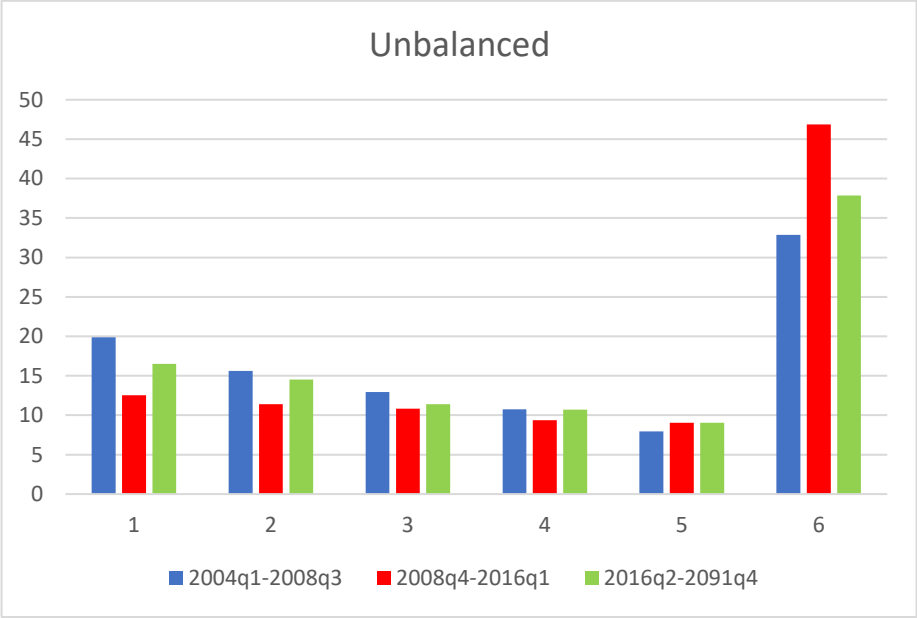


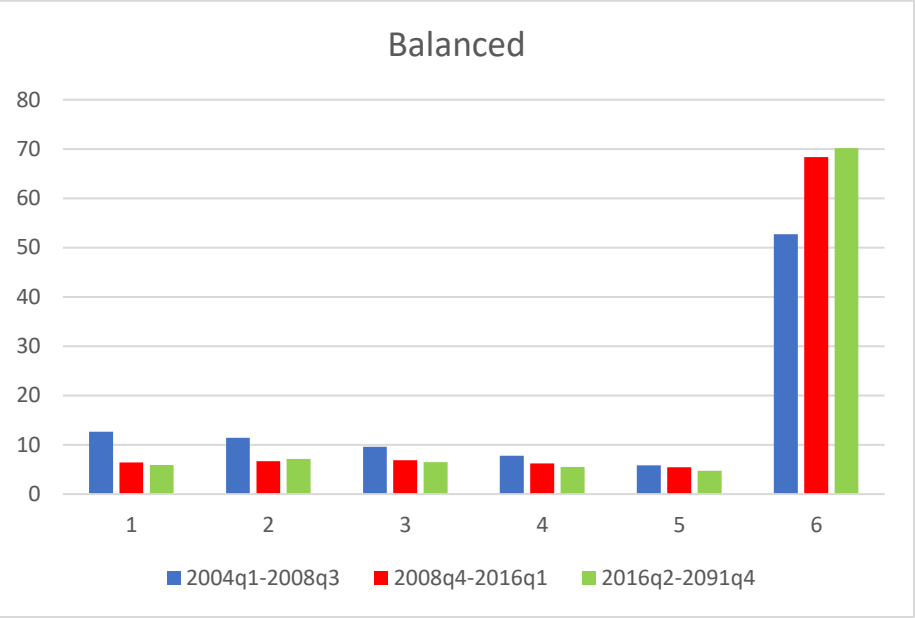




Source: LFS 2004 – 2019
Note: Percentages are reported in vertical axis

Graph 2. Total quarters in unemployment.





Source: LFS 2004 – 2019
Note: Percentages are reported in vertical axis

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

	Specification 1				Specification 2			
	Total Period	Period1 (pre-crisis)	Period2 (crisis)	Period3 (recovery)	Total Period	Period1 (pre-crisis)	Period2 (crisis)	Period3 (recovery)
per_dif_minwage	1.00	1.05	0.98***	0.98	0.99	1.06	0.98	0.95
per_dif_minwage # 15-24	.	.	.	.	1.01	1.01	1.00	1.03
per_dif_minwage # 25-34	.	.	.	.	1.01	1.01	1.00	1.09*
per_dif_minwage # 35-49	.	.	.	.	1.00	0.99	1.00	1.02
15-24	4.17	3.59***	5.98	4.23***	4.17	3.78	5.20***	4.22***
25-34	2.83***	2.63***	3.63***	2.58***	2.82***	2.73***	3.25***	2.54***
35-49	1.93***	1.99***	2.16***	1.57**	1.93***	2.08***	2.05***	1.57**
Female	2.40***	2.59***	2.30***	2.31***	2.40***	2.72***	2.13***	2.32***
Married	0.57***	0.45***	0.71*	0.45**	0.57***	0.44***	0.74	0.45***
Female # Married	0.76***	1.01	0.58***	1.03	0.76***	1.01	0.61***	1.03
Less than primary/Primary	0.66	0.42***	0.83	0.65	0.66	0.41	0.84	0.65
Lower Secondary	1.37	1.39	1.63	0.81	1.37	1.41	1.54	0.81
Post-secondary	0.14***	0.20***	0.11***	0.10***	0.14***	0.19***	0.14*	0.10***
Tertiary	0.79***	0.65	0.99	0.55***	0.79***	0.64***	1.00	0.55***
Post-tertiary education	0.83**	0.69	0.90	0.64***	0.83**	0.69**	0.90	0.64***
Immigrant	0.45	0.89	0.42	0.31	0.45	0.89	0.45	0.31
Eastern Macedonia and Thrace	3.63***	4.79***	3.67***	2.49***	3.63***	5.11***	3.31***	2.50***
Central Macedonia	3.24***	3.84***	2.60***	4.45***	3.24***	4.05***	2.42***	4.46***
Western Macedonia	9.45***	9.35***	7.71***	14.37***	9.45***	10.30***	6.37***	14.40***
Epirus	2.66	2.47***	2.67***	2.72***	2.66	2.56***	2.49***	2.73***
Thessaly	3.87***	4.02***	3.69***	3.94***	3.87***	4.24***	3.32***	3.95***
Ionian Islands	13.96***	24.72***	10.82***	12.74***	13.95***	28.59***	8.75***	12.78***
Western Greece	2.87***	2.16***	2.71***	4.07***	2.87***	2.23***	2.51***	4.08***
Sterea Ellas	3.25***	5.35***	2.67***	2.49	3.25***	5.73***	2.49***	2.49

Peloponnese	2.23***	2.59***	1.85	2.60***	2.23***	2.69***	1.79***	2.61***
Northern Aegean	4.58***	2.98***	3.14***	10.34***	4.58***	3.11***	2.88***	10.36***
Southern Aegean	16.93***	23.15***	15.17***	14.89***	16.93***	26.61***	12.06***	14.93***
Crete	9.53***	9.41***	9.80***	9.47***	9.52***	10.35***	7.96***	9.49***
q1	2.39***	1.84**	2.05***	2.94***	2.38***	1.88***	2.00***	2.96***
q3	1.01	0.86	1.16	0.93	1.01	0.85	1.19	0.94
q4	2.14***	2.00***	1.88***	3.28***	2.14***	2.02***	1.90***	3.29***
qoq_diff	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
/lnsig2u	9.17***	8.73***	9.45***	9.81***	9.16***	9.93***	7.50***	9.86***
AIC	124,738	31,264	66,363	26,336	124,742	31,256	66,343	26,337
BIC	125,043	31,564	66,637	26,610	125,083	31,577	66,694	26,641
Prob>chi2=	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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

	Specification 1				**Specification 2**			
	Total Period	**Period1 (pre-crisis)**	**Period2 (crisis)**	**Period3 (recovery)**	**Total Period**	**Period1 (pre-crisis)**	**Period2 (crisis)**	**Period3 (recovery)**
per_dif_minwage	1.04***	1.07***	1.03***	1.04***	1.02***	1.02	1.03**	1.05**
per_dif_minwage # 15-24	.	.	.	.	1.03**	1.08***	1.01	1.00
per_dif_minwage # 25-34	.	.	.	.	1.02	1.05*	1.01	0.99
per_dif_minwage # 35-49	.	.	.	.	1.01	1.05*	1.01	0.99
15-24	1.51***	1.01	1.35***	1.76***	1.52***	0.99	1.36***	1.76***
25-34	1.71***	1.20*	1.61***	1.91***	1.71***	1.19*	1.62***	1.92***
35-49	1.48***	1.16*	1.49***	1.60***	1.48***	1.15	1.50***	1.61***
Female	0.71***	0.50***	0.76***	0.92	0.71***	0.50***	0.76***	0.92
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***
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
Immigrant	0.52***	0.50***	0.52***	0.42***	0.52***	0.51***	0.52***	0.42***
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***
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***
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***
qoq_diff	1.19***	1.11***	1.07***	0.99	1.19***	1.11***	1.07***	0.99
_cons	0.02***	0.08***	0.02***	0.02***	0.02***	0.08***	0.02***	0.02***
/lnsig2u	2.24***	1.33**	2.23***	2.78***	2.24***	1.32**	2.23***	2.78***
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
Prob>chi2=	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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