Minimum Wage Effects on Employment and Changes in the Wage Distribution in Greece*

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Abstract

This paper is a preliminary analysis of the employment effects of the minimum wage cut adopted in 2012 and the corresponding age-based differentiation for workers above and below 25 years old. The analysis is constrained on full-time private sector workers of two substitute age groups, i.e. 20-24 and 25-29 years old. It is found that employment rates for 'younger' workers have been decreased in a lesser extent in comparison with the rates of 'older' workers. Furthermore, changes in the earnings' distribution of private sector full-time employees are presented. The main finding of this part of the paper is that distribution shifted significantly to the left. Minimum wage reform is considered to play an important role to this shift.

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1. Introduction

Minimum wage's importance in modern economies is unambiguous. It sets the lower bound to the wage paid to individual workers in the formal sector. Although, many economists claim that it also affects the informal sector. For several decades the minimum wage issue has caused an intense debate among labor economists. This debate mainly concerns the effects of the minimum wage on employment, wages or the wage distribution.

The present study focuses on the employment and wage effects of the minimum wage decrease that was implemented in 2012 in the context of the austerity programs adopted by the Greek government. The main purpose is to study the impact of the age-based minimum wage reform by analyzing employment rates of two different age groups: those aged 20 – 24 and 25 – 29 as minimum wage has been cut more for workers aged below 25 years old.

Firstly, the minimum wage effects on employment are investigated for the aforementioned age groups and secondly the changes on the wage distribution are presented. In the present paper, we focus on private sector full-time workers and use a simple difference-in-differences method. Thus, we get that employment rates for workers aged 25 – 29 years fell more than for these for 'younger' workers. Also, we find important results related with a shift of the wage distribution. In the present paper, we use data from Labor Force Survey (LFS) and Survey on Income and Living Conditions (SILC) between 2009 and 2014.

In the next section, a brief literature review about minimum wage employment effects is presented. Section 3 discusses the employment effects of the minimum wage cut. Section 4 describes the changes in the wage distribution through the recent economic crisis and in section 5 conclusions are presented.

2. Literature review

A large part of the labor economics literature is focused on minimum wage effects. However, the results of these studies vary considerably as they predict different effects in both qualitative and quantitative level. On the other side, theory offers unambiguous predictions about minimum wage effects only in the case of perfectly competitive labor market. In this context, a minimum wage set above the market-clearing level will reduce employment as employment participation will be higher but some workers, especially the low-paid, will be displaced out of the labor market. At this case minimum wage will destroy jobs and lead to higher unemployment (Stigler 1946). On the other hand, studying the effects of minimum wage on employment under noncompetitive conditions is a much more complicated issue. As Stigler (1946: 535-43) and Lester (1947: 135-48) claimed, minimum wage may have a positive impact on employment if it is set above the monopsonistic equilibrium level and simultaneously below the competitive equilibrium level. Thus, the monopsonistic labor market model predictions depend on the new minimum wage level. Therefore, in theoretical level, minimum wage employment effects depend on the form of the labor market and the prevailing conditions in it.

Despite the fact that it is not in the present study's purposes to offer an analytical review of the related literature, the main pillars of the minimum wage effects debate are presented in this section. During the 1960s and 1970s time-series studies found negative impact of the minimum wage on employment. Additionally, Brown *et al.* (1982: 487-

528) suggested that there is a negative but smaller effect for young adults and no certain effect for adults. To some extent, the results above confirmed the aforementioned standard theoretical predictions.

A few years later, during the 1990s, important studies about minimum wage based on "natural experiments" and cross-state variations have been realized. The benchmark of these studies is that of Card and Krueger (1994: 772-93) which analyses the impact of the 1992 minimum wage increase on employment in New Jersey. Using a difference-in-differences method, they found that there is no evidence of negative employment effects by the minimum wage increase in New Jersey. Contrariwise, they found that employment slightly increased concluding that minimum wage increase has the potential to create jobs. Although, they highlight that minimum wage increase led to rising prices. On the contrary, Neumark and Wascher (1992: 55-81; 1994: 497-512) support that there is a negative and significant impact of the minimum wage on employment.

In general, Card and Krueger's study fueled a large wave of empirical research about minimum wage's impact on employment. These studies called as "the new minimum wage research". This kind of research focused on the 'bite' of the minimum wage considering that minimum wage is more likely to affect more low-wage workers. Card and Krueger (1995) support that the main finding of this research is a minimum wage increase can cause a neutral or positive effect on employment. Actually, this study caused a large contestation of the prevailing theoretical predictions.

Generally, in contrast with Card and Krueger, many panel data based studies were realized and their findings confirmed the standard theoretical predictions mentioned above. In a more recent study related to the minimum wage effects on the wage distribution, Neumark and Wascher (2004: 425-50) stated that minimum wage changes are more likely to affect workers in different ways according to their skill level and position to the wage distribution. Regarding the wage effects of a minimum wage increase, their findings are similar to Card and Krueger's as they estimate positive and statistically significant effects. Although, they detect negative and significant employment effects for those workers paid near or at the minimum wage.

Hyslop and Stillman (2004) used a difference-in-differences approach in order to study the effects of a large reform in minimum wage in New Zealand. They compared employment effects between two age groups: teenagers and adults between 20 and 25 finding positive but insignificant effects.

Finally, Neumark and Wascher (2007) concluded that studies included "in the new minimum wage research were diverse in their findings" and in some extent, this is true. Even more recently, Neumark *et al.* (2013: 608-648) argue that empirical analysis that used time-series, conducted in negative impact of minimum wage on employment.

In the Greek literature, there are few studies dealing with minimum wage effects. Koutsogeorgopoulou (1994: 86-99) finds negative impact for both men and women. Also, Karageorgiou (2004: 39-67) concludes that there is negative but insignificant effect for young adults and positive effect for teenagers. Fotoniata and Moutos (2009) presented the major features of the minimum wage' evolution based on interviews from the labor market participants and focused on the influence of the minimum wage on the gender and the age-related wage gap. Recently, Yannelis (2014) finds that employment increases following the minimum wage cut through new hires.

3. Employment effects of minimum wage differentiation

Austerity programs have cost hundreds of thousands of jobs. During the onset of the crisis, since 2010 up to 2014, the number of unemployed has almost tripled. The same happened to the unemployment rate, which increased from 9.5% to 26.1% during the same time period as shown in Figure 1. We have to mention that the unemployment rate shows a downward trend by mid-2013 but it is expected to remain above 20% by the end of 2015 (OECD, Employment Outlook 2014).

Another remarkable feature of Greek labor market is high unemployment rates for young people. As presented in Figure 1, unemployment rates for those aged between 20 and 24 years is higher than this of the total population not only during the crisis but also prior to it. In this context in 2012 the Greek government decided to cut minimum wage by 22% for all workers and by 32% for workers aged below 25 years old to restrain high youth unemployment.

In this section, a simple difference-in-differences approach is employed comparing the employment rates of two age groups: those aged 20-24 and 25-29 years old. This selection was made as the minimum wage have been differentiated since 2012 for workers aged below 25 years and these two groups are almost substitutes. In summary, following Hyslop and Stillman (2004) we calculate the employment rates of the aforementioned age groups and then we study their evolution during the crisis, i.e. between 2009 and 2014. We also found their yearly changes between the same quarters of each year and finally we compare these changes in order to find out which age group is more affected by the minimum wage differentiation.

In Figure 2, we show the evolution of employment rates for the two age groups between 2009 and 2014. We focus on full-time private sector workers as they are more likely to be affected by the minimum wage change in terms of jobs. Note that studying the effect on working hours could be a possible issue of further analysis. The red vertical line in this figure notes the time of minimum wage cut, i.e. the first quarter of 2012, and the employment rates have been calculated as the proportion of full-time workers in the private sector to the total population of the specific age-group.

Since the onset of the crisis both employment rates have been decreased in a large extent. This finding is quite expected as the economy suffered a deep recession and unemployment has been increasing significantly. Thus, the main challenge of the present study is to isolate the impact of the crisis. This is the reason that a difference-in-differences method is used.

To be more precise, in Figure 3, we present the year-to-year change in employment rate for each age group in quarterly basis. We observe that employment rate for 20-24-year-old full-time workers in private sector has been decreased with slightly higher rate than the corresponding rate for 25-29-year-old workers. We can conclude that ‘younger’ workers were hit in a higher extent than the ‘older’ workers. This also remains for a year after the minimum wage cut. Although, since the third quarter of 2013, employment for ‘younger’ workers seems to get increased in contrast with that of 25-29-year-old workers which started to get increased in a later time. This figure may reveals a time-lagged effect of the minimum wage cut.

The results of the difference-in-difference method are summarized in Table 1. The treatment group is the 20-24-year-old worker and the control group is consisted of 25-29-year-old ones. We compare the change in employment rates for two periods, one before and one after the minimum wage change. As it is likely to be a time-lag effect we choose year 2013 as the ‘post-reform’ period. The ‘pre-reform’ period is year 2011.

The argument of time-lag existence is strengthened if we alternate the 'pre-reform' and the 'post-reform' period. This is revealed in Table 2, where the 'pre-reform' is year 2011 without the first quarter and the 'post-reform' period is 2012 without the first quarter too. In this case, the difference-in-difference is much smaller.
To sum up, both employment rates have been decreased. As shown in Figure 4, if we set 2009 as the base year, we observe that both age groups' employment rates have followed the same path not only before the minimum wage reform but also for a year after it. However, since the mid-2013 employment for 'younger' workers appears to bounce up faster than for 'older' workers. This may be an additional evidence for the existence of the time-lagged effect of the minimum wage reform.

4. The changes in the wage distribution and the contribution of minimum wage cut

In this part of our study, we combine data from LFS and EU-SILC in order to analyze the changes in the earnings' distribution. The main reason for combining data from both surveys is to get accurate information about wages as in LFS they are grouped in bands. Also, these wage bands have changed during the period we study. These changes are shown in Table 3.
The combination of the two datasets has been realized as follows: we use the distribution of full-time employees in the private sector from LFS in quarterly and annual basis. Then, we calculate the annual means for wages by EU-SILC dataset and for each wage band as determined in LFS. Finally we calculate the weighted means for each year in order to find the wage distribution. All wages are calculated in real terms by using 2014 as the base year.
In Figure 5 we present the earnings' distribution for full-time private sector employees. This figure offers a clear description of the changes in the wage distribution during the crisis. As expected, the wage distribution moved to the left, meaning that wages have fallen significantly. Of course, this shift could not only be entirely attributed to the minimum wage cut. Although, we strongly believe that minimum wage decrease was a determining factor in the wage distribution change. This argument becomes more powerful if we observe that there is a significant change of the distribution between 2011 and 2012.

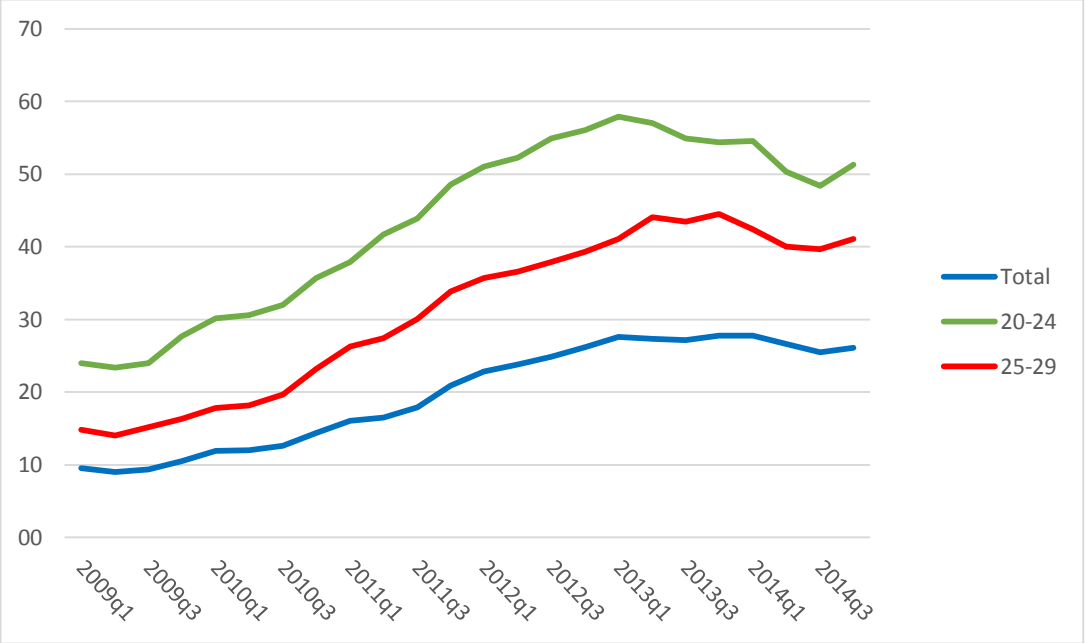
5. Conclusion

In the present paper, we used a simple difference-in-differences approach in order to analyze a potential employment effect of a minimum wage cut adopted by the Greek government in 2012. Our analysis is focused on full-time private sector workers as the minimum wage cut applied only to private sector. The approach employed in this papers results that employment rates for 20-24-year-old workers have been decreased less than the corresponding rate for the 'older' age group. We could argue that this finding possibly reveals a positive employment effect as the further minimum wage cut applied to workers aged below 25 year old may favored them. However, we have to note that employment rates for the 'younger' age group were initially low and this may be a reason for lower volatility.
Additionally, we also analyzed the changes in the earnings' distribution of full-time private sector employees between 2008 and 2014. Our findings lead to the conclusion

that the wage distribution has moved significantly to the left. We cannot attribute this shift only to the minimum wage cut but we consider this as a very important factor that affected the whole distribution.

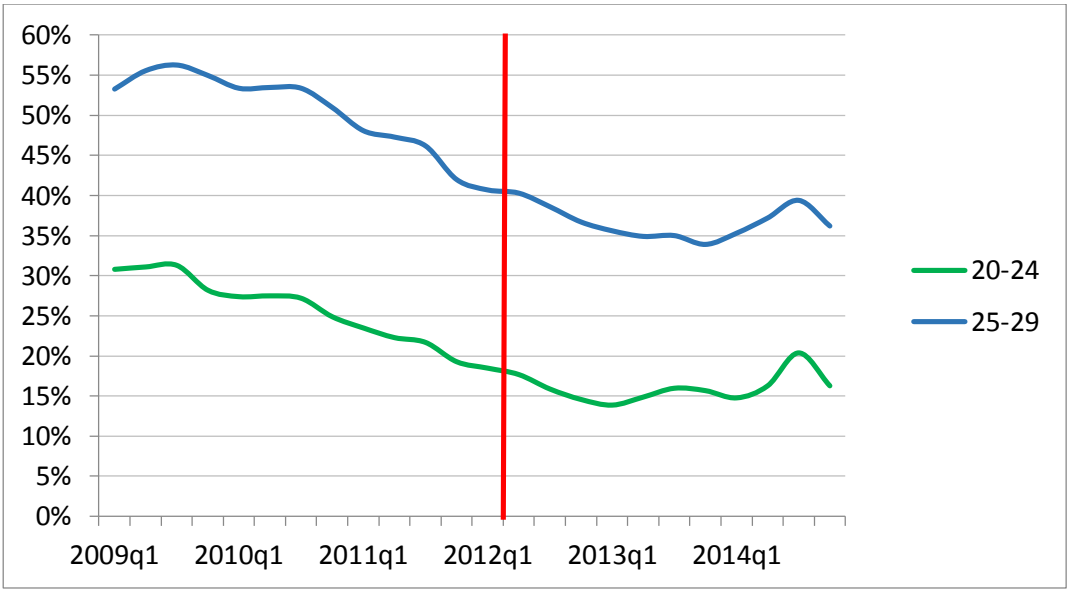
Finally, we could not clearly say that employees aged less than 25 years old were favored by the further minimum wage increase in terms of employment. The same also holds for the wage distribution and its relationship with the minimum wage cut. To get more reliable results, it is essential to use more advanced econometric methods and a larger time period sample.

Figure 1. Unemployment rate for total populations and age groups 20-24 and 25-29-year-old individuals (%), 2009-2014.



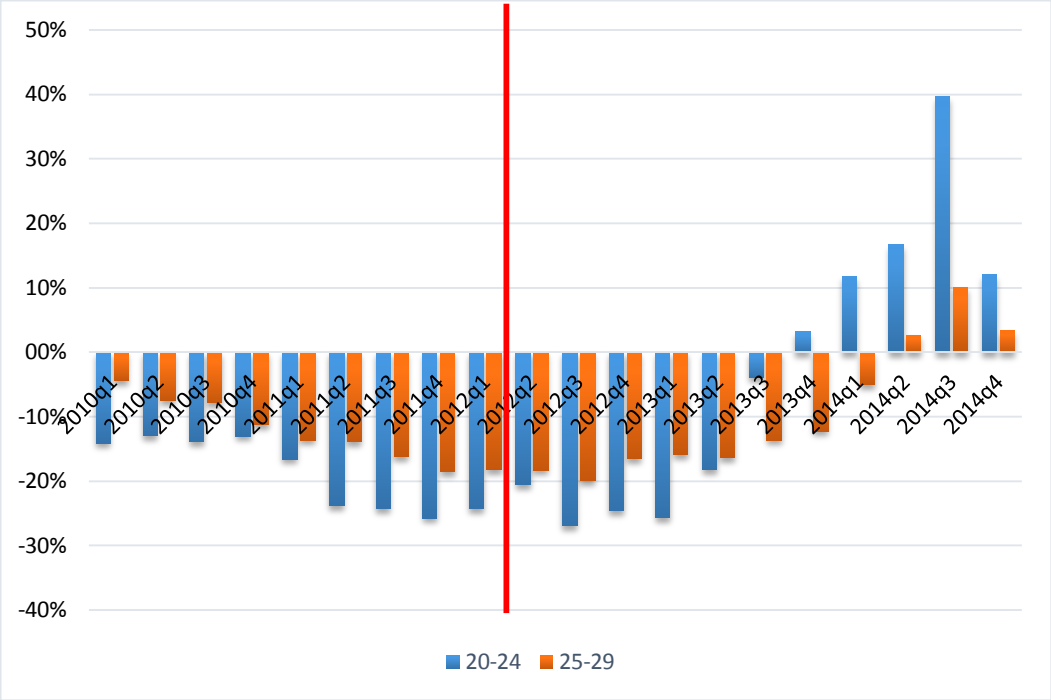
Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.)*

Figure 2. Employment rates for full-time private-sector workers 20-24 and 25-29-year-old individuals (%), 2009-2014.



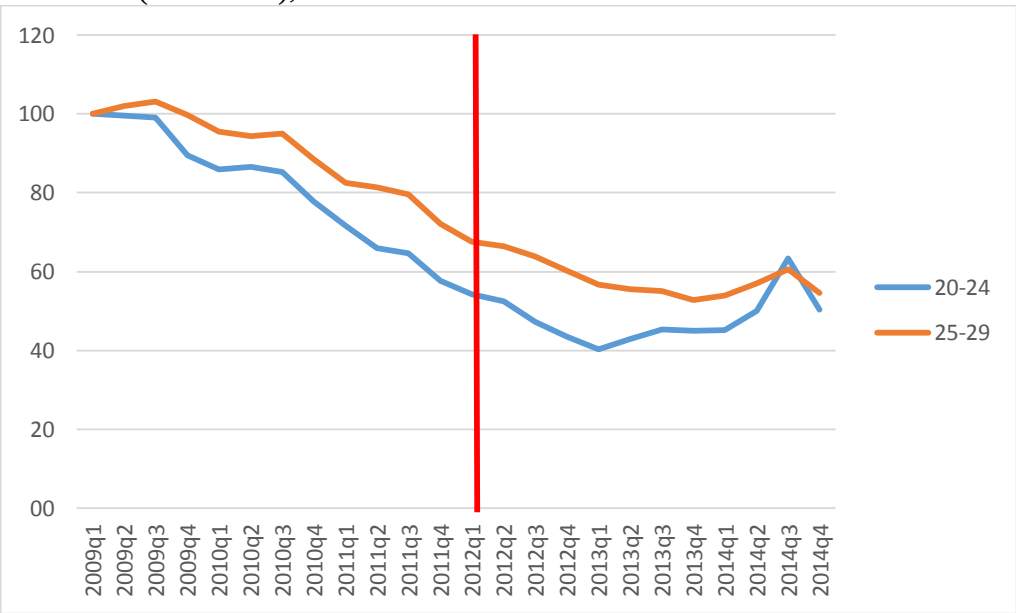
Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.)*

Figure 3. Year-to-year employment rates for full-time workers of the private sector aged 20-24 and 25-29 (%), 2009-2014.



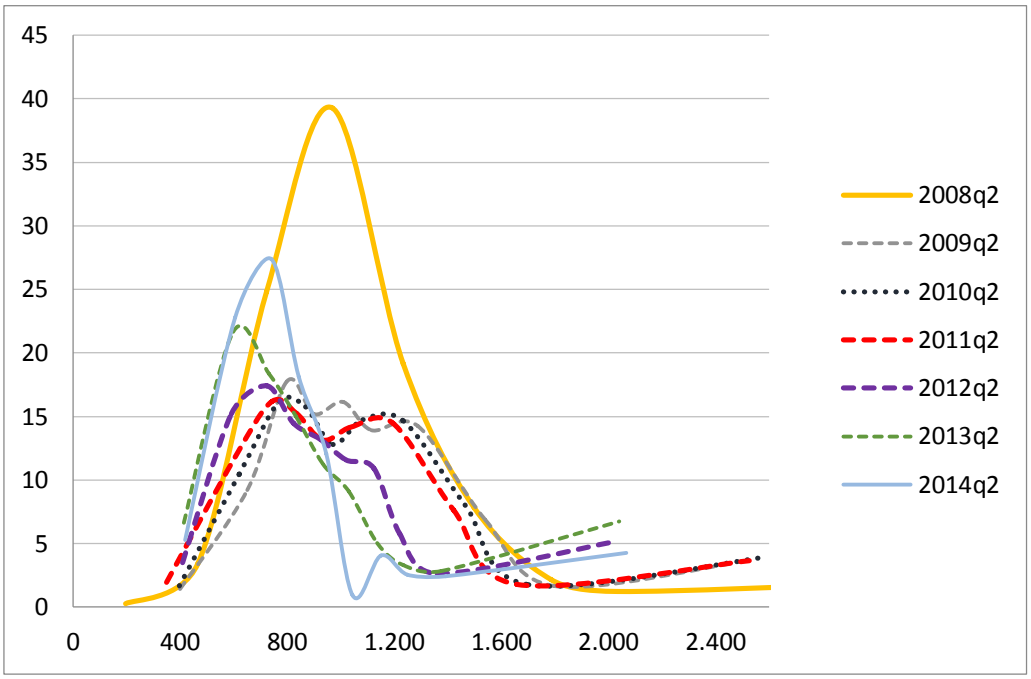
Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.)*

Figure 4. Employed persons, full-time workers of the private sector aged 20-24 and 25-29 (2009=100), 2009–2014.



Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.)*

Figure 5. Earnings' distribution of full-time private sector employees, 2008–2014.



Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.), Survey on Income and Living Conditions (SILC)*

Table 1. Results from difference-in-difference method – Case 1

	employment rates		no. employed	
	treatment[3]	control[4]	treatment[3]	control[4]
before[1]	21.7%	45.9%	116,481	330,062
after[2]	15.1%	34.9%	77,745	230,327
diff	-6.6%	-11.1%	-38,736	-99,735
diff-in-diff	4.5%		60,998	

[1] before: 2011q1-2011q4

[2] after: 2013q1-2013q4

[3] treatment: aged 20-24

[4] control: aged 25-29

Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.)*

Table 2. Results from difference-in-difference method – Case 2

	employment rates		no. employed	
	treatment[3]	control[4]	treatment[3]	control[4]
before[1]	21.1%	45.2%	112,514	325,009
after[2]	16.1%	38.5%	85,551	265,529
diff	-5.0%	-6.6%	-26,963	-59,480
diff-in-diff	1.6%		32,517	

[1] before: 2011q2-2011q4

[2] after: 2012q2-2012q4

[3] treatment: aged 20-24

[4] control: aged 25-29

Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.)*

Table 3. Wage bands, LFS 2008 - 2014

2008	2009	2010	2011	2012	2013	2014
0-250	0-499	0-499	0-499	0-499	0-499	0-499
251-500	500-699	500-699	500-699	500-699	500-699	500-699
501-750	700-799	700-799	700-799	700-799	700-799	700-799
751-1000	800-899	800-899	800-899	800-899	800-899	800-899
1001-1250	900-999	900-999	900-999	900-999	900-999	900-999
1251-1500	1000-1099	1000-1099	1000-1099	1000-1099	1000-1099	1000-1099
1501-1750	1100-1299	1100-1299	1100-1299	1100-1199	1100-1199	1100-1199
1751-2000	1300-1599	1300-1599	1300-1599	1200-1299	1200-1299	1200-1299
2000+	1600-1749	1600-1749	1600-1749	1300-1499	1300-1499	1300-1499
	1750+	1750+	1750+	1500+	1500+	1500+

Source: *Labour Force Survey, Greek Statistical Authority (EL.STAT.)*

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The Incidence of Long-Term Unemployment in Greece: Evidence Before and During the Recession

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Abstract

In an attempt to improve our understanding of recent developments in the Greek labour market, we examine the incidence of long-term unemployment defined as unemployed with continuous periods of unemployment extending for 12 months or longer. Using micro data from the Greek Labour Force Survey for the period 1999 to 2013, we investigate both, the trends and the structure of long-term unemployment. We also contribute to the existing literature by exploring the determinants of long-term unemployment. We apply typical econometric methods of logit regressions to estimate the probability of becoming long-term unemployed (versus short-term unemployed) with emphasis on the changes occurred during the crisis period. Empirical evidence suggests that females, the elderly, the less educated people, singles and those who live in urban areas are the most vulnerable groups to long-term unemployment. Local labor market conditions, as proxied by the regional separation and job-finding rates, determine the incidence of long-term unemployment as well.

1. Introduction

A permanent feature of the Greek economy is both the high level and the persistence of unemployment. During the period 1999-2008 the average quarterly unemployment rate oscillated around the 10.5% mark. Both the 2007-2008 global financial crisis that hit Greece at the end of 2008 and the outburst of the Greek sovereign debt crisis in 2010 deteriorated dramatically the conditions in the Greek labour market. Greece experienced the lowest level of unemployment at the third quarter of 2008 which stood at 7.2%. Since then, the unemployment rate was rapidly increasing that rose to a peak of 27.3% at the second quarter of 2013, an unprecedented level that Greece had not attained ever.

Long-term unemployment (defined as people out of work for 12 months or over) has garnered much attention as well. The problem of the long-term unemployment was persistent throughout the survey period. In the pre-crisis period, the average proportion of long-term unemployment (the proportion of unemployed people who are long-term unemployed) was at the neighborhood of the 54.5% mark. Thus, even though the unemployment rates were relatively low, large shares of unemployed workers experienced long spells of unemployment. A starkly different pattern of the long-term unemployment emerged with the onset of the recession. From the end of 2008, the proportion of long-term unemployment -following the unemployment rate- rose precipitously and reached for the first time the 66.8% mark at the second quarter of 2013 (Figure 1). The incidence of high long-term unemployment indicates that unemployment in Greece is characterized by stability: low inflows and outflows of unemployment and long duration (Kanellopoulos 2011). Moreover, comparative data shows that the incidence of long-term unemployment is higher than those in the EU-28 or OECD countries. The corresponding rates for the second quarter of 2013 were 46.5% and 35.3% respectively (Figure 2).

The case of Greece is of particular interest because the economic crisis has strongly affected the Greek labour market. There are no many studies that examine the incidence of long-term unemployment in Greece and they are limited to the pre-crisis period (Dedousopoulos *et al.* 1991; Kostaki and Ioakimoglou 1998; Livanos 2007; Mitrakos and Nicolitsas 2006). The present study covers a longer period (1999-2013) during which long-term unemployment increased drastically especially after 2009. We aim to investigate the trends and the structure of long-term unemployment with emphasis on the significant changes that occurred in the pre-crisis and during-the-crisis periods. Moreover, we contribute to the existing literature by exploring the determinants of long-term unemployment. We apply logit regressions to estimate the probability of becoming long-term unemployed. The literature pertaining to the incidence of long-term unemployment highlights the role of gender, age, education, marital status (Kostaki and Ioakimoglou 1998; Livanos 2007) nationality (Obben *et al*. 2002), region of residence, degree of urbanization, previous employment experience and local labor market conditions (Mitrakos and Nicolitsas 2006; Tasci and Ozdemir 2005). The obtained empirical results suggest that all of the aforementioned factors exert a significant influence on the probability of being long-term unemployed.

It is noted that Greek labour market suffers from serious structural problems which call for urgent and effective public policy responses (Blanchard 2006).

The paper is organized as follows. In section 2 we present the data sources and we discuss the distribution of the long-term and short-term unemployment shares by demographic groups between the pre-crisis and during-the-crisis periods. In section 3

we model the relationship between the incidence of long-term unemployment and several individual, job and regional characteristics. Section 4 presents the empirical results. The final section concludes.

2. Data and preliminary analysis

2.1 Data sources

The data utilized in this study originate from the Greek Labour Force Survey which is conducted by the Hellenic Statistical Authority (EL.STAT) on a quarterly basis since 1998 and provides useful information on several individual-specific characteristics of the labour force. The sample of the survey is around 30000 households in each quarter (approximately 80000 persons). We focus on the survey years 1999Q1-2013Q2 and the data provide representative aggregates for the entire economy since they are adjusted by the LFS sampling weights. The definitions of the variables used in the Greek Labour Force Survey are fully in line with Eurostat Regulations. Our sample consists of the unemployed people i.e. people aged 15-74 who were without work during the reference week, were currently available for work and were either actively seeking work in the past four weeks. Following the conventional definitions of ILO and OECD, long-term unemployment refers to the number of people with continuous periods of unemployment extending for a year or longer, expressed as a percentage of the total unemployed. We split our sample into two distinct periods (1999Q1-2008Q3 and 2008Q4-2013Q2) given that a break in the unemployment series is observed at the third quarter of 2008 (Venetis and Salamaliki 2015), which coincides with the beginning of the recessionary period (Tsouma 2014).

2.2 Distribution of the long-term and short-term unemployment shares by demographic groups

Table 1 reports the distribution of the long-term and short-term unemployment shares by demographic groups for the pre-crisis period and the crisis period. A share analysis of long-term unemployment by gender consists of determining what proportion of the long-term unemployed was males and what was females. The results show that in the crisis period, among the long-term unemployed, 66.22% were females. This means that females are overrepresented among the long-term unemployed. However, during the crisis-period this share fell to 54.34%. This indicates that females' position seems to have improved in the Greek labor market because males' position deteriorated dramatically. Structural shifts in the employment (such as the decline in manufacturing and construction industry, sectors that were traditionally dominated by males) made it more difficult for males to find a job.

Regarding age, in the pre-crisis period, individuals aged 15-34 have a high representation in the ranks of the long-term unemployed. In particular, the proportion of the long-term unemployed that were young people was 62% while this share fell to 48% during-the-crisis period. Moreover, individuals aged 35 and over are disproportionally represented in the ranks of the long-term unemployed during the recession. Concerning marital status, singles make up 55% of the long-term unemployed in the pre-crisis period but it slightly reduced to 50% in the recession period.

With regard to the education level, individuals with secondary education make up 50% of the long-term unemployed for both periods. On the contrary, the share of tertiary-educated among the long-term unemployed increased from 16% to 21% during the crisis period. Regarding nationality, Greek people are highly represented in the long-term unemployment pool for both periods, however, the share of the foreign individuals increased by 5 percentage points over time. Concerning the degree of urbanization, individuals who live in urban areas make up 73% of the long-term unemployed but this share remains constant over time. Finally, the share of people with previous employment experience increased remarkably from 50.29% in the pre-crisis period to 71.13% in the recession period.

3. Econometric methodology

In this section, we are interested in modelling the incidence of long-term unemployment. The data allows us to construct a dummy variable which takes the value one if an individual is long-term unemployed and zero if an individual is short-term unemployed. We apply the typical econometric method of logit regressions to estimate the probability of becoming long-term unemployed versus the probability of being short-term unemployed. For interpretation purposes we focus on the notion of the odds ratio. An odds ratio (OR) is defined as the ratio of the odds of an event occurring in one group to the odds of it occurring in another group. If OR coefficient is above (under) unity indicates that the odds of being long-term unemployed for a given category is greater (lesser) than for the reference category. If OR coefficient equals unity, the dependent variable is independent of the explanatory variable. The analysis is carried out for the pre-crisis period (1999Q1-2008Q3) and during the crisis period (2008Q4-2013Q2). In this procedure, we use a plethora of variables and examine their impact and their evolution on the incidence of long-term unemployment. The set of the variables includes: demographic characteristics (i.e. gender, age, marital status, nationality and educational level), regional characteristics (i.e. region of residence, degree of locality and region-specific rates), job characteristics (i.e. previous employment experience and industry of previous employment) and time dummies to capture the effect of the business cycle. All regressions are estimated by applying the Maximum Likelihood Estimation (MLE) method and the observations are weighted by a personal-based weight variable.

4. Empirical results

In this section we present and analyse the factors that determine the incidence of long-term unemployment. The effects of the independent variables are represented by the odds ratio (exponential value of the estimated coefficient) for both periods and are reported at Table 2. The econometric analysis reveals that all variables are statistically significant at 1% significance level.

According to the obtained results for the pre-crisis period, the odds ratio for females -relative to males- is 1.558. This finding indicates that the odds of a female being long-term unemployed is 1.558 times greater than the odds of a male being long-term unemployed. It is impressing to note that the impact of gender in the odds of being long-term unemployed continuous to be valid but reduces overtime. The reduction in the odds ratio from 1.558 to 1.328 implies that during the crisis period,

the odds of being long-term unemployed have increased for males relative to females. This is due to the fact that the relative position of males has worsened during the crisis period. Nevertheless, long-term unemployment affects mostly females.

Regarding the effects of age, we observe that young people (15-24 and 25-34) have lower odds of being long-term unemployed compared to prime-aged for both periods. On the contrary, individuals aged 45 and over have higher odds of being long-term unemployed compared to prime-aged. Although there are no significant changes between the two periods, it seems that the odds of an individual being long-term unemployed increases with age.

Concerning the marital status, we observe that in the pre-crisis period single individuals are more likely to become long-term unemployed but widowed or separated individuals are less likely compared to married ones. However, during the crisis period, the odds ratios have increased significantly for both groups. The odds of long-term unemployment are 31.3% higher for singles and 20.8% higher for widowed or separated in relation to married individuals.

With regard to education level, we note that primary educated individuals have greater odds of being long-term unemployed compared to people with higher education. It is obvious that the higher the education level of an individual, the lower the odds of that individual being long-term unemployed. In addition, foreign individuals are found to experience lower odds of being long-term unemployed compared to Greek individuals for both periods despite the fact that their position has deteriorated in the recession.

Our results indicate that the region is a highly significant determinant of the long-term unemployment. Although there are substantial regional variations, it appears that the residents of islands (Ionion Islands, South and North Aegean, Crete) face lower odds of long-term unemployment relative to those living in Attiki (capital) for both periods. The degree of locality affects the time that an individual remains in unemployment as well. Particularly, individuals who live in rural or semi-urban areas are less likely to become long-term unemployed compared to those who reside in urban areas for both periods.

Moreover, there is also a negative correlation between the odds of long-term unemployment and the previous employment experience of an individual. The results show that an unemployed individual who had worked in the past had 72% lower odds of becoming long-term unemployed in the pre-crisis period but this impact has reduced during the crisis period.

To investigate further the demand side and the differences in the local labor market conditions across regions we have included two novel variables: the regional separation rate and the regional job-finding rate. We find that the regional separation rate is a significant determinant of the long-unemployment. If the regional separation rate increases by 1 percentage point, an unemployed has 17% lower odds of becoming long-term unemployed in the pre-crisis period. In other words, people who lose their jobs have greater probability of finding a job since they stay in unemployment for a short time. This negative correlation is hold during the crisis period as well. Nevertheless, with 1 percentage point increase in the regional separation rate, an unemployed individual has only 7% lower odds of becoming long-term unemployed. Thus, the negative correlation between the regional separation rate and the odds of long-term unemployment became weaker. It is expected that if the recession becomes deeper, increases in the regional separation rate will increase the odds of long-term unemployment. On the other hand, the regional job-finding rate reveals that that there

are not significant developments in the labor demand side to change the structure of the unemployment.

Finally, we restrict our sample only to the unemployed individuals who have previous work experience and re-estimate the model. The results are reported at table 3. All variables are statistically significant at 1% significance level and the findings are similar to those obtained for the total sample. Moreover, we extend the second model with the inclusion of two more variables: the industry of previous employment and the reason for being unemployed. The results are reported at table 4. Evidence suggests that industry has a remarkable effect on the odds of long-term unemployment. During the crisis period only those who had last worked in Agriculture-Forestry-Fishing industry had greater odds of being long-term unemployed compared to those who worked in manufacturing, mining-quarrying and construction industry. Lastly, concerning the reason for unemployment, evidence suggests that in the pre-crisis period, people who lost their jobs (were laid-off or their contract ended) or resigned had lower odds of being long-term unemployed compared to those who stopped their job for other reasons. In contrast, during the crisis period, the odds of an individual being long-term unemployed are 32% higher for people who resigned. Thus, voluntary separation during the crisis period leads to longer unemployment periods.

5. Conclusions

The present study examines the incidence of long-term unemployment in Greece. We employ quarterly individual-level data, drawn from the Greek Labour Force Survey for the period (1999-2013) and investigate both the trends and the structure of the long-term unemployment. Evidence indicates that the upward trend in the unemployment rate has been accompanied by a prolongation of unemployment spells which led the proportion of the long-term unemployment to peak at the extraordinary level of 66.8% in 2013. We also examine the determinants of long-term unemployment by estimating the probability of becoming long-term unemployed with emphasis on the changes occurred during the crisis period. Empirical evidence suggests that females, the elderly, the less educated people, residents in urban areas, individuals without previous experience and individuals who are unemployed because they resigned have a higher probability of becoming long-term unemployed.

The results of the econometric estimations highlight the necessity of policy interventions in the Greek labour market. Thus, policy-makers should focus on creating employment opportunities for unemployed people. Furthermore, government should adopt appropriate policy plans that focus on the most disadvantaged groups such as females, old and less educated.

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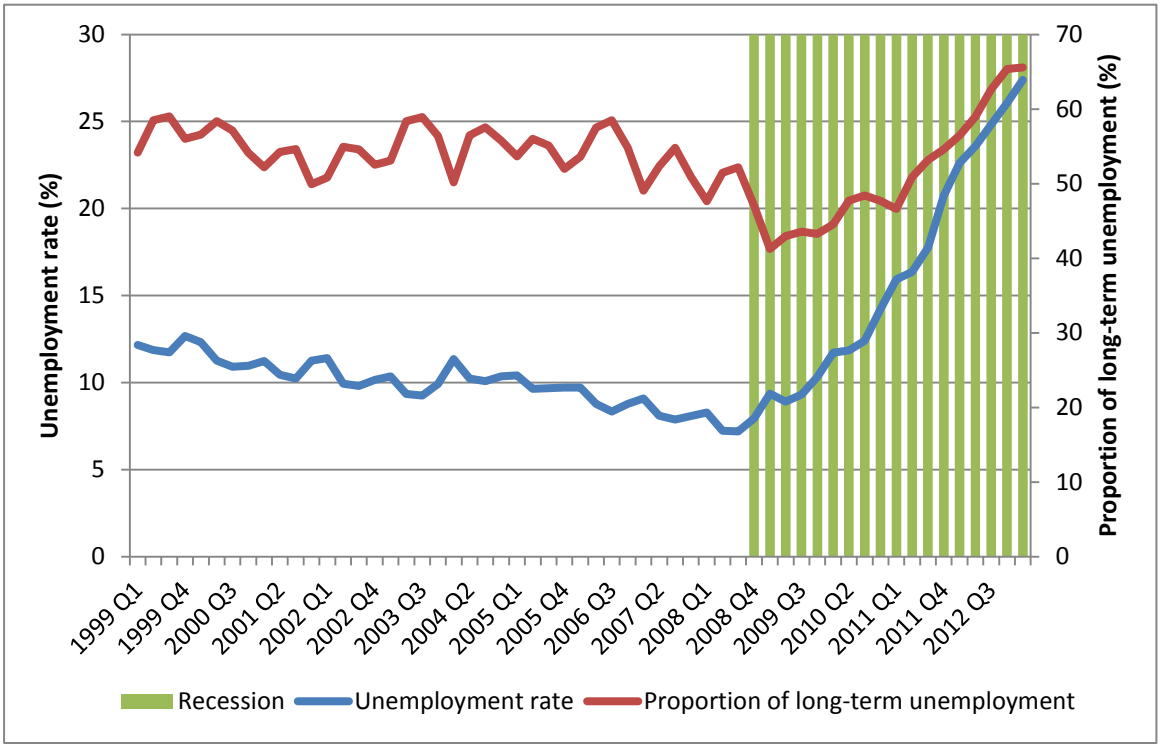
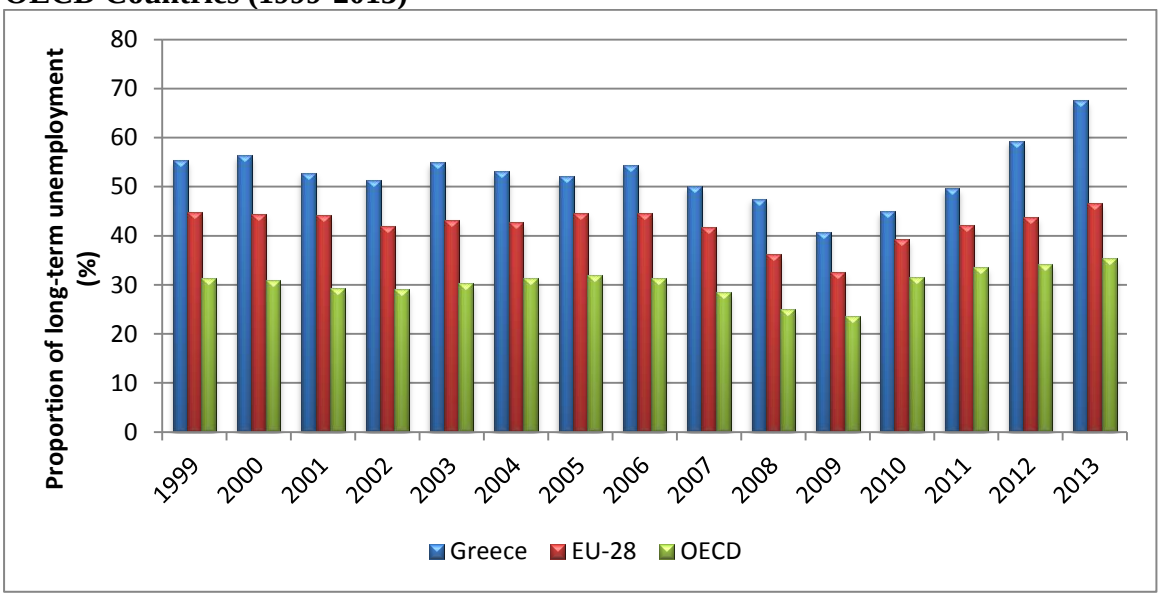
Figures

Figure 1. Unemployment and Long-term Unemployment in Greece (1999-2013)



Source: Labour Force Survey (1999Q1-2013Q2). Hellenic Statistical Authority (EL.STAT).

Figure 2. Annual Proportion of Long-term Unemployment in Greece, EU-28 and OECD Countries (1999-2013)



Source: OECD (http://stats.oecd.org/), Dataset: LFS - Unemployment by Duration (Dataset Level Metadata DUR_I)

Tables

Table 1. Characteristics of the Short-term and the Long-term Unemployed				
	Long-term Unemployed		**Short-term Unemployed**	
	Pre-crisis period (1999Q1-2008Q3)	**During-crisis period (2008Q4-2013Q2)**	**Pre-crisis period (1999Q1-2008Q3)**	**During-crisis period (2008Q4-2013Q2)**
Gender				
Females	66.22	54,34	55,46	48,32
Males	33.78	45,66	44,54	51,68
Age				
15_24	23.14	12,44	30,53	19,89
25_34	38.88	35,54	36,11	34,88
35_44	21.33	26,18	18,83	24,03
45_54	12.08	18,48	10,57	16,02
above55	4.58	7,36	3,95	5,18
Marital status				
Single	54.62	50,54	56,47	51,37
Married	39.85	42,81	38,74	43,67
Widowed/Separated	5.53	6,65	4,79	4,96
Education				
Tertiary	15.92	21,15	17,54	21,85
Post-secondary	12.53	12,85	13,06	12,28
Secondary	51.85	49	49,55	50,33
Primary	19.71	17	19,85	15,54
Nationality				
Greek	96.11	90,95	93,26	85,83
Foreign	3.89	9,05	6,74	14,17
Regions				
East Macedonia & Thraki	5.94	5,91	5,8	4,83
Central Macedonia	18.09	19,44	18,18	16,42
West Macedonia	4.64	3,23	2,94	2,92
Ipeiros	4.03	3,26	2,63	2,94
Thessaly	7.72	5,88	6,14	6,47
Ionion islands	0.97	0,98	3,31	2,67
West Greece	7.55	7,05	5,56	5,71
East & Sterea Greece	6.49	5,56	4,92	4,73
Attiki	34.35	37,48	33,86	38,18
Peloponnesus	4.99	4,9	4,42	3,51
South & North aegean	2.4	2,41	6,45	5,17
Crete	2.83	3,91	5,81	6,44
Urbanization				
Urban	73.05	72,19	69,83	70,73
Rural	15.32	15,47	17,28	16,43
Semiurban	11.62	12,34	12,89	12,84
Previous Employment Experience	50.29	71,13	69,2	80,94
Observations	69,698	47,238	57,478	39,931

Source: Labour Force Survey (1999Q1-2013Q2). Hellenic Statistical Authority (EL.STAT)
Notes: Individuals aged 15-74. Figures are weighted averages multiplied by 100 to represent percentages.

Table 2: Results of Logistic Regression , Long-term Unemployment (total sample)		
	Pre-crisis period (1999Q1-2008Q3)	**During-crisis period (2008Q4-2013Q2)**
Independent variables	**Odds Ratio**	**Odds Ratio**
Gender		
Female	1.558 (0.002)[a]	1.328 (0.002) [a]
Age		
15_24	0.276 (0.001) [a]	0.272 (0.001) [a]
25_34	0.723 (0.001) [a]	0.743 (0.001) [a]
45_54	1.191 (0.002) [a]	1.104 (0.002) [a]
above55	1.434 (0.004) [a]	1.440 (0.004) [a]
Marital status		
Single	1.180 (0.002) [a]	1.313 (0.002) [a]
Widowed/Separated	0.942 (0.002) [a]	1.208 (0.003) [a]
Education		
Tertiary	0.667 (0.001) [a]	0.669 (0.001) [a]
Post-secondary	0.952 (0.002) [a]	0.937 (0.002) [a]
Secondary	1.115 (0.002) [a]	0.905 (0.001) [a]
Nationality		
foreign	0.536 (0.001) [a]	0.647 (0.001) [a]
Regions		
East Macedonia & Thraki	1.051 (0.002) [a]	1.230 (0.003) [a]
Central Macedonia	1.012 (0.002) [a]	1.125 (0.002) [a]
West Macedonia	1.743 (0.005) [a]	1.042 (0.004) [a]
Ipeiros	1.151 (0.004) [a]	0.955 (0.003) [a]
Thessaly	1.114 (0.002) [a]	0.807 (0.002) [a]
Ionion islands	0.300 (0.001) [a]	0.322 (0.002) [a]
West Greece	1.047 (0.003) [a]	1.107 (0.003) [a]
East & Sterea Greece	1.196 (0.003) [a]	1.115 (0.003) [a]
Peloponnesus	0.897 (0.003) [a]	1.203 (0.004) [a]
South & North aegean	0.349 (0.001) [a]	0.421 (0.001) [a]
Crete	0.401 (0.001) [a]	0.585 (0.002) [a]
Urbanization		
rural	0.814 (0.001) [a]	0.926 (0.002) [a]
semiurban	0.853 (0.001) [a]	0.930 (0.002) [a]
Previous employment experience	0.284 (0.000) [a]	0.349 (0.001) [a]
Local labor market conditions		
Regional Separation Rate	0.826 (0.001) [a]	0.931 (0.001) [a]
Regional Job-finding Rate	1.005 (0.000) [a]	1.011 (0.000) [a]
Number of obs	127,176	87,169
LR chi2	2257549.38	1628202.68
Prob>chi2	0.0000	0.0000
Pseudo R2	0.0887	0.0748
Log likelihood	-11592794	-10069482

Source: Labour Force Survey. Hellenic Statistical Authority (EL.STAT).

Notes: The reference categories for the independent variables are the following: male, age 35-44, married, Greek, primary education, urban area, Attiki. All models include year and quarter dummies. The estimate of the constant term is not reported. [a], [b] and [c] denote statistical significance at 1%, 5% and 10% levels, respectively.

Table 3: Results of Logistic Regression, Long-term Unemployment (for the Unemployed with Previous Employment Experience)

	Pre-crisis period (1999Q1-2008Q3)	During-crisis period (2008Q4-2013Q2)
Independent variables	**Odds Ratio**	**Odds Ratio**
Gender		
Female	1.405 (0.002)[a]	1.187 (0.002) [a]
Age		
15_24	0.435 (0.001)[a]	0.436 (0.001) [a]
25_34	0.780 (0.001)[a]	0.800 (0.001) [a]
45_54	1.172 (0.003)[a]	1.101 (0.002) [a]
above55	1.395 (0.004)[a]	1.383 (0.004) [a]
Marital status		
Single	1.099 (0.002)[a]	1.302 (0.002) [a]
Widowed/Separated	0.996 (0.003)[a]	1.241 (0.003) [a]
Education		
Tertiary	0.876 (0.002)[a]	0.809 (0.002) [a]
Post-secondary	1.060 (0.003)[a]	0.964 (0.002) [a]
Secondary	1.173 (0.002)[a]	0.954 (0.002) [a]
Nationality		
foreign	0.509 (0.002)[a]	0.594 (0.001) [a]
Regions		
East Macedonia & Thraki	0.890 (0.003)[a]	1.150 (0.004) [a]
Central Macedonia	0.957 (0.002)[a]	1.064 (0.002) [a]
West Macedonia	1.707 (0.007)[a]	0.784 (0.003) [a]
Ipeiros	0.877 (0.004)[a]	0.743 (0.003) [a]
Thessaly	0.942 (0.003)[a]	0.701 (0.002) [a]
Ionion islands	0.158 (0.001)[a]	0.269 (0.002) [a]
West Greece	0.888 (0.003)[a]	1.005 (0.003)
East & Sterea Greece	0.941 (0.003)[a]	1.075 (0.004) [a]
Peloponnesus	0.728 (0.003)[a]	1.081 (0.004) [a]
South & North aegean	0.214 (0.001)[a]	0.324 (0.001) [a]
Crete	0.276 (0.001)[a]	0.491 (0.002) [a]
Urbanization		
rural	0.670 (0.002)[a]	0.866 (0.002) [a]
semiurban	0.824 (0.002)[a]	0.898 (0.002) [a]
Local labor market conditions		
Regional Separation Rate	0.773 (0.001)[a]	0.925 (0.001) [a]
Regional Job-finding Rate	1.006 (0.000)[a]	1.018 (0.000) [a]
Number of obs	66,599	60,136
LR chi2	797613.54	973888.73
Prob>chi2	0.0000	0.0000
Pseudo R2	0,0595	0,0630
Log likelihood	-6305322.3	-7241646.4

Source: Labour Force Survey. Hellenic Statistical Authority (EL.STAT).

Notes: The reference categories for the independent variables are the following: male, age 35-44, married, Greek, primary education, urban area, Attiki. All models include year and quarter dummies. The estimate of the constant term is not reported. [a], [b] and [c] denote statistical significance at 1%, 5% and 10% levels, respectively.

Table 4: Results of Logistic Regression, Long-term Unemployment (for the Unemployed who denote Industry of Previous Employment)		
	Pre-crisis period (1999Q1-2008Q3)	**During-crisis period (2008Q4-2013Q2)**
Independent variables	**Odds Ratio**	**Odds Ratio**
Gender		
Female	1408 (0.002) [a]	1.230 (0.002) [a]
Age		
15_24	0.436 (0.001) [a]	0.438 (0.001) [a]
25_34	0.779 (0.001) [a]	0.791 (0.001) [a]
45_54	1.162 (0.003) [a]	1.094 (0.002) [a]
above55	1.392 (0.004) [a]	1.344 (0.004) [a]
Marital status		
Single	1.154 (0.002) [a]	1.361 (0.002) [a]
Widowed/Separated	1.006 (0.003) [b]	1.242 (0.003) [a]
Education		
Tertiary	0.843 (0.002) [a]	0.831 (0.002) [a]
Post-secondary	1.045 (0.003) [a]	0.947 (0.002) [a]
Secondary	1.138 (0.002) [a]	0.948 (0.002) [a]
Nationality		
foreign	0.499 (0.002) [a]	0.584 (0.001) [a]
Regions		
East Macedonia & Thraki	0.906 (0.003) [a]	1.166 (0.004) [a]
Central Macedonia	0.957 (0.002) [a]	1.072 (0.002) [a]
West Macedonia	1.779 (0.008) [a]	0.859 (0.004) [a]
Ipeiros	0.907 (0.004) [a]	0.767 (0.003) [a]
Thessaly	0.960 (0.003) [a]	0.723 (0.002) [a]
Ionion islands	0.196 (0.001) [a]	0.330 (0.002) [a]
West Greece	0.891 (0.003) [a]	1.056 (0.003) [a]
East & Sterea Greece	0.985 (0.003) [a]	1.073 (0.004) [a]
Peloponnesus	0.779 (0.003) [a]	1.159 (0.005) [a]
South & North aegean	0.271 (0.001) [a]	0.385 (0.002) [a]
Crete	0.336 (0.001) [a]	0.549 (0.002) [a]
Urbanization		
rural	0.711 (0.002) [a]	0.894 (0.002) [a]
semiurban	0.861 (0.002) [a]	0.925 (0.002) [a]
Local labor market conditions		
Regional Separation rate	0.780 (0.001) [a]	0.924 (0.001) [a]
Regional Job-finding rate	1.003 (0.000) [a]	1.014 (0.000) [a]
Industry of previous employment		
Agriculture; Forestry; Fishing	0.883 (0.004) [a]	1.121 (0.005) [a]
Electricity, Water supply, Public Administration, Social Security	1.096 (0.003) [a]	1.006 (0.003) [b]
Transportation; Communication; Entertainment	0.843 (0.002) [a]	0.819 (0.001) [a]
Financial-Insurance, Real Estate, Administrative & Other Services	0.891 (0.002) [a]	0.998 (0.002) [a]
Professional, Scientific, Technical Activities	1.010 (0.003) [a]	1.036 (0.003)
Education; Human health; Social work Activities	1.105 (0.004) [a]	0.855 (0.003) [a]
Craft & related trade workers; Accommodation-Food	1.083 (0.003) [a]	0.939 (0.003) [a]

Reason for unemployment		
Lay-off	0.662 (0.001) [a]	0.822 (0.002) [a]
Contract termination	0.430 (0.001) [a]	0.560 (0.001) [a]
Resignation	0.879 (0.002) [a]	1.321 (0.005) [a]
Number of obs	66,599	60,136
LR chi2	1020201.11	1112430.59
Prob>chi2	0.0000	0.0000
Pseudo R2	0.0761	0.0720
Log likelihood	-6194028.5	-7172375.5

Source: Labour Force Survey. Hellenic Statistical Authority (EL.STAT).
Notes: The reference categories for the independent variables are the following: male, age 35-44, married, Greek, primary education, Attiki, urban area, Manufacturing, Mining and Quarrying, Construction. All models include year and quarter dummies. The estimate of the constant term is not reported. [a], [b] and [c] denote statistical significance at 1%, 5% and 10% levels, respectively.

An evaluation of labour market interventions in the face of the Greek crisis.

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Abstract

The Greek competitiveness deficit was, among others, one of the main drivers of the economic crisis. Troika considered the Greek labour market as over-regulated and provided a series of measures in order to restore competitiveness and stabilises the economy. The suggested measures caused a substantial change in labour market institutions regarding employment protection legislation, the size of a minimum wage, union coverage, and the presence and coverage of collective bargaining.

Despite the fact that labor market deregulation is a common European practice for almost the last two decades, in Greece reforms in this field were induced in an extremely accelerated pace since 2010, which depicts an innovation in the way the Common Labour Market is developing. These interventions distorted the character of labour law that was originally developed to protect the weakest part in the working relations, the employee, by incorporating features met in commercial law. The present study will assess the efficacy of these interventions and will examine the links between them and the real economy by scrutinising the evolution of average household income during the crisis.

Keywords: *Greek crisis, labour market, household income*

1. Introduction

The flawed construction of the Eurozone allowed the crisis that originally burst in the financial sector to transform into an economic crisis Autumn 2008.The euro system was utterly unprepared to deal with the internal imbalances that emerged, since the existing mechanisms were rather precautionary than able to tackle an evolving crisis. Therefore, the only tool available was labour market flexibility to adjust price levels in order to bring about stability (Stockhammer 2011).

Moreover, according to conventional policy practice the Greek labour market had to undergo serious reforms in order to restore the competitiveness gap between Greece and the member states of the European core. This was due to the rigidities of the Greek labour market, which played a key role in the escalation of the Greek economic crisis, as argued by the institutions forming Troika.

These reforms were implemented in the Greek labour market as a prerequisite for every disbursement of the loans provided by support mechanisms in order to handle the general government's funding gap.

The main pillars of labour market interventions since 2010 can be summarised in:

- The introduction of measures reducing wages, reducing or abolishing benefits, freezing wage increases and diminishing minimum wage in both private and public sector
- The deterioration of full, stable employment and protection against individual and collective dismissals in favour of flexible forms of work that involve limited salaries and adjustments in working hours
- The way collective agreements are formed (parts involved, process and coverage) and their duration

The present study will assess the link between deregulation of labour market institutions and average income of households through a short overview of the relevant literature that provides theoretical considerations and facts about the formation of the Greek labor market in the pre-crisis period. The second part will discuss the main interventions in this field and present a metric of labour market deregulation. Next, an econometric model will be employed in order to assess the impact of deregulation on average household income.

2. The form of the labour market in the pre-crisis period in Greece

In Greece, about 20% of the total workforce was receiving a salary of no more than 700 euros well before the crisis, creating a pool of cheap and mainly highly qualified workforce. At the same period real wages in Germany were reduced by 11%, while 4 million workers employed in "mini jobs" schemes earned less than 600 euros per month (Kouzis 2012). As it becomes obvious, the measures introduced since 2010 were nothing new either to the European or to the Greek labour market, but part of gradual changes in labour law during the last two decades.

By the time memoranda reforms became part of Greek legislation, the Greek labor market was ambiguously regulated. Temporary contracts were almost as popular as to the rest EU 15, but part time employment was lower than Eurozone's standards. An explanation to the latter could be that private sector was indifferent to non full-time employment until the burst of the economic crisis.

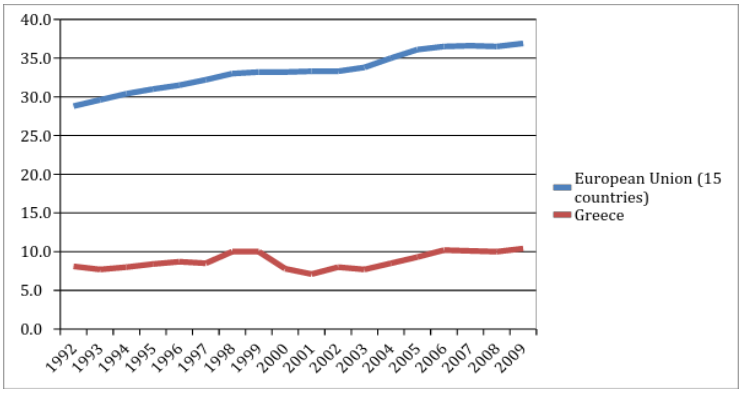


Figure 1. Part-time workers in % of total employment

Source: Eurostat

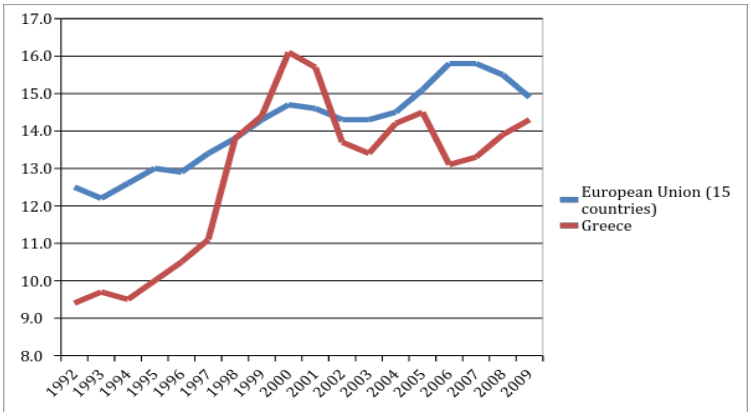


Figure 2. Percentage of employees with temporary contracts
Source: Eurostat

Greek labor cost increased more than in EU15 in the period before and after the Olympic games that concurs with a period of major construction projects, and modernization and expansion of tertiary sector activities in both private and public sector. Wage convergence within the Eurozone never happened despite its upward trend after the accession in the EU. Therefore, compensation of employees increased in a much more moderate way than labour cost, indicating differences in productivity and in price level of goods and services between Greece and the Euro area.

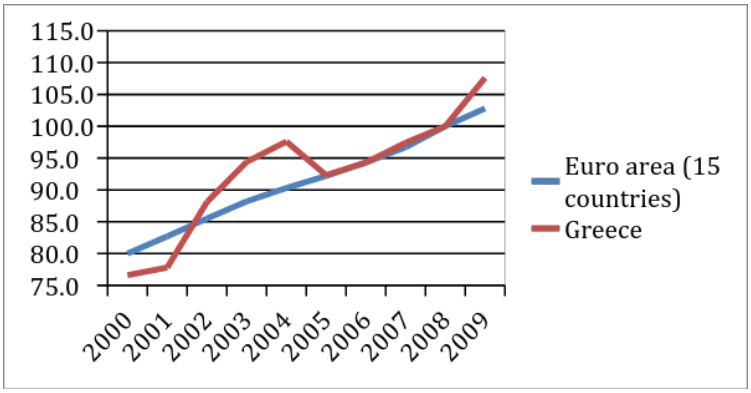


Figure 3. Labor cost index
Source: Eurostat

Moreover, labor protection was never a bottleneck to the Greek market, which is proved by the upward trend of dismissals. At the same time, balance of hirings to dismissals is diminishing feeding unemployment.

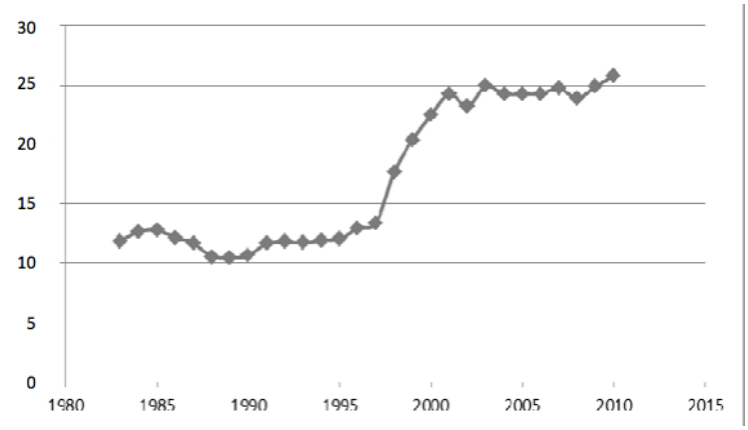


Figure 4. Percentage of all wage earners dismissed within a year
Source: Dedoussopoulos *et al* 2013

Unemployment in Greece, since 1990's, was mostly close to the EU15 rates. This relatively small deviation from the European standards can be attributed to intertemporal shortcomings of the Greek production structure, which were amplified by competitiveness of Common Market policies, but also to the Greek shadow economy that absorbs part of inactive workforce.

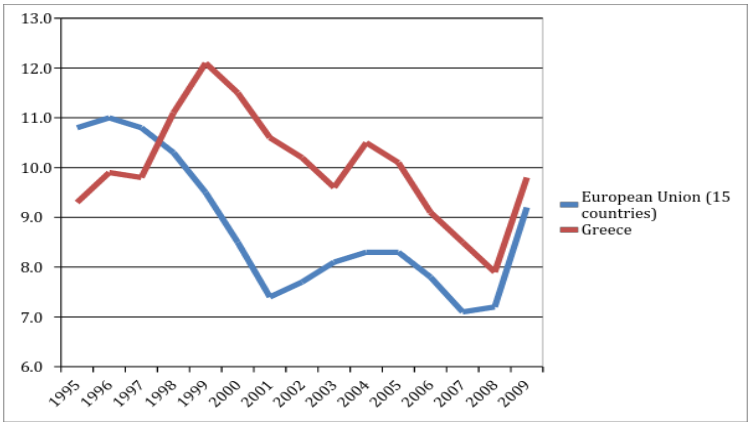


Figure 5. Unemployment rate
Source: Eurostat

The number of wage earners in Greece is relatively small due to the large rate of self-employment. Private sector is dominated by SMEs, mostly family firms, with lower than public sector's contribution to hirings. However, only a small portion, around 30%, of the wage earners is employed in public sector. Furthermore, public sector's employment was below the European average even before the crisis, which contradicts the assumption about particularly large size. Nevertheless, it was subject to fundamental malfunctions that kept it away from being efficient.

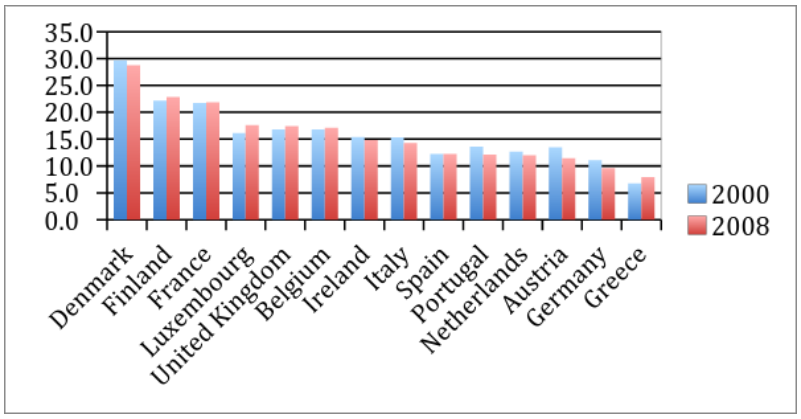


Figure 6. Employment in public sector
Source: OECD

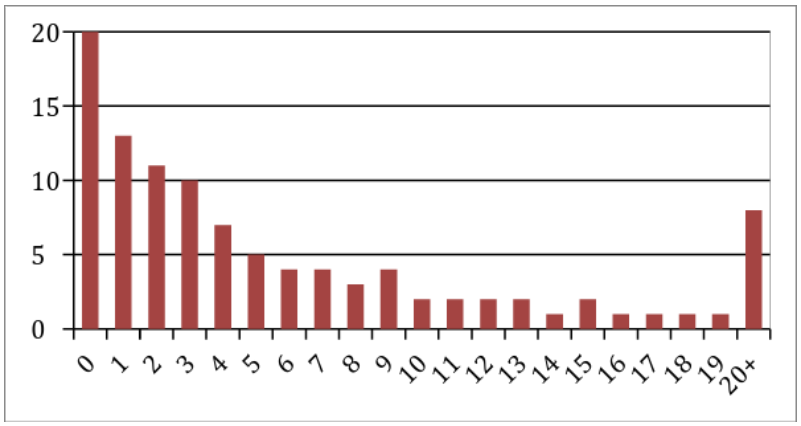


Figure 7. Number of employees per director
Source: Tzanetos, 2013

All these indicate that Greek labour market suffered mainly from issues regarding the production structure and monitoring mechanisms rather than excessive regulation. However, interventions for stabilizing Greek economy were focused on reforms that liberalised the labour market in order to become more competitive and efficient.

3. Labour market interventions: A short literature overview

Structural labour market reforms is an OECD-IMF orthodoxy that anticipates job creation, boost of exports and markets' self-regulation that resolve crises. This strategy was particularly famous in the UK and USA during the 80's and became the paradigm for the rest of the world by 1990's. Even though this policy concept received tremendous critique due to its dubious efficacy, in 2009 EC published a study based on the EC's QUEST model, which indicated that the effects of the crisis would be mitigated, only if labour markets were sufficiently flexible.

Checchi and Garcia-Peñalosa (2010), on the contrary, argue that labour market protection provides insurance against market forces and shocks. Stockhammer and Onaran (2012) claim that flexibility is not able to reverse the negative trends of the economic crisis and that this kind of policy resulted in declining wage shares that created an unsustainable growth model in the Euro area. Keynes stemming from the perception that wages are the source of demand, in 1930 stated that wage flexibility in wages would cause economic instability, while it is also insufficient to create full employment.

Dedoussopoulos *et al* (2013) note that this practice tends to reduce total individual consumption - including the revenues in the sector of social security - and has a positive influence on the upward course of recession. Nominal wage cuts and labour market flexibility act as a device of domestic devaluation that aims to improve trade balance but increases the real value of debt. Stockhammer and Onaran (2012) argue that this kind of adjustment in small, open European economies is incapable of affecting the overall outcome in a positive way because most of the exports are within the Euro area.

Treating labour as private cost merely overlooks the effects on macroeconomic indicators and suggests the adoption of flexible forms of employment as a solution to economic turbulence. Consequently, interventions that promote labour market liberalisation are more likely to have a sharp decrease in domestic demand than improvement in competitiveness and economic performance.

4. Labour market legislation and a metric of deregulation

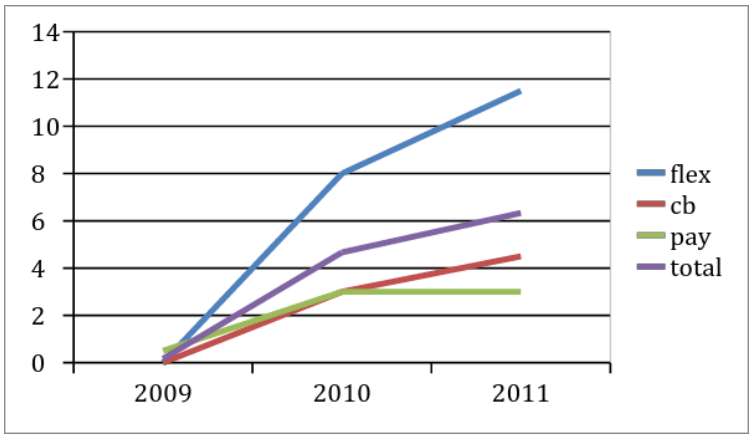
The present study assesses if, how, and to what extent liberalisation of labour market institutions affects income of household, which is a sufficient measure to estimate wealth that determines domestic demand and economic performance. In doing so, labour market reforms should be represented by a quantifiable variable. Basic memorandum's legislation in this field consist the source of data that fall under three major categories: deregulation in payroll, collective bargaining and flexibility.

Table 1

Category	Law	Interventions
Payroll	3833/10, 3845/10, 3899/10	Decrease in public sector's benefits, decrease in all public sector wages.
Collective bargaining	3833/10, 3845/10, 3899/10, 4024/11	Decisions for wage reductions (in public and private sector) override collective bargaining, prohibit the principle of the most favorable regulation, special business contracts override collective bargaining, suspension of

		ministerial decisions for sectoral agreements extensions
Flexibility	3833/10, 3845/10, 3846/2010, 3863/10, 3899/10, 3920/11, 3979/11, 3986/11, 4024/11	Employment of the youth with reduced remuneration, context for labor renting, rotation work, labor reserve in the public sector, abolition of permanency in public sectors employment, "mobility" schemes, regulations for temporary employment, reduction in overtimes, redefinition of overtime work, abolition of Sunday holiday, widening in the criteria for collective dismissals, decrease dismissals cost,

The evaluation of every intervention was a simplification of the concept followed by OECD for computing the Protection of Employment indicator. The graph clearly indicates that since 2009 Greek labor market experienced a severe deregulation that was more intense in the side of flexibility in employment and less significant on issues regarding labor earnings. The total amount of deregulation is computed as an average of deregulation in the three mentioned areas.



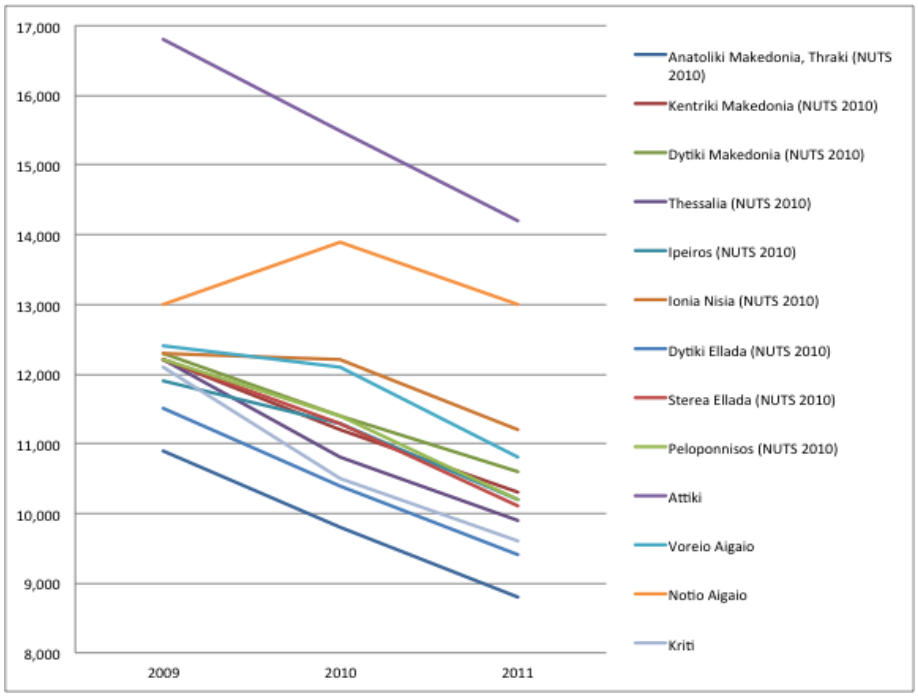
Deregulation in the Greek labor market
Source: Own calculation

5. Empirical analysis of the effect of labour market interventions on income

In this section we will attempt to justify the theoretical considerations that link flexibility in the labor market to wealth and decrease in demand. In doing so, we estimate the effect of deregulation on average household income during the crisis. We follow panel data analysis in order to have a sufficient amount of data, and use annual time series data that run from

2009-2011, so that there is no seasonality. Cross-sectional variables are regional values apart from deregulation, which is measured at national level. All quantitative data were retrieved from Eurostat.

Average household income consists of wages and salaries, earnings from self-employment and rentiers' profits. Since 2009, it followed a downward path that is evident in all Greek regions with the exception of the Ionian Islands (IN).



Average household income, NUTS2
Source: Eurostat

Household income depends on the expenses of private and public sector that pay salaries of employees and freelancers' profits. Gross fixed capital formation is a metric of expenditures on GDP, and by this means it affects income of households. Unemployment on the other hand, whether subsidised or not, is considered as income loss. Finally, according to the previously discussed literature, income is expected to be affected by labor market flexibility, positively or negatively.

Therefore, average household income is given by:

$$inc = c + \alpha \cdot dereg + \beta \cdot un + \gamma \cdot cf$$

where *inc* is average household income, *dereg* is the value of total deregulation, *un* is the number of the unemployed, and *cf* is the gross fixed capital formation

Running the equation with the OLS method gives some indication of endogeneity. According to the economic theory, unemployment is a function of capital flows and previous

period's unemployment. Therefore, we employ instrumental variables that can interpret unemployment in that way. Moreover, we fill the instrument list with demographic variables and variables that express labor skills.

The instrumental variables employed are the number of the unemployed in the previous period (*g*), trade balance (*x_m*), population density (*pop*), the number of people with tertiary education (*ed*). The latter variable will be employed in quadratic form in order to capture the effect of over-education. Instrumental variables are checked for correlation with regressors and error term.

We run regression with tsls and cross section weights, due to the differentiation in economic performance of Greece's 13 regions. Signs confirm the initial assumptions about the strong negative effect of deregulation on income. There is also a negative relationship between income and unemployment, and a positive relationship with capital formation according to the economic rationale.

Variable	Coef
C	*11 63.54***
DEREG	*-140.86****
UN	*-5.02****
CF	*0.75****
Weighed statistics	
R^2 *adjusted*	*0.84*
F-statistics	*68.65*
Durbin-Watson	*1.41*

As is obvious, household income depends heavily on the level of labor market regulation. Despite the fact that only a part of active workforce is wage earners affected by swifts in the form of labor relations, the protection of labour seems to affect all kinds of household incomes. This means that a big part of private sector in Greece is largely dependent on domestic demand and cannot be involved in export activities. This result is also in line with the argument about the wage-led nature of the Greek economy.

Unemployment is also negatively related to the household income, but to a lesser extent. Although it is only a small portion of the unemployed that receives unemployment benefit, it should be mentioned that it is higher than the remuneration received by flexible forms of employment. Finally, the small but positive effect of capital stock to average household income indicates that household wealth is shaped by expansionary or contractionary policies in both the private and public sectors.

6. Concluding Remarks

The reforms in the labour market constituted the main tools of internal devaluation in order to restore competitiveness and stabilise the Greek economy. Nevertheless, intensive deregulation in the Greek labour market could not respond to the inefficiencies caused by a defective production structure and insufficient monitoring mechanisms. Labour market reforms affected negatively households' wealth enhancing the dynamics of the evolving recessionary spiral in Greece. Competitiveness did not seem to be restored (World Economic Forum 2010) while the Greek economy experienced the most severe shock in its recent history losing one quarter of its GDP since 2008

The Greek economy needs injections that impact on effective demand creating job vacancies with sustainable – economically and socially - conditions. This requires interventions in the opposite direction than the ones that took place in Greece, such as reformation of the production model with a focus on quality factors rather than compression of labor costs, restoration of labor protection legislation and establishment of sufficient monitoring mechanisms.

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