The wage curve during the great depression in Greece

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Abstract

This study investigates the existence of a wage curve in Greece using micro data from the Quarterly Labour Force Survey for the period 2003-2012. According to the estimated results, the implied by the empirical law short-run negative relationship between regional unemployment and real wages cannot be identified using either pooled or longitudinal data. In fact, wages in Greece do not respond to the transitory components of regional unemployment but rather exert permanent disparities between regions. These findings indicate that the wage formation in Greece during the decade 2003-2012 seems to be more close the Nordic model of labour market rather than to the Anglo-Saxon one. However, utilizing models specifications that take into account the structural break of unemployment observed the 1st quarter of 2009 we found that the doubling of regional unemployment rates is associated with a fall in wages by around 6 percentage points in the period 2009-2012. In addition, a horizontal decrease of around 16 percentage points in individual wages is identified.

Keywords: Wages; Unemployment; Wage Curve; Regional Labour Markets; Greece

JEL Classification: E24; J30; R11

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1 Introduction

Many empirical studies attempt to confirm the empirical law of the *"wage curve"*[1] but only a minority of them have failed to do so (Nijkamp and Poot, 2005). For example, according to the study of Albæk *et al.* (2000) the wage curve relationship does not exist in the Nordic labour markets once regional fixed effects are accounted for. The authors attributed this irresponsiveness of individual wages to regional unemployment to the institutional framework governing the underlying labour markets. Their results were consistent with a theoretical model where central bargaining agents determine a national wage increment and local bargaining agents add subsequent wage drifts.

The model of Albæk *et al.* (2000) implied that the elasticity of wages to regional unemployment is smaller, the more centralized is the level of collective bargaining. An empirical confirmation of this hypothesis was recently provided by Blien *et al.* (2011), who used longitudinal matched data for the German labour market to demonstrate that the elasticity of wages with respect to local unemployment increases as the level of collective bargaining becomes more decentralized. More specifically, the authors estimated that wages are quite responsive when negotiated at the firm level while a wage curve did not show up for the plants applying binding sectoral agreements.

Regarding evidence for the Greek labour market, the relevant literature is limited to a recent study presented by Livanos (2010). Although the wage curve framework is used to evaluate real wage flexibility, the author estimated unexpectedly high elasticities of nominal wages with respect to the regional unemployment rates. More specifically, using annual cross-sections from the Greek Labour Force Survey for the period 2000-2004, the author reported an estimated elasticity of -0.152 for the total economy and -0.193 for the private sector alone, both of them significantly greater from the empirical law proposed by Blanchflower and Oswald (1994). He concluded that, contrary to the conclusions reached by OECD

[1] According to Blanchflower and Oswald (1994), a negative relationship between individual wages and the current local unemployment rate exists. Using micro data for a large number of economies, they estimated that the magnitude of the regional unemployment elasticity of pay is approximately -0.100.

studies, the highly regulated Greek labour market exhibits a high degree of (nominal) wage flexibility. Apart from OECD reports, Livanos' findings also contradict with more recent studies, which using micro data showed that Greece belongs to those EU countries which exhibit a high degree of nominal downward wage rigidity (e.g. Knoppik and Beissinger, 2009; Fabiani *et al.*, 2010)

However, the degree of wage flexibility is majorly determined by the institutional framework that governs the underlying labour market, therefore the wage curve literature should take the specifics of the labour relations system more explicitly into consideration (Ammermüeleller *et al.*, 2010). For example, the centralized wage determination process in the Nordic countries did not account for regional differences. Similarly, sectoral agreements in Germany do not account for firm or region specific-heterogeneity, therefore the absence of a wage curve may reflect institutional rigidities (Blien *et al.*, 2011). On the other hand, the great elasticity of the wage curve in the subsample of German firms applying firm-level contracts may be due to the fact that at this level of collective negotiations the prevailing regional market conditions exert a strong influence on the bargained outcomes.[2] In either case, the characteristics of the labour relations framework seem to provide a sufficient explanation for the slope of the wage curve: Whereas a wage curve relationship exists, its slope may be a function of the level at which collective negotiations take place, while the absence of a wage curve may be attributed to the fact that the institutional framework may restrict wage responsiveness to changing local labour market conditions.

The institutional framework of the Greek labour market bears some resemblance to those of the Nordic countries during the 90s. Before the structural reforms imposed by the Greek government during the ongoing debt crisis, the labour relations system was heavily centralized. Collective negotiations at the national level determined wage increments based on a

[2]The authors also suggest that estimating wage curves by the level of bargaining regime, provides an useful tool for choosing between competing theories of the wage curve, i.e. efficiency wages or bargaining theory-based explanations.

national consumer price index.[3] These negotiations were taking place periodically, usually every two years, and were establishing the minimum wage for all wage earners in the Greek economy. Next, negotiations at sectoral and occupational levels occurred which were automatically extended to cover all the corresponding groups of workers. Collective negotiations at these levels could only improve the outcome attained at the national level, while they did not take into consideration the prevailing environment of regional or local labour markets. A more decentralized type of collective negotiations, at the firm level, was also not allowed to worsen outcomes determined at broader levels of bargaining.[4] Evidently, such a structure of the labour relations system could not promote downward wage flexibility with respect to the regional market conditions, since agreements at more decentralized levels could only improve the more centralized ones.

Since 2010, however, successive legislation was introduced in order to accommodate an unlimited decentralization of the wage bargaining process. The need of such a structural reform was deemed necessary giving the rising unemployment rate. Under the provisions of the new Labour Law, any firm, regardless of the number of its workers, can sign a firm-level collective agreement. Moreover, these agreements are no longer bound upon sectoral and occupational agreements, therefore they may establish wages lower than the ones attained at broader levels of collective bargaining, however, not falling below the minimum wage floor established by the national-wide agreement.[5] The new structure of the collective bargaining process eliminates several institutional restrictions imposed by the previous one and provides firms with more room to manoeuvre when current local market conditions become unfavourable. Therefore, one may expect that under the new framework a wage curve relation is more likely to show up in the Greek labour market.

[3]Regarding the negotiations for the signing of the 2010-2012 national collective agreement, the social partners agreed that minimum wage increments would be based on the Eurozone's harmonized consumer price index instead of the national one.

[4]Under the provisions of the old Labour Law, a firm-level collective agreement could be signed only in companies with more than fifty employees.

[5]A compact review on the specifics of the Greek labour relations system before and after the structural reforms imposed by the so-called *Troika* (i.e. the European Commission, the ECB and the IMF) is provided by Voskeritsian & Kornelakis (2011).

The main purpose of our study is to estimate the elasticity of individual wages with respect to current regional unemployment in the Greek labour market, making use of the full empirical specification proposed by Blanchflower & Oswald (1994). Therefore, we estimate wage curves for the periods 2003-2008 & 2009-2012 using pooled cross-sections and longitudinal data where available. Moreover, we make use of matched employer-employee data in order to test the validity of the wage curve relationship with respect to the collective bargaining regime covering each worker. Additionally, we estimate wage curves at the levels of the firm and the region for a more thorough investigation of the linkage between pay and current regional unemployment. Regardless of the dataset, the time period, the bargaining regime and the level of the analysis, our results do not support the existence of downward wage flexibility in the highly regulated Greek labour market.

The remainder of this paper is organized as follows. The next section presents basic stylized facts regarding unemployment rates at the national and regional level. Then, Section 3 presents the utilized databases while Section 4 discuss in details the adopted empirical strategy and the utilized econometric methods and techniques. Section 5 presents the estimation results and Section 5 concludes.

2 Unemployment in Greece: 2001-2012

This section presents a brief discussion on the evolution of some key macroeconomic trends in Greece during the last decade. Figure 1 displays the gross domestic product and the total unemployment growth rates from the first quarter of 2001 until the second quarter of 2012. According to this graphical depiction, it seems that two distinct periods are formed. More specifically, in the first period (2001q1-2008q4), the growth rate of the Greek economy is positive while the growth rate of the total unemployment is mainly below zero and exerts a rather negative trend. However, the macroeconomic environment has been dramatically altered into a more volatile one during the second period (2009q1-2012q2) of our graph.

The growth rate of the GDP is persistently negative while the growth rate of the national unemployment rate has jumped to positive values with a strongly positive trend. Therefore, we want to investigate the extent at which the Greek labour market operates according to a wage curve scheme, and whether this functioning is differentiated between the two distinct periods outlined above.

[Figure 1 about here]

2.1 Regional unemployment

Since our main purpose is to estimate the sensitivity of local wages to current regional unemployment, we proceed by examining the unemployment rates to the more disaggregated level of the thirteen administrative regions according to the NUTS-II classification. Table 1 presents some summary statistics of the regional unemployment rates for the periods 2001q1-2008q4 and 2009q1-2012q2. More specifically, we have decomposed the total unemployment rate of each region in both periods into a permanent and a transitory component. The permanent component refers to the average unemployment of each region in each time period, while the transitory component refers to the deviations of the regional unemployment rates from their period average. Since the wage curve describes a short-run (or contemporaneous) relationship between individual wage levels and current regional unemployment, such a decomposition can be quite insightful. At first, Table 1 informs us about the existence of permanent unemployment differentials across regions in both periods. These permanent differences can be attributed to either exogenous or endogenous factors (Elhorst, 2003). Moreover, the levels of the permanent components of regional unemployment rates are significantly increased in the second period, where the total unemployment rate has risen to 14.6 per cent from 9.6 per cent in the first period. Regarding the short-run deviations of regional unemployment rates from their period averages, we see that in the first period their median is around zero and they are distributed quite normally. In the second period, however, their median is systematically deviating from zero while the shape of their distribu-

tion is skewed to the left (Figure 2). Therefore, in the case where a wage curve relationship exists in the Greek labour market, its magnitude should not be homogeneous between the two aforementioned periods, since the transitory component of regional unemployment has shifted into a more volatile pattern after 2009.

[Table 1 about here]

[Figure 2 about here]

3 Data

3.1 Labour Force Survey

A primary source of data we utilize in this paper is the Quarterly Labour Force Survey (QLFS henceforth) for Greece, for the periods 2003q1-2008q4 and 2009q1-2012q2. The QLFS, provided by the Hellenic Statistical Authority (EL.STAT henceforth), refers to individuals above the age of fifteen. For each quarter, it surveys around 68,000 individuals and 13,000 salary workers. It contains detailed information on plenty individual characteristics such as gender, age, years of education, marital status, nationality, employer type (public or private sector), employer size (according to the number of employees), occupation, industry, region, hours of work and monthly earnings. More specifically, the QLFS pay measure is recorded into eight income bands for the period 2003q1-2008q4 and into ten income bands for the period 2009q1-2012q2. Therefore, whenever monthly earnings are used as the dependent variable, they refer to the midpoint of each income band. To calculate hourly pay, we divided each midpoint by the usual monthly hours of work (i.e. usual weekly hours of work times 4.2 weeks per month). The most disaggregated level at which regional information is provided is the NUTS-II level. Therefore we can identify thirteen distinct administrative regions and for each one of them we were able to calculate the current regional unemployment rate.

3.2 Structure of Earnings Survey

The second source of data stems from the Greek Structure of Earning Survey (SES henceforth) for the years 2002 and 2006. These are cross-sectional matched employer-employee datasets also provided by the EL.STAT. They contain information about individuals working at firms with at least 10 employees and their employers while they cover the sectors C-K of the NACE Rev. 1.1 nomenclature (i.e. mining and quarrying, manufacturing and services). The 2002 dataset surveys 48,685 individuals working in 2,896 firms while the 2006 sample surveys 47,873 individuals working in 3,086 firms. The SES data contain rich information on a number of individual characteristics such as age, gender, tenure with the current employer, level of educational attainment, earnings (both annually and monthly, regarding the month at which the surveys were conducted, i.e. October) and hours of work, also at annual and monthly level. These data are matched with information about the employer for which each individual is working for, such as firm size according to the number of employees, industry affiliation, region of operation, ownership type and collective bargaining regime. With respect to the latter employer-specific characteristic, we are able to distinguish which level of bargaining regime covers the workforce of each firm, i.e. national, sectoral or firm. Therefore, we are able to test the wage curve relationship taking institutional variation explicitly into account. Regional information is also provided at the NUTS-II level, so we merged the SES data with the corresponding current regional unemployment rates calculated using the QLFS data. To the best of our knowledge this is the first study to employ matched employer-employee data to test the wage curve relationship in the Greek labour market.

4 Estimation Strategy

In order to estimate wage curves for the Greek labour market, we adopt the empirical framework proposed by Blanchflower and Oswald (1994). More specifically, we estimate Mincerian earnings generating functions, augmented with the logarithm of the current regional

unemployment. We report results using various earnings definitions, i.e. annual income, monthly income and hourly wages (in nominal and real terms where possible). However, since there might be a measurement error when using income instead of hourly wage, we rely better on the specifications using hourly wages as the dependent variable. [6]

Another aspect of the estimation procedure is concerned with the inclusion of time and regional dummies in the model specification. Since most studies in the wage curve literature use datasets which expand to more than one years, the inclusion of time dummies is deemed necessary in order to capture the adjustment of wages to inflation, i.e. the nominal wage flexibility (Heinz and Rusinova, 2011). Since, like in many EU countries, minimum wages in Greece are adjusted for inflation (Du Caju *et al.*, 2008), the inclusion of time fixed effects in our models is justified. Regarding the paper for Greece, Livanos (2010) reported estimates without controlling for time fixed effects, although he used repeated cross-sections for the period 2000-2004.

The major argument behind the exclusion of regional dummies rests on the assumption that wages respond to the "transitory" and "permanent" components of local unemployment with the same elasticity (Card, 1995). However, whereas there are significant permanent regional characteristics that are related with both unemployment and wages, then it is very crucial to control explicitly for region-specific fixed effects and estimate the wage curve elasticity (if any) using deviations of wages and regional unemployment from their average values. In this paper we investigate whether the wage curve exists in the Greek labour market which exhibits a high degree of "permanence" in the geographic patterns unemployment. Since the wage curve relationship represents a transitory relationship between wages and regional unemployment, its pure magnitude is properly estimated once permanent regional effects are removed from wages (Albæk *et al.*, 2000).

[6] Blanchflower and Oswald (1994) reported elasticities for the US labour market using annual income as their dependent variable. This troubling feature was pointed out by Card (1995) who mentioned that the elasticity of annual income with respect to regional unemployment is the sum of the elasticities of hourly wages and annually working hours with respect to regional unemployment. In our estimation, we correct for the corresponding hours of work when the dependent variable is other than the hourly wage rate, in order to identify the pure effect of current regional unemployment on individual pay.

Since the wage curve is estimating by augmenting typical Mincerian earnings generating functions with a structural factor as the regional unemployment rate, it is important to take into consideration that region-specific characteristics may exert a similar influence on individuals working in the same regional labour market. As Card (1995) points out, the error components may be positively correlated across individuals from the same region, therefore, estimation methods which do not correct for a regional-level error component, inflate significantly the precision of the estimated wage curve elasticity. This is another drawback of the estimates reported in Livanos' (2010) study, where the author corrected the standard errors for clustering only at the year level. In order to produce more accurate estimates, we follow the suggestion made by Card (1995) and apply the Moulton (1990) correction, in order to estimate standard errors that are properly clustered (at the regional or at the firm level where possible) and hence to control for common components of variance.

4.1 Individual-level regressions

4.1.1 Pooled Samples

The empirical framework originally introduced by Blanchflower and Oswald (1994) and served as a benchmark model for every subsequent study, is one of the following form:

$$lnw_{irt} = \alpha + \beta lnU_{rt} + \gamma X_{irt} + \delta_r + \tau_t + \varepsilon_{irt} \tag{1}$$

where w_{irt} is the remuneration for individual i in region r in period t, U_{rt} is the current unemployment rate of the region where the i-th individual is observed , X_{irt} is a vector of observed characteristics typically used in the empirical wages literature (at the individual and at the firm level), δ_r is a set of regional dummy variables, τ_t is a set of time dummies and ε_{irt} is a disturbance term. The estimated coefficient of the logged regional unemployment, $\hat{\beta}$, after controlling for a series of other characteristics, is an estimate of the wage curve magnitude, i.e. it measures the short-run responsiveness of wages to local market shocks.

The empirical law of Blanchflower and Oswald (1994) advocates that this coefficient is -0.1 and since both the wage and the current regional unemployment variables enter into the regression in a logarithmic form, it can be read off as an elasticity: a doubling in the regional unemployment rate will be accompanied by a drop of around 10 percent in the level of wages in that region, *ceteris paribus*.

4.1.2 Longitudinal sample

Equations like (1) are typically estimated via pooled cross-sections of individual-level data. However, the use of panel data instead, makes it possible to control for unobserved heterogeneity of individuals who are observed at different time periods, or different points of the business cycle (Card, 1995). Moreover, the use of panel data instead of repeated cross-sections provides with significantly less inflated elasticities or real wages with respect to unemployment (Solon *et al.*, 1994). Therefore, whereas allowed by the data, we estimate individual-level models of the form:

$$lnw_{irt} = \alpha + \beta lnU_{rt} + \gamma X_{irt} + \delta_r + \psi_i + \varepsilon_{irt} \tag{2}$$

where ψ_i captures unobserved heterogeneity of the i-th individual, while all the other terms remain as specified for equation (1). Moreover, the use of panel data allow us to investigate the dynamic aspects of the wage curve relationship as many studies in the relevant literature do (e.g. Albæk *et al.*, 2000; Baltagi *et al.*, 2007; Bell *et al.*, 2002). The original framework suggested by Blanchflower and Oswald (1994) is a static vehicle of examining wage flexibility. The relationship they propose is between unemployment and wage levels, not wage growth, i.e. a Phillips curve. However, individual remuneration may have an autoregressive nature. For example, Albæk *et al.* (2000), state that if regional unemployment is a sufficient proxy of the prevailing economic conditions and if wages are not influenced by other factors, then individual pay may exhibit a high degree of regional persistence. This means that the current

pay of the i-th individual in the r-th region may be significantly determined by his pay in the previous period. A simple way to explore such a scenario is to include the lagged value of the dependent variable in the set of regressors in equation (2). The magnitude of the estimated coefficient of the lagged pay variable will help us to evaluate both the degree of persistence of wages in the Greek labour market as well as the two competing theories of wage flexibility, i.e. the wage curve versus the Phillips curve.

4.2 Regional-level regressions

Our empirical strategy proceeds by examining the negative linkage between pay and current regional unemployment at a more aggregate level. Albæk *et al.* (2000) argued that wage rigidity at the regional level may well coexist with aggregate wage flexibility given the specifics of the wage bargaining system. For example, according to the institutional framework of the Nordic labour markets, horizontal wage increments are determined by central bargaining agents, targeting on a specific national unemployment rate. In Greece, however, national wage increments seemed to follow a time-dependent adjustment procedure, occurring when social partners agreed on inflation-based wage increases, ignoring the national or region-specific unemployment rates. The authors, although failed to estimate a typical wage curve relationship for the Nordic countries, they did find some evidence of aggregate wage flexibility in some of them (i.e. Finland, Norway and Sweden). In order to examine such a relationship for the Greek labour market as well, we calculated mean values of our variables based on region-year-quarter cells, thus constructing a region-level panel where we can explore both a static and a dynamic linkage between pay and current regional unemployment. Moreover, in order to avoid problems with confounding variables, we use as a wage variable the mean residual from cell-based OLS low wage regressions in the fashion of equation (1). Hence, we estimate fixed effects models of the form

$$\overline{y_{rt}} = \alpha + \beta \overline{X_{rt}} + \nu_r + \varepsilon_r \tag{3}$$

where $\overline{y_{rt}}$ is the mean wage residual estimate from individual-level regressions and X_{rt} is a vector containing the current unemployment rate of region r as well as a lagged value of the dependent variable in order to examine any dynamic aspects of regional wage formation.

4.3 Firm-level regressions

Lastly, we analyse the linkage between pay and current regional unemployment by running regressions at the firm level. Traditionally, the wage curve relationship is investigated via worker-level data, however, some studies provide also some evidence at the firm level (e.g. Blanchflower and Machin, 1996; Bellmann and Blien, 2001). For example, Bellmann and Blien (2001) argued that the theoretical explanations of the wage curve resting on bargaining theories and efficiency wage considerations can also be evaluated with firm-level data. Therefore, for this level of analysis, we estimate models like the one bellow:

$$ln\overline{w_{jrt}} = \alpha + \beta lnU_{rt} + \gamma\overline{X_{jrt}} + \delta_r + \tau_t + \varepsilon_{jrt} \tag{4}$$

where $\overline{w_{jrt}}$ is the mean remuneration of all individuals working in the j-th firm, located in the r-th region at time t, U_{rt} is the contemporaneous regional unemployment rate, $\overline{X_{jrt}}$ is a vector containing characteristics firm-level regressors (average co-worker and employer-specific characteristics), δ_r and τ_t are region and time fixed effects respectively and ε_{jrt} is a firm-specific disturbance term.

5 Estimation results

5.1 Individual-level regressions

In this section we discuss the results obtained while searching for a Greek wage curve. Panel A of Table 2 presents the results after estimating equation (1) for the period before the crisis, i.e. 2003q1-2008q4. We run OLS regressions using monthly salaries and hourly wage

rates, both in nominal and in real terms as dependent variables. The vector of explanatory variables includes controls for gender, years of education, marital status, a quadratic in age, a dummy indicator for foreign-born workers, occupational and industry dummies, a dummy variable indicating whether the individual works in the private sector of the economy as well as the monthly hours of work in the cases where the dependent variable is the monthly salary. [7] Standard errors are clustered at a region-year-quarter level in order to account for common components of variance across individuals working in the same labour market, at the same period. Table 2 displays only the variables of interest (the rest of the regressors have the expected sign and magnitude; the full list of results is available from the authors). For the first period, according to our pooled cross-sectional estimates, nominal wages exhibit some degree of responsiveness to regional market conditions. The estimated coefficients are $-.131$ and $-.120$ when using monthly salary and hourly wages as dependent variables, respectively. Their magnitude is close to those reported by Livanos (2010) who also used nominal wages with the same dataset for the period 2000-2004. However, since the wage curve describes the flexibility of real wages to the prevailing labour market conditions, one should put more weight on the coefficients reported whilst measuring the dependent variable in real terms.

Next we insert time dummies in order to capture the effect of inflation on individual wages. In this case we see that the magnitude of the wage curve elasticities suffers a severe reduction, while the estimated coefficients are identical either we use nominal or real measures of individual remuneration as dependent variable. Next, we control for regional fixed effects in order to account for permanent differences in the rates of unemployment and the levels of wages across different regions. Hence, the estimated magnitude of the wage curve elasticity should measure the short-run or the transitory relationship between deviations of individual pay and regional unemployment from their average values (Card, 1995). However, after the inclusion of regional dummies in our model specification, the elasticity of the wage curve gets

[7] In the empirical wage curve literature samples are usually restricted to private sector employees since the regional wage variability of public sector workers is small, while the wage setting in the public sector is determined under different decision making processes. However, our results (available from the authors upon request) do not change if we focus solely on the private sector.

close zero and becomes statistically insignificant (even if the inclusion of time and regional dummies provides with more accurate estimates since it reduces the estimated standard errors of the regional unemployment coefficient). Therefore, as in the case of the Nordic countries (Albæk *et al.*, 2000) our results suggest that a transitory relationship between pay and unemployment did not exist in the Greek labour market, after all permanent variation has been removed.

Panel B of Table 2 presents the results of the same estimation procedure for the second period under examination, 2009q1-2012q2. Again, we see that significant elasticities are obtained only when time and regional fixed affects are not being accounted for. Moreover, the elasticity of real measures of pay is greater than the one of the nominal ones. When time and regional dummies are gradually inserted into the model, the estimated coefficients of regional unemployment become practically zero once again. Therefore, the use of pooled cross-sections does not confirms the operation of Blanchflower and Oswald's (1994) empirical law in the periods before and during the Greek debt crisis.

[Table 2 about here]

Next we use a longitudinal sample of the QLFS for the period 2007q1-2008q4 in order to estimate wage curve elasticities whilst controlling for unobserved individual heterogeneity. Solon *et al.* (1994) showed that the use of longitudinal data instead of repeated cross-sections provides removes a great fraction of upward bias from the elasticity of real wages with respect to aggregate unemployment. Moreover, the longitudinal design of the data allows us to explore the autoregressive nature of individual remuneration and hence evaluate the validity of the wage curve over its competitor theory for wage flexibility, i.e. the Phillips curve.

The results are presented at Table 3. Panel A contains the estimated coefficients of a static version of the wage curve for the period 2007q1-2008q4. According to our fixed effects estimates, the elasticity of individual pay with respect to current regional unemployment is zero, hence a wage curve does not show up in this case either. Moreover, the estimated

elasticities are significantly lower than those reported in Table 2 where we used pooled cross-sections. Next, we augment the vector of explanatory variables in equation (2) with a lagged variable of individual pay. In other words, we estimate a dynamic formulation of the wage curve. Our results confirm the absence of a wage curve relationship in the Greek labour market since the estimated coefficients are nearly zero. Moreover, it is important to account for wage dynamics. The estimated coefficients of the lagged individual pay measures are statistically significant at the 1 per cent level, however their magnitude are considerably lower than unity. Similar findings were reached by Baltagi and Blien (2007) using German data, who concluded that the correct specification of the wage formation process is not a wage curve nor a Phillips curve, but it is important to control for wage dynamics.

[Table 3 about here]

Our investigation of a Greek wage curve proceeds through the use of matched employer-employee data (SES) for the years 2002 and 2006. Their main advantages are that they provide more accurate information for the remuneration of workers, recorded in a continuous form instead of income bands. Moreover, they inform us about the level of collective negotiations that covers the firm where each individual is working into. Therefore we are able to examine the empirical law of the wage curve taking the institutional framework of the labour market explicitly under account. So far, only a recent study by Blien *et al.* (2011) has utilized matched data in order to examine the linkage between pay and unemployment with respect to the institutional framework of the labour market. The authors estimated that the magnitude of the wage curve is greater for workers covered by firm-level agreements as compared to workers covered by agreements at the sectoral level.

Our analysis with the matched data begins by regressing a benchmark model, in the spirit of equation (1), on three different measures of individual remuneration, i.e. annual pay, monthly earnings and hourly wage rate. The benchmark model (columns [1] of Table 4) includes controls for gender, level of educational attainment, quadratic terms for age and

tenure within the firm where an individual is currently working, occupational and industry dummies, a time fixed effect as well as the corresponding number of working hours when the dependent variable is other than the hourly wage rate. Our results suggest that there is a statistically significant relationship between pay and current regional unemployment. When the dependent variable is the annual pay, its magnitude is $-.198$, it falls to $-.100$ when we regress the same set of variables on monthly earnings (exactly equal to the empirical law of Blanchflower and Oswald) while it decreases to $-.067$ when we use the hourly wage rate as the dependent variable.

In columns [2] of Table 4 we augmented the explanatory vector with a set of institutional variables indicating whether the firm into which an individual is working, is covered by a collective agreement at the sectoral and the firm level (collective agreements at the national level is the reference category). We observe that the bargaining regime covering each individual does not affect the estimated coefficient of the wage curve.[8] No matter the way individual remuneration is measured, the estimated coefficient of regional unemployment is only marginally decreased when we control for the bargaining regime. Moreover, when regional fixed effects are inserted into the model specification, the wage curve relationship disappears, providing further evidence on the non existence of a transitory relationship between pay and unemployment in the Greek labour market.

[Table 4 about here]

However, in order to test more formally whether the magnitude of the wage curve elasticity varies with the level of collective negotiations, we split the total SES sample into three sub-samples: those who are covered by the national wide collective agreement which sets the national minimum wage floor, those who are additionally covered by collective agreements

[8]The unreported coefficients of the bargaining regime dummies measure the wage gap between workers covered only by the national-wide agreement and those whose wages are determined at the sectoral and the firm level. Evidence between the firm-level associated wage premium was recently provided by Daouli *et al.* (2012) using the same dataset. Full results are available from the authors upon request.

at the sectoral level and those who are covered by firm-level negotiations. The results are displayed at Table 5. Controlling for the full set of observed individual and employer-specific characteristics, as in Table 4, and including both time and regional fixed effects, our results suggest that a wage curve does not show up regardless the measurement of the dependent variable or the bargaining regime which covers each workplace. This clearly contradicts with the findings of Blien *et al.* (2011) who found that, in Germany, the wage curve elasticity is greater when wages are negotiated at a more decentralized level, i.e. at the firm. The difference with the results of our study can be attributed to the different institutional frameworks regulating each labour market. In Greece, national-wide and sector-specific agreements do not take regional heterogeneity into consideration while they are establishing series of wage floors under which wages were not allowed to decline. Moreover, the institution of firm-level collective contracting was not originally designed to help firms to adjust into regional or firm-specific needs, but rather to provide another vehicle for improving outcomes bargained at broader levels of negotiations.[9]

These characteristics of the Greek labour law during the period under examination, could not facilitate downward wage flexibility and adjustment to prevailing local labour market conditions, even if the determination of wages occurred at the firm level. Therefore, our failure to confirm the empirical law of the wage curve in the Greek labour market using individual-level data can be attributed to the inflexible design of the Greek labour relations system.

[Table 5 about here]

5.2 Regional-level regressions

Albæk *et al.* (2000) showed that the absence of a transitory relationship between individual pay and regional unemployment in a given economy, may be well consistent with

[9]However, the restructured labour law introduced into the late 2011, offers firms and their employees the possibility for an unconditional collective determination of the wage at the firm level, given that it is not lower than the one agreed at the national scale (see Voskeritsian and Kornelakis, 2011).

evidence of aggregate wage flexibility from time series data. Unlike the case of Nordic countries, however, we are unaware of a times series study examining the extent of wage flexibility in the Greek economy, perhaps due to the lack of sufficient data at the macro level. Yet, recent studies examining the wage rigidity of the Euro area (e.g. Knoppik and Beissinger, 2009; Fabiani *et al.*, 2010) classified Greece among those countries with a high degree of wage rigidity.

Therefore, since we failed to validate the existence of a typical wage curve relationship in the highly regulated Greek labour market, we proceed by examining whether there is evidence of such a relationship in a more aggregate level for the periods before and during the ongoing debt crisis. In order to perform such a task, we constructed a panel dataset at the regional level using the QLFS data for the periods 2003q1-2008q4 and 2009q-2012q2. This was performed by calculating region-year-quarter mean values of the variables included in equation (1) and then estimating the aggregate relationship between mean regional pay and current regional unemployment. In order to avoid any confounding variables problems entailed in such an estimation, we followed a procedure similar to that of Albæk *et al.* (2000). We run separate OLS regressions for each region-year-quarter cell using both the hourly wage rated and the monthly salaries as dependent variables. The regressions included gender, years of education, a quadratic in age and dummies for marital status, nationality, occupation, industry, private sector and hours of work in the case where monthly salary is used as the dependent variable. Then, we took the residuals of these regressions and estimated the mean log wage residual which we regressed on the log of the current unemployment rate. The results from our fixed effects estimates of equation (3) are reported in Table 6. Panel A refers to the obtained results for the period before the debt crisis, 2003q1-2008q4. In columns [1], we regress the average residual on the logged regional unemployment rates. In columns [2] we further control for regional fixed effects. This improves the precision of our estimates, however, the existence of an "aggregate" wage curve does not seem to be confirmed, while the estimated coefficients of regional unemployment are almost identical, regardless of which

pay measure is used as the dependent variable.

In columns [3] and [4] we explore the dynamics aspects of this aggregate relationship. In columns [3] we regress the mean residual on the log of the current regional unemployment as well as on the lagged dependent variable. Columns [4] further control for regional fixed effects. It can be seen that there is a significant degree of persistence in the regional wage determination process. Yet, even at an aggregate level, a short-run relationship between pay and unemployment does not occur whilst examining the before-crisis period.

[Table 6 about here]

Panel B of Table 6 displays the results obtained for the period 2009q1-2012q2. Once again, we estimate that the regional wage formation is highly persistent while a great fraction of wage variability is explained via permanent differences across regions. Regarding the short-run linkage between regional unemployment and individual pay, a statistically significant coefficient of $-.047$ is obtained when we use the mean residual from log hourly wage OLS regressions as the dependent variable. However, this finding is not quite stable since it is not confirmed when the dependent variable is obtained through monthly salary regressions. Hence downward wage flexibility is not confirmed in the Greek labour market even in a more aggregate level. Our findings contradict with those of Albæk *et al.* (2000) who found evidence of an aggregate relationship between unemployment and pay for some Nordic countries despite the absence of a transitory wage curve. The authors attributed this finding to the institutional framework of these economies: central bargaining agents determine wages based on a target level of national unemployment. In Greece on the other hand, wage increases determined on the national level of bargaining do not target to a desired unemployment rate, but they are rather time-dependent, based on national inflation rates.[10]

[10]National-level negotiations for the years 2010-2012 agreed on wage increments based on the harmonized CPI of the Euro area.

5.3 Firm-level regressions

The previous sections provided empirical evidence indicating the absence of a transitory wage curve in the highly institutionalized Greek labour market, either at the individual or at the more aggregate level of the region. This seems to be in full accordance with policy reports and studies who characterize the Greek labour market as a highly institutionalized and rigid one. In the relevant literature, the wage curve relationship has been also tested using firm-level data. For example, Bellman and Blien (2001) used data from panel of German establishments and found that, at this level of analysis, wages do react to variations of the regional unemployment rate. Their finding also contradicted the view that the German labour market is inflexible due to the characteristics of the collective bargaining system. Since there are no appropriate longitudinal firm-level data for the Greek economy, we used the SES data to conduct a firm-level analysis. The matched design of those datasets allowed us to calculate average values of the remuneration per firm (annual earnings, monthly salary and hourly wage rate) and regress them upon a set of average co-worker and employer-specific characteristics in the spirit of equation (4). The former include mean tenure years and mean age per firm, mean education years, proportion of female workers, proportion of part-time workers and occupational shares. Employer-specific characteristics such as firm size and industry affiliation while we include a time dummy since we are working with pooled cross-sections. Standard errors are clustered on a region-year level. The results are displayed in Table 7. According to the benchmark model no significant evidence supporting a transitory relationship between the average remuneration per firm and current regional unemployment is found. Next, we control for the bargaining regime covering the workforce of each firm, reaching to practically the same results. Finally, in order to partial out permanent differences across regions, we included a set of thirteen regional dummies to obtain coefficients that are very close to zero, especially in the cases of annual earnings and hourly wages. Therefore, the wage curve relationship cannot be supported at this level of analysis either. The institutional rigidities of the Greek labour market serve as a good candidate to explain this insensitivity.

When local market conditions are deteriorated, firms can do nothing to reduce the wages the pay since they are constrained by binding collective agreements at the national and the sectoral level. Moreover, before the restructuring of the Labour Law in the late 2011, firms who applied firm-level contracts could not pay wages lower than those agreed at broader (sectoral or occupational) levels of collective negotiations.

[Table 7 about here]

6 Concluding remarks

The purpose of this paper was to explore the validity of Blanchflower and Oswald's (1994) empirical law of the wage curve within the context of the highly institutionalized Greek labour market in the periods before and during the ongoing debt crisis. The so far empirical evidence provided with rather conflicting results, since several studies for the EU and OECD reports classified the Greek labour market as a highly rigid one, while the only paper to measure the wage curve elasticity (Livanos, 2010) concluded that wages in Greece are very flexible despite the contrary beliefs.

In this paper, using different micro datasets we failed to confirm the existence of a transitory relationship between the level of pay and the current regional unemployment rate at any level of our analysis, i.e. individual, firm, regional, in both time periods. Our overall results suggest that there is not a wage curve mechanism operating in the Greek labour market. The estimated coefficients were very close to zero and statistically insignificant. The transitory relationship disappeared once we introduced into our model specifications time and, most importantly, regional fixed effects. Their inclusion was deemed necessary since wage increments in Greece are rather time-dependent, based on some measure of the inflation rate. Regarding the regional dummies, their inclusion was of great importance since unemployment rates and pay levels differ systematically across regions, therefore any permanent differences had to be controlled for in order to uncover the real short-run wage

curve elasticity. Our results agree with another well known study for the Nordic countries (Albæk *et al.*, 2000), which attributed the non-existence of a wage curve relationship to the specifics of the labour relations system. In our study we took explicitly the institutional framework of the Greek labour market, estimating wage curve elasticities with respect to the level of collective bargaining which covers each worker. Our results indicated that such a transitory relationship between individual pay and contemporaneous regional unemployment does not show up in any level of collective bargaining. This finding also contradicts with the only so far relevant empirical evidence for Germany (Blien *et al.*. 2011) who estimated that wages determined under firm-level negotiations are far more sensitive that those agreed at sectoral levels. This difference in the results may be attributed in differences of the institutional framework in each country. At least under the provisions of the previous Labour Law, which allowed only upward wage flexibility as the level of collective bargaining was getting more decentralized.

Overall, our results indicate that wages are insensitive to contemporaneous local market conditions. The dramatic jump in the levels of the overall and the regional unemployment rates led to the restructuring of the labour relations framework, during the late 2011, towards a further decentralization in order to help firms to adjust to changes in their economic environment and to preserve the number of jobs. Hence, a further evaluation of the wage curve relationship in the near future is deemed necessary, in order to evaluate the effectiveness of such a reform on the degree of wage flexibility in the Greek economy.

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Table 1: Summary statistics of permanent & transitory unemployment rates by region (NUTS-II) and time period

	$2001q1 - 2008q4$					$2009q1 - 2012q2$				
	Permanent	Transitory				Permanent	Transitory			
Region	Mean	Median	SD	Min	Max	Mean	Median	SD	Min	Max
East Macedonia & Thrace	.104	-.004	.016	-.024	.035	.163	-.013	.048	-.063	.077
Central Macedonia	.104	.006	.013	-.024	.016	.159	-.014	.056	-.069	.091
Western Macedonia	.152	.003	.020	-.032	.038	.188	-.027	.064	-.077	.113
Epirus	.110	-.001	.011	-.021	.020	.146	-.016	.038	-.036	.074
Thessaly	.102	-.002	.020	-.032	.038	.137	-.012	.044	-.057	.083
Ionian Islands	.102	-.011	.041	-.061	.088	.131	.009	.045	-.081	.168
Western Greece	.103	-.003	.010	-.013	.027	.146	-.011	.053	-.056	.104
Central Greece	.110	-.010	.022	-.030	.049	.160	-.024	.059	-.059	.121
Attica	.090	-.001	.015	-.030	.039	.145	-.010	.054	-.065	.095
Peloponnese	.085	.004	.010	-.015	.014	.121	-.015	.041	-.041	.079
Northern Aegean	.080	-.001	.019	-.040	.029	.114	-.014	.055	-.064	.106
Southern Aegean	.105	-.015	.049	-.075	.114	.140	-.004	.042	-.069	.100
Crete	.071	-.001	.022	-.040	.059	.135	-.006	.050	-.075	.094
Greece	.096	.004	.012	-.026	.024	.146	-.016	.052	-.056	.094

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: Permanent unemployment refers to the period-specific average unemployment rate for each region. Transitory unemployment refers to the time-specific deviations from the permanent unemployment rates.

Table 2: The impact of (ln) regional unemployment rates on (ln) pay measures in Greece (Pooled cross-sections, QLFS)

Dependent variable:	Monthly salary		Hourly wage	
Specifications	Nominal	Real	Nominal	Real
Panel A: 2003q1-2008q4				
Benchmark model	-.131^a	-.011	-.120^a	-.001
	(.028)	(.011)	(.029)	(.012)
	[.384]	[.383]	[.472]	[.475]
Plus time dummies	-.048^a	-.048^a	-.023^b	-.023^b
	(.011)	(.011)	(.010)	(.010)
	[.399]	[.386]	[.488]	[.477]
Plus time and region dummies	-.012	-.010	.004	.006
	(.007)	(.008)	(.007)	(.008)
	[.403]	[.389]	[.489]	[.479]
Observations	334,588		334,265	
Panel B: 2009q1-2012q2				
Benchmark model	-.059^a	-.148^a	-.038^a	-.127^a
	(.011)	(.010)	(.010)	(.010)
	[.449]	[.454]	[.517]	[.519]
Plus time dummies	-.057^a	-.057^a	-.026	-.026
	(.021)	(.020)	(.022)	(.021)
	[.450]	[.456]	[.518]	[.521]
Plus time and region dummies	-.003	-.004	.005	.004
	(.016)	(.016)	(.015)	(.015)
	[.455]	[.461]	[.522]	[.524]
Observations	157,920		157,650	

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: Weighted OLS regressions. All specifications include controls for gender, years of education, a quadratic for age, a dummy indicator for foreign-born workers, occupational and industry dummies, a dummy indicator if the individuals works in private sector and the corresponding hours of work when the dependent variable is other than the hourly wage rate. Regional unemployment refer to the contemporaneous unemployment rates and have been calculated at NUTS-II regional classification, corresponding to 13 administrative regions. Monthly salary refers to the net monthly earnings including regular additional payments. For the period 2003q1-2008q4 the QLFS questionnaire included 8 income bands while the for the period 2009q1-2012q1 the corresponding bands were 10. In both cases our monthly pay measure contains the mid-point of each income band. For real values the CPI of 2005q1 was used. Hourly wage is derived by dividing monthly salary by the usual weekly hours of work for 4.2 weeks per month.
^{a}, ^{b} and ^{c} denote statistical significance at the 1%, 5% and 10% levels, respectively. Standard errors in parentheses are corrected for clustering at the year-quarter-region level. R-squared values in brackets.

Table 3: Static and dynamic wage curves in Greece (QLFS longitudinal sample, 2007q1-2008q4, FE estimates)

Dependent variable:	Monthly salary (ln)		Hourly wage (ln)	
Model specifications	Nominal	Real	Nominal	Real
Static wage curve				
Regional unemployment(ln)	-.0006	-.0006	.0006	.0006
	(.0007)	(.0007)	(.0015)	(.0015)
Dynamic wage curve				
Regional unemployment(ln)	-.0001	-.0001	.0001	.0001
	(.0001)	(.0001)	(.0010)	(.0010)
Lagged dependent variable	.370[a]	.370[a]	.287[a]	.287[a]
	(.044)	(.044)	(.039)	(.039)

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: All estimates are weighted using fixed weights at individual level computed by averaging quarter-specific individual weights. All specifications include controls for gender, years of education, a quadratic for age, a dummy indicator for foreign-born workers, occupational and industry dummies, a dummy indicator if the individuals works in private sector and the corresponding hours of work when the dependent variable is other than the hourly wage rate. Regional unemployment refer to the contemporaneous unemployment rates and have been calculated at NUTS-II regional classification, corresponding to 13 administrative regions. Monthly salary refers to the net monthly earnings including regular additional payments. For the period 2003q1-2008q4 the QLFS questionnaire included 8 income bands while the for the period 2009q1-2012q1 the corresponding bands were 10. In both cases our monthly pay measure contains the mid-point of each income band. For real values the CPI of 2005q1 was used. Hourly wage is derived by dividing monthly salary by the usual weekly hours of work for 4.2 weeks per month.
[a], [b] and [c] denote statistical significance at the 1%, 5% and 10%, respectively. Standard errors in parentheses are corrected for clustering at year-quarter-region level.

Table 4: The impact of (ln) regional unemployment rates on (ln) pay in Greece (SES pooled cross-sections, 2002 & 2006)

Dependent variable:	Annual pay			Monthly salary			Hourly wage		
Specifications	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
Benchmark model	-.198[a]	-.191[a]	.142	-.100[a]	-.097[a]	.003	-.064[a]	-.062[a]	.037
	(.051)	(.048)	(.100)	(.023)	(.023)	(.041)	(.023)	(.023)	(.042)
Bargaining regime	-	✓	✓	-	✓	✓	-	✓	✓
Regional fixed effects	-	-	✓	-	-	✓	-	-	✓
R-squared	.573	.574	.576	.632	.634	.638	.593	.594	.598
Observations		96,387			96,389			96,389	

Source: Structure of Earnings Survey (SES) 2002 & 2006, Hellenic Statistical Authority (EL.STAT).

Notes: Weighted OLS regressions. All specifications include controls for gender, level of educational attainment, quadratic terms for age and tenure with the current employer, occupational and industry dummies, a dummy indicating whether the individual is a private sector worker as well as a time fixed effect. Contemporaneous regional unemployment rates and have been calculated at NUTS-II regional classification, corresponding to 13 administrative regions. The hourly wage rate has been constructed by dividing monthly salary with the usual weekly hours of work for 4.2 weeks per month.

[a], [b] and [c] denote statistical significance at the 1, 5 and 10 percent, respectively. Standard errors corrected for clustering by firm in parentheses.

Table 5: The wage curve under different levels of collective bargaining in Greece (SES pooled cross-sections, 2002 & 2006)

Dependent variable:		Annual pay	Monthly salary	Hourly wage
Bargaining regime	Obs.	[1]	[2]	[3]
National level	32,921	.049	-.068	-.025
		(.139)	(.073)	(.068)
		[.579]	[.627]	[.619]
Sectoral level	48,744	.120	.084	.124
		(.148)	(.081)	(.080)
		[.568]	[.622]	[.577]
Firm level	9,722	.210	.143	.255
		(.246)	(.107)	(.183)
		[.564]	[.686]	[.613]

Source: Structure of Earnings Survey (SES) 2002 & 2006, Hellenic Statistical Authority (EL.STAT).

Notes: Weighted OLS regressions. All specifications include controls for gender, level of educational attainment, quadratic terms for age and tenure with the current employer, occupational and industry dummies, a dummy indicating whether the individual is a private sector worker as well as a time fixed effect. Contemporaneous regional unemployment rates and have been calculated at NUTS-II regional classification, corresponding to 13 administrative regions. The hourly wage rate has been constructed by dividing monthly salary with the usual weekly hours of work for 4.2 weeks per month.

^{a}, ^{b} and ^{c} denote statistical significance at the 1, 5 and 10 percent, respectively. Standard errors corrected for clustering by firm in parentheses.

Table 6: The effect of (ln) regional unemployment rates on mean (ln) pay rates, region-year-quarter averages, FE estimates

Dependent variable:	Hourly wage				Monthly salary			
Independent variables	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]
Panel A: $2003q1 - 2008q4$								
Regional unemployment(ln)	-.051	-.023	-.008	-.001	-.069	-.024	-.012	-.003
	(.056)	(.014)	(.006)	(.012)	(.057)	(.017)	(.007)	(.011)
Lagged dependent variable	-	-	.875[a]	.581[a]	-	-	.856[a]	.549[a]
			(.054)	(.045)			(.042)	(.037)
Regional fixed effects	-	✓	-	✓	-	✓	-	✓
R-squared	.162	.760	.843	.880	.220	.787	.850	.884
Observations	312		234		312		234	
Panel B: $2009q1 - 2012q1$								
Regional unemployment(ln)	-.010	.017	-.026	-.047[b]	.012	.045	-.002	.001
	(.028)	(.013)	(.017)	(.021)	(.039)	(.023)	(.030)	(.049)
Lagged dependent variable	-	-	.075[a]	-.569[a]	-	-	.796[a]	.418[a]
			(.045)	(.092)			(.084)	(.153)
Regional dummies	-	✓	-	✓	-	✓	-	✓
R-squared	.114	.499	.630	.718	.075	.596	.552	.668
Observations	169		117		169		117	

Source: Quarterly Labour Force Survey (QLFS), Hellenic Statistical Authority (EL.STAT).
Notes: The dependent variable is the logarithm of the mean residuals from the region-year-quarter specific OLS wage equation regressions. White heteroskedasticity corrected standard errors in parentheses. All specifications include controls for gender, years of education, a quadratic for age, a dummy indicator for foreign-born workers, occupational and industry dummies and a dummy indicator if the individuals works in private sector. Regional unemployment rates have been calculated for NUTS-II regions. Monthly salary refers to Net Income from work (including regular additional payments). Real values have been calculated using the quartely CPI (2005q1=100). The hourly wage rate has been constructed by dividing monthly salary with the usual weekly hours of work for 4.2 weeks per month.
[a], [b] and [c] denote statistical significance at the 1%, 5% and 10% levels respectively.

Table 7: The impact of (ln) regional unemployment rates on (ln) pay in Greece (SES pooled cross-sections, 2002 & 2006)

Dependent variable:	Annual pay			Monthly salary			Hourly wage		
Specifications	[1]	[2]	[3]	[1]	[2]	[3]	[1]	[2]	[3]
Benchmark model	-.048	-.039	-.005	-.113^{c}	-.119^{b}	-.115	-.041	-.040	-.022
	(.130)	(.129)	(.175)	(.063)	(.054)	(.077)	(.046)	(.045)	(.075)
Bargaining regime	-	✓	✓	-	✓	✓	-	✓	✓
Regional fixed effects	-	-	✓	-	-	✓	-	-	✓
R-squared	.338	.340	.351	.378	.382	.391	.457	.460	.466
Observations		5,982			5,981			5,981	

Source: Structure of Earnings Survey (SES) 2002 & 2006, Hellenic Statistical Authority (EL.STAT).

Notes: All specifications include mean values at the firm level for gender, level of educational attainment, age, tenure with the current employer, occupational shares and industry dummies, a dummy indicating whether the individual is a private sector worker as well as a time fixed effect. Contemporaneous regional unemployment rates and have been calculated at NUTS-II regional classification, corresponding to 13 administrative regions. The hourly wage rate has been constructed by dividing monthly salary with the usual weekly hours of work for 4.2 weeks per month. ^{a}, ^{b} and ^{c} denote statistical significance at the 1, 5 and 10 percent, respectively. Standard errors corrected for clustering by firm in parentheses.