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# Public-private wage duality during the Greek crisis

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## Abstract

During the recent crisis, Greece experienced a severe contraction and rapid transformation in its labour relations and pay-setting system in both the private and public sectors. Although the quantity (employment) adjustments that followed have been well documented, the changes that were triggered in the wage structures of the two sectors remain largely unexplored. In this paper we examine these changes using Greek Labour Force Survey micro-data. We find a differential adjustment across sectors in terms of magnitude, timing, and structure. Despite general perceptions, adjustment in public sector wages has been slow and limited, with pre-crisis premia persisting throughout the period. Instead, the private sector recorded substantial adjustment, changing noticeably its valuation of worker and job characteristics and emerging from the crisis with a structure of returns that rewards more intensively marketable skills. This may be an important feature in the prospective recovery of the Greek economy.

**JEL Codes:** J31, J45, J58, C31, C34, H12

## 1. Introduction

Since the onset of its debt crisis, Greece has battled a deep recession with an array of measures that affected the private and public sector differentially. On casual observation, it may appear that most of the employment adjustment came from the private sector while wage adjustment concerned mainly public sector workers. In reality, however, wage adjustment in the private sector has been sizeable – not only due to the mounting unemployment but also due to radical

labour market reforms there, which involved a drastic cut in minimum wages and the full decentralisation of wage bargaining.

The public sector wage cuts, implemented mainly in the early parts of the crisis, were meant to address the dual objective of supporting the government's fiscal consolidation programme and rationalizing pay conditions in the sector. In turn, labour market interventions in the private sector came somewhat later and aimed at restoring international competitiveness and facilitating the adjustment of relative prices in the private economy. The pervasiveness of measures in both sectors is believed to have changed radically the landscape in the two segments of the labour market. Evidence on this, with regard to wage and employment outcomes, is by now well documented. For example, Tzannatos and Monogios (2013) report falls in public sector earnings of 22-40% (depending on method of calculation); while the OECD reports a cumulative drop in private sector real wages by some 13% (OECD, 2014). According to official data sources (see our discussion in section 2.3), the number of wage earners in the private sector declined by around half a million, while employment in the public sector declined by around half that number (albeit not dissimilarly in percentage terms). With regard to unemployment, Daouli et al (2014) show that the headline increase, from 8% in 2008 to 27% in 2013, was underpinned by a sudden increase in job-separations (with annual transitions from employment to unemployment rising from less than 2% in 2008 to over 5% already in 2011), while the job-finding rate of the unemployed collapsed more strongly somewhat belatedly (mainly in 2011-2012), from around 25% to below 10%.

Despite this evidence on aggregate labour market outcomes, very little is actually known with regard to changes in wage structures in the economy. In this paper we set out to examine these, as yet unexplored, changes. One goal is to answer the wider question of “who lost the most” – i.e., which of the two sectors was most severely affected (and how). Studies on other European countries have shown a variable range of changes in public sector wage premia with the crisis. Nikolic et al (2014) show that between 2008-2011 the premium increased in Croatia by almost 13%, while in neighbouring Serbia it declined by 11.2% in the same period. In contrast, evidence from Romania suggests a drastic change, with the premium falling from 40% to -15%. In some cases, wage cuts were such that they typically increased within-sector inequality, affecting mostly women and the low-paid, e.g. in Hungary this affected more than 50% of public sector

employees below secondary education level (see the collection of studies in Vaughan-Whitehead, 2013). In other cases the decline in the public sector premium was associated with increased compression in the distribution of public sector pay (e.g., as reported by Hospido and Moral-Benito, 2014, for Spain, where the public sector premium fell between 2008 and 2012 by some 25%). In Greece, pre-crisis public sector premia had been known to be large and persistent (Papapetrou, 2006; Giordano et al, 2011; Christofides and Michael, 2013; Christopoulou and Monastiriotis, 2014). It is thus important, given the size of the crisis in Greece and the pervasiveness of the reform measures that were followed, to examine how the public sector premium evolved during the crisis.

A second and more pertinent goal is to examine changes in the way in which each sector values and rewards different labour market characteristics – in other words, the relative and absolute changes in the premia and penalties characterizing the wage structures of the two sectors. This fills an important gap not only in terms of the available literature but also in policy terms – because it was exactly the objective to ‘rationalize’ these wage structures that motivated most of the labour market reforms during the period. Our analysis of these wage structure changes thus informs the discussion about the nature and effects of the labour market reforms in the country, during the crisis and prospectively.

Our analysis covers the period from 2009, a year that marked the beginning of the crisis but saw no wage cuts or labour market reforms, until 2013, the year that followed the implementation of the bulk of labour market reforms and marked the height of the crisis. We document differences in wage dynamics across the public and private sectors both at the observational level and adjusting for individual and job characteristics. To explore the driving forces of these differences, we perform endogenous switching wage regressions which control for sector selection; we compare changes in the estimated returns to characteristics across sectors; and we inform our discussion by decomposing the wage changes to their detailed constituent components (price, composition, and selection effects).

We find that the Greek experience differed from that in other European countries. Compared to private sector wages, public wages were less impacted during the Greek crisis. In result, public wage premia increased, especially for the low-paid workers. Both sectors registered substantially

negative horizontal price effects. However, wage adjustment in the private sector happened faster and was accompanied by substantial counteracting changes in the structure of returns both for individual characteristics (e.g., education) and on the aggregate (for worker and job characteristics at large). In contrast, wage changes in the public sector took longer to take effect and with modest changes in the valuation of worker and job characteristics.

This differential adjustment of wages and employment (relative to the private sector as well as vis-à-vis the experience of other countries), could be in part at least attributed to the known institutional rigidities and legislative barriers of the Greek state as well as the strong union power and evidence of political patronage in the public sector. However, it would be rather imprudent to attribute this solely to union power or institutional rigidities. As the political science literature has demonstrated, adjustment in the public sector was significantly hindered by the resistance of successive governments to fully and wholeheartedly implement the reforms they were committing to (see, inter alia, Featherstone, 2011; Zahariadis, 2014). This is perhaps a more important factor, also explaining why adjustment in Greece has been so costly in comparison to other bailout countries (Monastiriotis, 2014). But it should also be noted that the rise in public premia is not unusual when the private sector is exposed to severe market and regulatory adjustment. For example, Bender and Heywood (2012) have recently shown that public wage premia increased in the USA after the recession of the early 1980s, as this coincided with a differential transformation in labour relations in the private and public sectors during that period (Katz, 2013). Although it goes beyond the purpose of our paper to empirically identify the causal factors underpinning our results, in our view it is the combination of the aforementioned factors – the institutional framework of the labour market, the political context and will, and the extent of the recession in the private economy – that account for the patterns unveiled by our analysis.

## **2. Background**

### **2.1. A brief outline of the crisis**

For several years since Greece's entry into the euro-zone (in 2001), economic performance in the country was on the surface impressive, boasting high growth rates, decreasing inflation, and upgrades in infrastructure. Under the surface, several problems persisted, including widespread

clientalism, corruption, a weak and uncompetitive industry, and market rigidities (Mitsopoulos and Pelagidis, 2011). The accumulated effects of these problems materialized in 2009 in the form of a 15.8% budget deficit and a subsequent climb in borrowing rates exceeding 10%. Isolated from the markets and unable to devalue its currency, Greece negotiated an emergency bail-out agreement with its euro-zone partners and the IMF in May 2010, which was accompanied by strict conditionality over an extensive programme of structural reforms and fiscal consolidation measures. The bailout package (to the tune of €110 billion) allowed Greece to achieve an unprecedented fiscal adjustment, with the country's fiscal deficit declining by almost 10 percentage points within a year. This fiscal adjustment, achieved through significant tax hikes and cuts in public wages and pensions, created a deep recession to the Greek economy, which started declining with rates over 6% per annum (Monastiriotis et al., 2013). Delays and problems of implementation of structural reforms only acted to intensify the recessionary effect of fiscal consolidation, which was further exacerbated by the political instability that ensued, pushing Greece to a downward austerity-recession spiral well beyond what was observed in other bailout-recipient countries in the Eurozone (Monastiriotis, 2014).

Amidst continuing fiscal-economic problems and social-political turmoil, Greece received a second bailout package in early 2012 (worth €130 billion), which included further conditionality for the implementation of structural reforms, increasingly going beyond the realm of public administration and fiscal governance and aiming instead at restoring economic competitiveness through internal devaluation and the liberalisation of labour and product markets.<sup>1</sup> In the labour market this included a drastic reduction in the minimum wage and full decentralisation of wage bargaining.

Despite the continuing recession and mounting unemployment, Greece managed to record its first budget surplus at the end of 2013 and small positive growth rates in 2014. But the prolonged recession had transformed the debt crisis into a humanitarian one (e.g. Kentikelenis et al., 2011), so that these developments had little effect on public sentiment. In a snap election in January 2015, the 'pro-austerity' parties in government lost power to a coalition of anti-austerity parties led by left-wing SYRIZA, who had promised to reverse the bulk of the measures implemented

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<sup>1</sup> The full text of the 'memoranda of understanding' that accompanied the two bailout agreements can be found at: <http://crisisobs.gr/en/repository/?ct=98&st=103>.

since 2009, including the aforementioned reforms in the labour market. Subsequent negotiations with the country's creditors have softened the new government's stance, but economic and political uncertainty has remained and questions of a 'Grexit' have resurfaced. By result, it appears now that many of the measures implemented in the labour market over the last five years will remain in place for the foreseeable future.

## 2.2. Wage reforms in the public and private sectors

Prior to the crisis, wage determination in Greece was characterised by a combination of centralised bargaining and various forms of sectoral and occupational fragmentation. In the private sector, bargaining for minimum wages (for basic unskilled occupations) took place at the national level, while other salary categories were bargained separately (over and above the national bargain) by sectoral or occupational unions. Although these unions formally only represented employees in private firms with over 20 employees, coverage extended de facto to all employees in the sector/occupation (Tsarouhas, 2008; Zambarloukou, 2006). In the public sector in turn, pay differed among job contracts covered by private or public employment law. The former category was governed by the same rules as the private sector (and the majority had union representation), while the latter was represented by a thick net of, often job-specific, workers' associations (all falling under the umbrella of the Chief Directorate of Public Employee Associations) but only at non-wage negotiations; the government unilaterally set the pay-scales for these jobs by law.

This fragmentation, along with a tradition of clientelism and pork-barrel politics in the country (Lavdas, 2005), allowed individual public sector unions to pursue particularistic privileges, including non-competitive pay-raises (through the implementation of so-called "special pay scales" and the provision of different bonuses and pay-increments even to similar occupations across different Ministries), which resulted in a rather disparate web of non-uniform pay-scales and fragmented pay determination systems (GMIA, 2011). In result, public sector employees with identical skills and job content often earned very different wages across different segments of the public sector – and almost invariably significantly higher wages than their private sector counterparts even in similar sectors and occupations (Christopoulou and Monastiriotes, 2014). A manifestation of this can be found in the evolution of wages and productivity, prior to the crisis,

in sectors with strong public employment presence vis-à-vis the rest of the economy. As is shown in Figure 1, sectors associated to public employment had throughout the period lower productivity (measured in GDP per hour worked) and higher wages (measured in terms of total compensation per hour worked), while the gap had been widening in the years leading to the crisis.

These conditions were abruptly interrupted with the beginning of the Greek crisis. Under pressure to reduce its public expenditure, in 2010 the Greek state unilaterally adopted an array of measures that have impinged on all areas of policy, including in the labour market (see Tzannatos and Monogios, 2013; Ioannou, 2013). With a series of laws voted in that year, the government introduced numerous public pay cuts<sup>2</sup> which had an average effect of about 12% (NBG, 2010). As the crisis escalated in fall 2011, and amid a massive strike wave, the parliament passed another law to further rationalize the pay-scales.<sup>3</sup> This second wave of cuts was meant to address the wage disparity within the public sector discussed above. For jobs in the narrow public sector paid according to general pay-scales, the 2011 law evened out the basic pay and its evolution with seniority. Although the basic pay was now set somewhat higher relative to prior levels, most benefits were abolished resulting in an overall reduction in total earnings. These new wage arrangements also became the model for private law contracts in public sector utilities and organizations, which were removed from the jurisdiction of collective bargaining. However, they did not apply for civil servants paid under special pay-scales, or for public law contracts in utilities and entities. These job categories were the object of the third wave of reforms that took place in 2012 as part of the agreement for the second bail-out package<sup>4</sup>. In that year, the government extended the implementation of the unified remuneration system to public sector utilities, and rationalized the wages of civil-servants based on equivalent criteria, though sustaining the distinction between unified and special pay-scales and the associated premium.

Starting with the 2011 law, the government also reformed wages and industrial relations in the private sector. The law implemented a radical decentralisation of wage bargaining by annulling the ‘principle of the most favourable provision’, according to which enterprise-level bargaining could only deviate upwards from the national agreement (and was thus associated with wage

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<sup>2</sup> Laws: N.3833/2010 (ΦΕΚ Α40), N.3845/2010 (ΦΕΚ Α65), N.3899/2010 (ΦΕΚ Α212).

<sup>3</sup> Law N.4024/2011 (ΦΕΚ Α226).

<sup>4</sup> Law: N.4093/2012 (ΦΕΚ Α222).



premia – Daouli et al., 2013). Also radical was the reduction in the monthly minimum wage that followed in 2012<sup>5</sup>. For those above the age of 24, the reduction was from 751 to 586 euros (22%) and for those under the age of 25 the reduction was from 751 to 510 euros (32%).

### 2.3. Employment adjustments during the crisis

As has been already noted, and well documented in public discussions, the combined effect of the crisis and of the austerity measures has been a substantial increase in unemployment, from 8% in 2008 to 27% in late 2013. Most of this increase came from job-losses in the private sector and a collapse of new hires (Daouli et al, 2014), which obviously affected new labour market entrants most – thus contributing to the record rise in youth unemployment to 60% in January 2013. By consequence, a wave of out-migration started taking effect, raising also concerns about a possible brain-drain: according to Eurostat data, emigration increased by a staggering 54% during 2010-2012 (from 119,985 to 154,435), with over half of the emigrants in the 20-39 age group. This trend, especially for youth migration, continued also in 2013/14 – a factor which presumably contributed to the sharp decline in youth unemployment rates more recently (down to 50% in late 2014 according to Eurostat).

In contrast, job-losses in the public sector came mainly from the non-renewal of temporary contracts and early retirement (Zahariadis, 2014), for two reasons. On the ‘supply’ side, reforms in the pension system represented a net loss of future income for big groups of near-retirement public sector employees (Gupta 2012, Symeonidis 2013). On the ‘demand’ side, legal constraints<sup>6</sup> and unwilling governments gridlocked public sector downsizing despite pressures from the country’s creditors. Thus, although the Greek government committed in 2012 to a cutback of at least 150 thousand permanent jobs (initially by 2015), actual dismissals throughout the period were measured in the low thousands.

We illustrate the overall effect of these two developments, in the public and private sectors, in Figure 2. Panel A shows that employment loss in the private sector has been almost twice as high

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<sup>5</sup> This was included in the same law (N.4093/2012) which rationalized wages of the civil-servants.

<sup>6</sup> Article 103 of the Constitution states that a public employee cannot be dismissed from a position established by law – which is the case for all permanent public sector jobs – unless the position is abolished. In 2012 the government legislated job abolitions but the implementation of this was politically protracted and in cases overturned by the Constitutional Court (Zahariadis, 2014). The issue was meant to be dealt with by a constitutional reform planned for 2016, which has now been taken off the agenda.

as that in the public sector – with employment in the private sector nearing 1.5 million employees by 2013.<sup>7</sup> It is worth noting that the decline in employment in the private sector intensified in the 2010-2012 period, before most of the wage and labour reforms in this sector took place, and it subsided somewhat thereafter – with the possible implication that some of these measures may have contributed to reducing the employment cost of the crisis.<sup>8</sup> A similar conclusion can be drawn from the evolution of unemployment (for both age groups), as shown in panel B.

Quite naturally, these developments have altered fundamentally the pay and valuation conditions in the Greek labour market, in both absolute (i.e., declining wages) and relative terms (relative valuation of characteristics and sorting within and across sectors). In the remainder of the paper we focus exclusively on these wage adjustments, keeping in the background the quantity changes that may have triggered, or resulted from, them.

### 3. Empirical strategy

#### 3.1. Method

We start by describing public sector wage premia both at the observational level and from Mincer wage regressions which control for worker and job characteristics. We report these raw and net premia at the mean and by decile of the wage distribution. We then account for the possible endogeneity between wages and the choice of sector by estimating an endogenous switching regression model, as developed by Van der Gaag and Vijverberg (1988). This model comprises two Mincer wage equations (one for each sector) and a selection equation sorting individuals across sectors, with jointly dependent errors<sup>9</sup>:

$$\ln W_{it} = \beta X_{it} + \varepsilon_{it} \quad (1)$$

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<sup>7</sup> As we discuss later, a similar pattern is observed with regard to hours of work, which declined sizeably in the private sector but actually increased, marginally, in the public sector.

<sup>8</sup> Evidence for this, in relation to changes in the minimum wage legislation, is provided by Yannelis (2014).

<sup>9</sup> This is essentially a two-stage procedure, analogous to the Heckman model. Our estimation is by a Full Information Maximum Likelihood (FIML) method, which fits the binary and continuous regressions simultaneously and makes the appropriate error adjustments. For details see Lokshin and Sajaia (2004).

$$S_{it} = \gamma_1(\ln W_{it, publ} - \ln W_{it, priv}) + \gamma_2 Z_{it} + u_{it} \quad (2)$$

In (1),  $W_{it}$  is the monthly wage of individual  $i$  who is interviewed in year  $t$ ,  $X$  is a vector of control variables,  $\beta$  the respective returns, and  $\varepsilon$  is a random error. In (2),  $S=1$  if person  $i$  is in the public sector,  $(\ln W_{it, publ} - \ln W_{it, priv})$  denotes the public-private wage differential,  $Z$  is a vector of instruments that influence the choice of sector, and  $u$  is the error term. We report estimates of the above model separately for different calendar years.

With the derived estimates, we subject the mean wage change from year  $t_0$  to year  $t_1$  to the classic Blinder-Oaxaca decomposition technique, which separates endowment and price effects as follows:

$$\ln \bar{W}_{it_1} - \ln \bar{W}_{it_0} = (\bar{X}_{it_1} - \bar{X}_{it_0})\beta_{t_1} + (\beta_{t_1} - \beta_{t_0})\bar{X}_{it_0} \quad (3)$$

The first term in the right-hand side of (3) captures differences in worker characteristics valued at  $t_1$  prices (i.e. it gives the endowment effect that would prevail if there were no differences in the structure of returns between the two calendar years, so that  $\beta_{t_1} = \beta_{t_0}$ ), and the second term captures differences in the price of these characteristics expressed in  $t_0$  mean values. To obtain a detailed narrative of wage dynamics, we conduct the above decomposition for alternative time periods (2009-2013; 2009-2011; and 2011-2013) and by separating the characteristics of workers (education, experience<sup>10</sup>, marital status, whether has child/ren, foreign-born) from those of employers/jobs (sector, occupation, region, part-time contract, temporary contract, small firm, hours of work). Specifically, we identify the part of wage-changes that is due to (i) compositional changes in worker characteristics; (ii) compositional changes in job characteristics; (iii) changes in the returns to worker characteristics; (iv) changes in the returns to job characteristics; and (v) changes in the constant (which we interpret to reflect wage changes due to horizontal shifts in ‘baseline’ wages). Further, we compute a separate ‘selection’ effect which gives the part of the overall wage change that is accounted for by the way in which different employees select into different sectors (as captured in our selection equation).

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<sup>10</sup> Although in our data we separately observe job tenure from general labour market experience, we chose not to include the former in our regressions due to the well-known issue of identifiability (Altonji and Williams 2005). Our results remain robust when we include tenure and tenure squared (available upon request).

Finally, we calculate the equivalent detailed decomposition at different deciles of the wage distribution, though we exclude the selection effect since econometric techniques for validly accounting for sample selection in the context of quantile regression are at early stages of development (e.g. Arellano and Bonhomme 2010; Huber and Melly 2011). To do this, we employ the recentered influence function (RIF) approach proposed by Firpo et al. (2009), which implements a transformation of the log wage so that its mean equals the quantile of interest. Using this function and assuming a linear relationship with the worker and job characteristics, we can generalize the Oaxaca decomposition of the mean gap to quantiles. However this linearity assumption is restrictive and potentially involves out-of-sample predictions. To address this limitation we employ the DiNardo et al. (1996) weighting approach which equalizes the empirical distributions of characteristics between the years compared.

Specifically, our decomposition at the  $j$ -quantile ( $q_{tj}$ ) of log wages relies on the following regression:

$$\text{RIF}(\ln W_{it}, q_{tj}) = \beta(q_{tj})X_{it} + v_{it}, \quad (4)$$

where  $\text{RIF}(\ln W_{it}, q_{tj}) = q_{tj} + [j - d_j] / f_{\ln W}(q_{tj})$ ,  $f_{\ln W}(q_{tj})$  is the density function of  $\ln W_{it}$  computed at quantile  $q_{tj}$ , and  $d_j$  is a dummy variable that equals one if  $\ln W_{it} \leq q_{tj}$  and zero otherwise. For  $t = t_0$  we estimate (4) as a linear (OLS) regression, but for  $t = t_1$  we estimate a weighted least squares (WLS) specification, with the weights given by:

$$w(X) = [\Pr(t = t_0 | X) \Pr(t = t_1)] / [\Pr(t = t_1 | X) \Pr(t = t_0)], \quad (5)$$

In (5),  $\Pr(t = t_1 | X)$  is the conditional probability of an individual being interviewed in  $t_1$ , which we derive by assuming a logit model. It then becomes straightforward to decompose the wage difference by decile into the Oaxaca-equivalent composition and price effects, as follows:

$$q_{t_1j} - q_{t_0j} = [(\beta^{OLS}(q_{t_1j})\bar{X}_{it_1} - \beta^{WLS}(q_{t_1j})\bar{X}_{it_0})] + [(\beta^{WLS}(q_{t_1j}) - \beta^{OLS}(q_{t_0j}))\bar{X}_{it_0}] \quad (6)$$

Before we proceed, a note on unobserved sample selectivity is in order. Given that employment rates have been declining rapidly over the study period, the sample we analyse each year may be increasingly selected on the basis of characteristics for which we do not control in our

regressions. For example, the composition of our sample may be changing with respect to previous labour force status (e.g. past exposure to unemployment or inactivity), or soft/intangible skills (e.g. motivation, trustworthiness, entrepreneurialism). Because databases that collect wage data rarely include this type of information, selectivity on unobservables is a common problem when one analyses wage dynamics. Although we recognize the problem, we expect that it poses few challenges in our analysis. First, as noted already, the three main forces that have affected the employment composition during the Greek crisis is the progressive exclusion of the young from the labour market (since new hires have essentially frozen), retirement, and brain drain. These entail sample selectivity with respect to age and education, both of which we observe in our data (see also Monastiriotis and Martelli, 2013, for direct evidence on this). Second, research has shown that soft skills that are rewarded in the labour market are highly (though imperfectly) correlated with educational outcomes (Lundberg 2013). Such evidence allows confidence in our estimation results.

### 3.2. Data and descriptive patterns

In our empirical analysis we use individual-level data from the spring wave of the Greek Labour Force Survey (LFS), for the years 2009-2013. This is a quarterly household survey covering information on a range of personal, household and labour market characteristics, including regular monthly wages (reported in wage bundles which typically have a 100 euro range)<sup>11</sup>. Each wave contains approximately 30,000 working-age individuals, of which around two-fifths are wage earners – though this share drops as the crisis deepens.

The LFS data manifest clearly the significant differences between the public and private sectors both statically and dynamically (Table 1). Relative to the private sector, the public sector consistently employs more women and more workers who are educated, experienced, natives, and married with children; and has lower rates of irregular (especially part-time) employment. During the crisis the share of the private sector in total employment decreased by 2.2 percentage points. Average years of schooling increased in both sectors, but average experience increased

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<sup>11</sup>Because the bundles differ slightly across waves, we have harmonised them into eight comparable categories. Following common practice, we take the mean value of the bundles as a proxy for each individual's monthly wage. Although clearly imperfect, this is the only possible way to analyse wages in Greece and it has been shown by Christopoulou and Monastiriotis (2014) to produce robust estimates of Mincer equations when using alternative methods of estimation (OLS and interval regressions).

only in the private sector, reflecting the increasing job-finding difficulties for new labour market entrants and the soaring retirement ages. Part-time employment also increased substantially in this sector (but declined in the public sector); while the share of foreign-born declined. Average hours of work were higher in the private sector but have been constantly declining (with around 1.8 hours of weekly work lost between 2009 and 2013), while in the public sector average weekly hours actually increased. In contrast, nominal wages have declined in both sectors but have remained higher in the public sector throughout the period.<sup>12</sup>

In real terms (Figure 3A), private wages declined almost linearly from the beginning of the crisis, while public wages fell only faintly over 2009-2011, sharply over 2011-2012, and slightly further in 2013. In other words, public wages declined with a significant delay – at least considering the immense pressures applied to public finances during the period. As a result, the raw public-private sector wage differential (Figure 3B), which stood at 32.7% in 2009, rose between 2009 and 2011, declined notably in 2012, but recovered significantly – and rather surprisingly – in 2013 (reaching 33.8% in that year).<sup>13</sup> The equivalent differential in terms of hourly wages follows a similar pattern, but it is much larger in size due to the sectoral differences in hours of work.<sup>14</sup> Of course compositional changes have exerted an influence on these trends. Controlling for such changes through an OLS regression on the pooled sample gives a somewhat different picture.<sup>15</sup> The net differential appears to have risen from 8.8% in 2009 to 14.6% in 2011 but to have subsequently dropped in 2013, though remaining higher than in 2009 (at 9.3%).<sup>16</sup>

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<sup>12</sup> The rise of public nominal monthly wages in 2009-2011 may seem at odds with estimates of a significant cut in average wages during the period (e.g., NBG, 2010, estimated this at near 12%). Part of this disparity is explained by measurement, as our wage measure excludes annual bonuses. Another part is due to compositional changes of the public workforce: for example, a disproportionate outflow of temporary contract workers (which typically have lower wages) will tend to increase measured average wages despite the pay-cuts. We demonstrate this in Table A1 in the online Appendix, which compares our estimates with data from external sources and shows that in all cases (including our data) the wage bill falls monotonically throughout the crisis, even when our mean wage increases. This latter discrepancy concerns only our descriptive statistics, as our regression analysis controls for compositional changes.

<sup>13</sup> One may suspect that the hump-shaped pattern in public premia is driven by wages in the “wider” public sector which was subjected to fewer reforms and later on in the crisis. We show in Figure A1 in the online Appendix that, in fact, the pattern is most evident in the “narrow” public sector (i.e. public services) and in local government.

<sup>14</sup> See Figure A2 in the online Appendix.

<sup>15</sup> The full set of regression results is available in Table A2 in the online Appendix.

<sup>16</sup> Because our analysis does not take into account annual bonuses (for Christmas, Easter and paid holidays) which were significantly cut in the public sector (but not fully in the private sector), our results likely overestimate public sector premia. But given the largely horizontal nature of these bonuses (proportional to the monthly wage) this

The temporal evolution of public wage premia calculated at the mean may of course mask diverse patterns across the wage distribution. Thus, we next examine changes by wage decile, with the necessary forewarning that they may be noisy, since they derive from a wage variable that is reported in bundles. As Figure 4 shows, in the first half of the crisis private sector wages fell more or less uniformly across the wage distribution, though slightly more for the low-paid. In contrast, public wage changes in that period were unsystematic, and they were even positive at the 2<sup>nd</sup> and 6<sup>th</sup> deciles. Such wage hikes can be explained by the discontinuation of many temporary low-pay contracts in 2010 but, also, they may indicate that public sector administrators countered the early wage cuts by expediting internal promotion. In the second half of the crisis, private sector wages dropped dramatically at the lower tail of the distribution, reflecting the cut in minimum wages. All other workers saw smaller wage declines, though still higher than those in the earlier period, with those at the 8<sup>th</sup> decile affected the least. Given the unification of the pay-scales that was applied in the largest part of the public sector during that period, the corresponding public wage changes were also negative and larger than before, but now formed a clear W-pattern, affecting less those at the tails and at the median of the wage distribution.

These differential changes in sectoral wages across the distribution translate into differential patterns in public sector premia. We show this in Figure 5, where we plot net premia derived from quantile regressions on the pooled sample (full set of results available upon request). Comparing the light (2009) and dark (2013) solid lines, one can see small benefits for the low-paid and important losses for the high-paid in the public sector relative to their private sector counterparts. However, as with premia at the mean, changes over the full period conceal important changes across sub-periods. Over 2009-2011, driven by faster private wage adjustment, the net public premium increased substantially across the board, exceeding 20% for the low-paid. It was over 2011-2012, when the unified pay scales were applied, that the premium fell. In fact, in 2012, the premium is almost linearly decreasing across wage quantiles. Some of this fall was corrected in 2013.

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mostly affects our descriptive results: in principle, returns to sector-specific worker and job characteristics should be independent from non-regular annual bonuses.

## 4. Econometric analysis

### 4.1. Wage structures and sector-selection

Previous studies have shown that there is significant selection of workers between the public and private sectors in Greece. To account for selection, we follow the endogenous switching regression model and instrument the ‘choice’ of sector using an indicator of whether a worker has parents or a spouse employed in, or retired from, the public sector. Following Christopoulou and Monastiriotis (2014) and earlier studies cited therein, we hypothesise that this indicator (henceforth, ‘public history’) reflects both wider household preferences about the sector of employment and information/access advantages for public sector jobs.<sup>17</sup>

The results suggest that before the crisis selection related to ‘public history’ has been significant (Table 2). We estimate that having a household member employed in the public sector in 2009 was associated to a 43% higher probability of the individual being also employed in the public sector. Selection on this and correlated unobserved characteristics, however, did not affect wages for those individuals that obtained public-sector jobs (the ‘rho’ correlation coefficient is statistically insignificant). Instead, ‘public history’ translated to a wage penalty for those individuals who were ‘wrongly’ selected into the private sector: for them, we estimate a wage penalty in 2009 of 3% (‘lamda’ coefficient in the private-sector wage regression). Reading across columns, it is evident that this selection mechanism became weaker as the crisis progressed. In 2011 the influence of the ‘public history’ variable for an individual’s selection into the public sector had declined to 37.6%, showing that, indeed, this variable reflected to a certain extent an accessibility issue. The private-sector penalty associated to possession of characteristics that selected an individual into the public sector almost doubled over this period, in turn suggesting that this sector was intensifying its wage sorting in favour of employees who possessed more private-sector-like characteristics. This effect, however, declined and became statistically

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<sup>17</sup> As Table 1 shows, around 30% of public sector workers have ‘public history’, while the corresponding share for private sector workers is only 9%. Our identifying assumption is that public history affects sector selection but not sector-specific wages. Of course, it is plausible that it reflects unobserved characteristics common across family-members (e.g. non-cognitive skills) that do affect wages, irrespective of sector selection. However, our data are generally unresponsive of this hypothesis. In Table A3 in the online Appendix, we show that public history does not predict wages conditional on the control variables in all cases apart from year 2013 in the public sector (where we never find significant selection effects). For a discussion on the performance of this instrument relative to other candidate instruments, see Christopoulou and Monastiriotis (2014). For sector-specific wage regressions unadjusted for selection, see Table A4 in the online Appendix.



insignificant by 2013, perhaps reflecting that with the pervasive job losses in the private sector, even the possession of unobserved characteristics more akin to the private sector was not sufficient to generate a wage advantage there. Consistently, the selection influence associated to public history declined further in that period to 31%.

Among the other characteristics that contribute to sector-selection, a few present statistically significant changes which are worth discussing. The selection of women away from the public sector declined over time, as they were rapidly losing their jobs in the private sector, which traditionally protects men as the primary bread-winners. Likewise, the strong selection of non-natives away from the public sector halved by 2011, again because private-sector job losses hit disproportionately non-natives, but re-emerged in 2013 as private-sector job-losses became more pervasive affecting more horizontally the population, irrespective of ethnicity. In a similar fashion, both part-time contracts (initially more pervasive in the private sector) and temporary contracts (initially more pervasive in the public sector) first diminished in the public sector but eventually recovered. These patterns make sense, as part-time and temporary public sector jobs were amongst the first to be shed away, and as many private-sector jobs were switched to part-time or temporary status.

The estimates of the second-stage wage regressions are also interesting. First, the female wage penalty has been consistently higher in the private sector throughout the crisis. Over 2009-2011, this penalty increased in the private sector and decreased in the public sector and, thus, the female disadvantage in the private sector initially intensified. However, this change was fully restored by 2013. Further, the early stages of the crisis saw fast convergence in the returns to education in the two sectors, with the public sector advantage (of some 20%) literally disappearing by 2011. This equalisation of the returns to education remained in 2013, with returns increasing notably in both sectors (by over 40% in total), showing the elevated significance of education not only for job-finding but also for one's wage outcomes once employed. The experience premium also saw increases of similar magnitude. The sectoral differential in this premium, which was statistically indistinguishable from zero before the crisis, initially increased, as the returns to experience increased faster in the public sector. However, the private sector caught up with the public sector at the second half of the crisis.

With regard to household characteristics changes have been less dramatic. The premium associated with being married, which was statistically equal across sectors for the duration of the crisis, remained rather unchanged. The premium associated with having children, which was significant only in the private sector, declined in the latter phase of the crisis and became statistically insignificant there also. In contrast, there is a significant differentiation between the two sectors with regard to the foreign-born penalty. While up to 2011 both sectors equally penalized foreign workers, in 2013 the public sector seems to offer a foreign-born premium (at the almost implausible rate of 18.6%). This result reflects the significant compositional changes that took place in the sector with regard to non-native employment, presumably with the public sector maintaining in its ranks only the highest-skilled/top-paid among its non-native employees.<sup>18</sup>

Among the job characteristics, part-time and temporary contracts entailed sizeable wage penalties which were statistically higher in the public sector over the entire period. These penalties initially deepened but eventually recovered in all cases apart from the temping penalty in the private sector, which increased throughout (by a total of 35%). In turn, the small-firm penalty, after an initial increase in both sectors, fell to its original levels in the public sector but more than doubled in the private sector, clearly reflecting the deteriorating demand conditions in the country and the impact that this had, disproportionately, to small businesses. The overall effect of the fall in demand is also reflected in the evolution of the estimated intercepts (showing ‘baseline’ wages net of individual and job characteristics), with the disadvantage observed for the private sector growing from 4.7% in 2009 to 8.4% in 2011 and falling slightly to 6.1% in 2013, despite the fact that the public sector intercept also declined (by 7.2% over the entire period compared to 8.7% in the private sector).

Note that the decline in the estimated intercepts is notably lower than the decline in actual wages reported by official sources (and also recorded in our data as described in the previous section). This reaffirms our earlier conclusion that compositional and valuation changes have also been an important part of the story of labour market adjustment in Greece during the crisis. To examine these, we proceed with our decomposition analysis.

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<sup>18</sup> Note from Table 1 that the non-native share in the public sector had more than halved by 2013, representing just 0.5% of total employment in the sector.

## 4.2. Decomposition of wage changes

We begin with the decompositions at the mean of the wage distribution (Table 3). The results corroborate the earlier finding that the impact of selection, although observable, is not particularly sizeable. Selection amplified total wage adjustment in the public sector by a non-trivial 5.3% (0.0137 log-points), but in the private sector the effect was opposite and minimal (-1.7% or 0.0056 log-points). Interestingly, this effect is driven entirely by developments in the second phase of the crisis, as the effect of selection in the two sectors in the first phase of the crisis worked in the opposite direction.

Having net out the selection effects, we find that the observed downward wage adjustment is more than fully explained by changes in the price components. While in almost all cases the endowment effects moved in the opposite direction, they were nowhere near sufficient to counter-balance the substantial wage adjustment in the country. In the public sector, endowment effects worked against downward wage adjustment by a factor of 18.7% (0.0484 log-points); whereas in the private sector they were negligible (at 0.7% of the raw difference). As the detailed decomposition results show, the reason for this difference is that, while in the public sector compositional changes both in worker and job characteristics tended to push wages up, in the private sector these effects pushed in opposite directions, largely offsetting each other. Put differently, workforce quality improved with the crisis in both sectors, but job quality increased in the public sector and decreased in the private sector. Concerning the timing of these changes, the largest part of the compositional adjustment in the public sector took place early on in the crisis, which reflects again that this sector shed many temporary and part-time (i.e. low-skill and low-pay) jobs at that time. In the private sector, the deterioration in job quality happened immediately as soon as the crisis started and continued apace thereafter, but improvements in worker quality were more pronounced in the later phase.

The movement of the price components was similarly non-uniform, despite the overall downward influence (by 113% and 103% in the two sectors, respectively). In the public sector, returns to worker characteristics pushed wages up while returns to job characteristics worked in the opposite direction. In absolute value, these effects were similar (corresponding to 30% and 28% of the raw wage change, respectively) and thus cancelled out. In contrast, in the private

sector, the returns to both worker and job characteristics worked to increase wages. Favourable worker characteristics were valued higher after the crisis (in *ceteris paribus* terms), so that they counteracted wage declines by a very large 60.8%, while the corresponding effect of job characteristics was even higher, at 66.5% of the raw wage change. In both cases, the main component driving the downward movement of wages has been the price effect corresponding to the constant, which gives a measure of the shock experienced in each sector. The effect is large in the public sector (at -0.2997 it represents a ‘baseline’ adjustment of 115.5% of the total raw change) but it is really devastating in the private sector (-0.7406 or 230% of the corresponding raw change), thus showing how the negative demand shock, but also adjustment to it, was more sizeable in that sector.

When comparing sub-periods we find that this private sector shock increased as the crisis deepened and as wage-setting was liberalised, while the countervailing effects remained on average roughly unchanged. The only difference is that the worker price-effects became more pronounced in the second half of the crisis while the job price-effects were more pronounced in the first half (as did the corresponding endowment effects). On the contrary, the negative ‘baseline adjustment’ in public wage was equally sizeable throughout the crisis, but the countervailing forces were stronger in the first half of the crisis and weaker in the second half. Although the initial wage-cut did take effect (as seen in the decline of the ‘baseline’ component by 0.15 log-points) a large part of it was counterbalanced by the simultaneous move towards a more favourable valuation of worker characteristics (equivalent to a total-wage rise of 0.16 log-points) as well as by the smaller improvements in the endowment components. In a way this explains why policy efforts, which were hugely unpopular and costly in political terms, took so long to take effect. In contrast, when the valuation of worker characteristics was rationalised (in/after 2011), actual public sector wages declined much faster.

To delve deeper in these patterns, we turn to the decomposition results by wage decile, which we report in Figure 6. As with the results at the mean of the distribution, we find that composition effects due to changes in worker and job characteristics had a minor contribution to wage changes across deciles; price effects due to worker and job characteristics had a moderate and mostly positive contribution; and the constant effect had the highest negative influence in both sectors. However, the mean decompositions conceal that, over 2009-2013, price effects due to worker and job characteristics were in fact negative at the low deciles in both sectors. In contrast,

worker and job price effects favoured workers at the 3<sup>rd</sup>-5<sup>th</sup> wage deciles in the public sector, and those at the upper end of the distribution in the private sector, i.e. exactly where the negative constant effect was highest. This suggests that the way the public sector adjusted its rewards to worker and job characteristics during the crisis favoured the low-paid, while private sector adjustments favoured the high-skilled highly-paid workers. Admittedly, the constant effect in the public sector was positive at the very low wage deciles, and overall more sizeable than what the decomposition at the mean suggests. This is more obvious when one compares sub-periods, with the mean decompositions suggesting that the constant effect was stable over time but the quantile decomposition showing a huge increase over time (from a nearly positive effect over 2009-2011 to a highly negative effect in 2011-2013). We attribute these results to underlying selection effects, for which we have not controlled.<sup>19</sup> Because they are less affected by selection bias, the results from the private sector are more reliable. These results suggest that the crisis (i.e. the ‘baseline adjustment’ captured by the constant) initially affected wages more or less uniformly across the wage distribution but, as the crisis escalated, those who were affected most were at the tails of the wage distribution; i.e. the minimum wage earners and the high-skill highly-paid employees.

## 5. Conclusion

The crisis in Greece has been largely presented as a crisis of, and in, the public sector. Indeed, public sector workers saw remarkable wage cuts, while an effective hiring freeze and some downsizing was also implemented, as the country fought to consolidate its public finances. Nevertheless, the private sector was also, and in some respects more deeply, affected. Quantity adjustments were particularly pronounced, with around one million jobs lost in the space of four years, average weekly hours declining by as much as 5% and unemployment more-than-tripling to 27% in 2013. But wages in the private sector were also severely affected, as they fell faster and deeper than in the public sector.

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<sup>19</sup> We base this inference on decomposition analysis at the mean without adjustment for sector selection, which we report in Table A5 (see online Appendix). As this table shows (and in comparison with Table 3), failure to control for selection significantly biases the magnitude of the estimated price effects in the public sector. In particular, when we do not correct for selection bias, the constant effect appears significantly larger overall, and much larger in the second half of the crisis relative to the first half, which is exactly what we find in the quantile decompositions. Importantly, correcting for selection does not affect the direction of the price effects.

Motivated by these developments, in this paper we utilised individual-level data from the Greek LFS to examine the compositional and valuation dynamics underpinning the observed wage adjustments not only over the whole period (2009-2013) but also across two constituent sub-periods. This was not an arbitrary choice. Despite its severity, the Greek crisis unfolded rather slowly and in a prolonged fashion. Between 2009 and 2011, the (centre-left) government of the time imposed fiscal austerity measures (including public-sector wage-cuts) with relative brevity, facing huge opposition both by the public and in parliament. Following the loss of confidence of this government in November 2011, the country was led by a coalition government which implemented further cuts in the public sector and a much more pervasive programme of labour market reforms. The political turbulence of 2011 had a devastating effect on the Greek economy, as fears about a sudden exit from the Eurozone led to a further collapse in demand and investment, and an immense liquidity problem throughout the economy. Thus, in more than one ways, the crisis in Greece has had at least two phases – and in many respects it can be argued to have had also two faces, one for the private and one for the public sector.

The results from our regression and decomposition analyses confirm these observations. Among our headline findings, the one that perhaps stands out concerns the overall wage adjustment between sectors and periods: in the public sector monthly regular wages took a long time to adjust and only fell significantly after 2011; in contrast, the corresponding wages in the private sector were affected faster and overall more deeply, even prior to the wave of measures that deregulated wage bargaining and lowered minimum wage-floors. Importantly, this result remains not only when we control for sector-selection but also when we control for the actual changes to workforce/job characteristics. In all cases, wage adjustment in the private sector appears to be larger and to have started earlier compared to the public sector – despite the fact that measured productivity in the private sector declined slower (and was, to start with, more closely aligned to wages) than in the public sector. In result, and against common perception, the monthly public wage premium increased in the early phase of the crisis and only started falling after 2011, though never decreasing below its 2009 level. In fact, the fall in public wage premia affected mostly the least privileged public sector workers, i.e. those in high-skill high-pay jobs who before the crisis were earning the lowest wage premia. In contrast, the wage reforms tended to protect public employees at the lower end of the wage distribution; that is, those who were already the most privileged compared to their private sector counterparts.

Underneath this finding, however, are substantial differences in the way in which prices have adjusted in the two sectors. Our results suggest that in the private sector demand pressures were strong and continuous, affecting initially all skill levels and later the high skilled. Importantly, however, these pressures were partly offset by an intensification of wage-sorting, with a significant rise in the returns to marketable workforce characteristics, including most notably the returns to schooling. In the public sector in turn, adjustment was slower and more muted in the beginning of the crisis, as this sector also rewarded worker characteristics higher than before (and saw some improvement in the composition of workers and jobs). After 2011, however, the rationalisation of pay-scales in that sector led to a relative reduction in the price/valuation of marketable workforce characteristics, impacting mostly the high-skilled.

The steeper wage adjustment in the private sector (where misalignment from labour productivity in the pre-crisis years seems to have been lower) and the persistence of the public sector premium, may suggest that aggregate wage adjustments during the crisis were not fully in tune with the real needs of the labour market. However, not all observed changes are discouraging. The changes in returns in the private sector, in particular, are a rather positive development, as returns in this sector have been traditionally low, thus acting as a disincentive to seeking private-sector dependent employment and further reinforcing the selection of the more skilled and more educated into the public sector. Thus, although, unlike in some other countries, the crisis did not eliminate the public sector premium, it nevertheless seems to have instigated a process of convergence in the returns to key marketable worker characteristics – especially education and labour market experience. The correction of these imbalances may be the most important, and perhaps the only, ‘good news’ coming out from the crisis for the Greek labour market.

It remains to be seen whether these changes represent a new equilibrium or if they will be short-lived – either because of further future adjustments in the economy or because of wider policy developments in Greece. It is of course to be expected that, with economic recovery at some point in the future, private sector wages may recover faster and thus the public sector premium may decline. It is less easy to foretell whether the observed changes in the structure of returns will also be scooped away in a future recovery. For all this, much depends of course on the wider situation in the country following the events of June/July 2015. Either way, the patterns revealed in our analysis offer an important insight into the price changes that have taken place in Greece

during the first five years of the crisis. These insights are of course of academic value in their own right, but may also be crucial for informing future policy-making in the country.

### **Supplementary material**

Supplementary material (the Appendix) is available online at the OUP website.

### **Acknowledgements**

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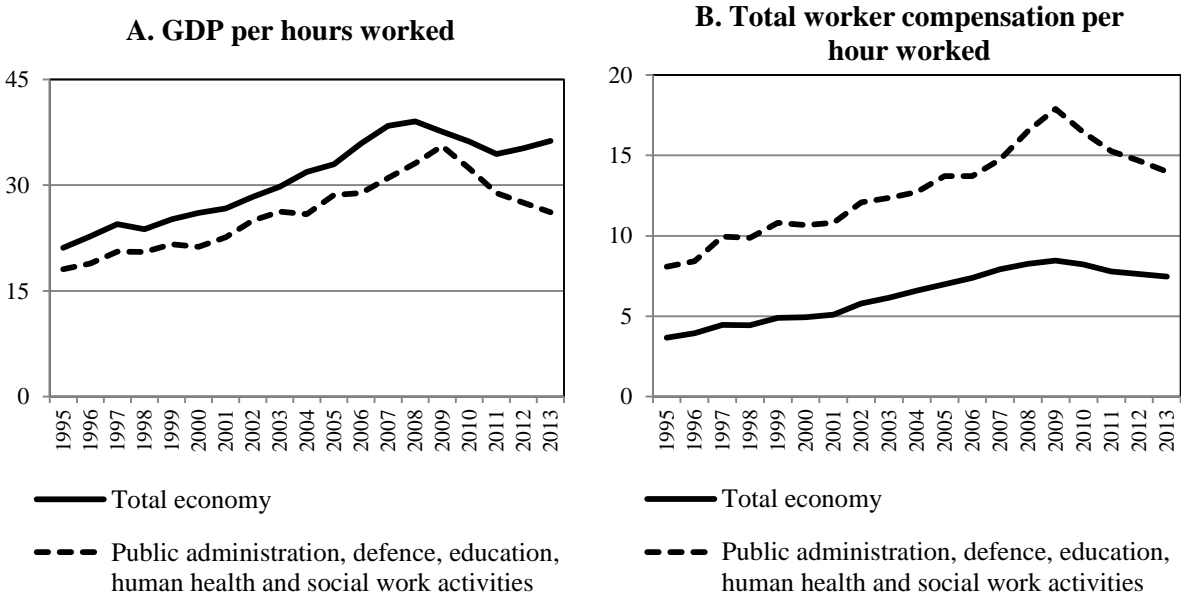
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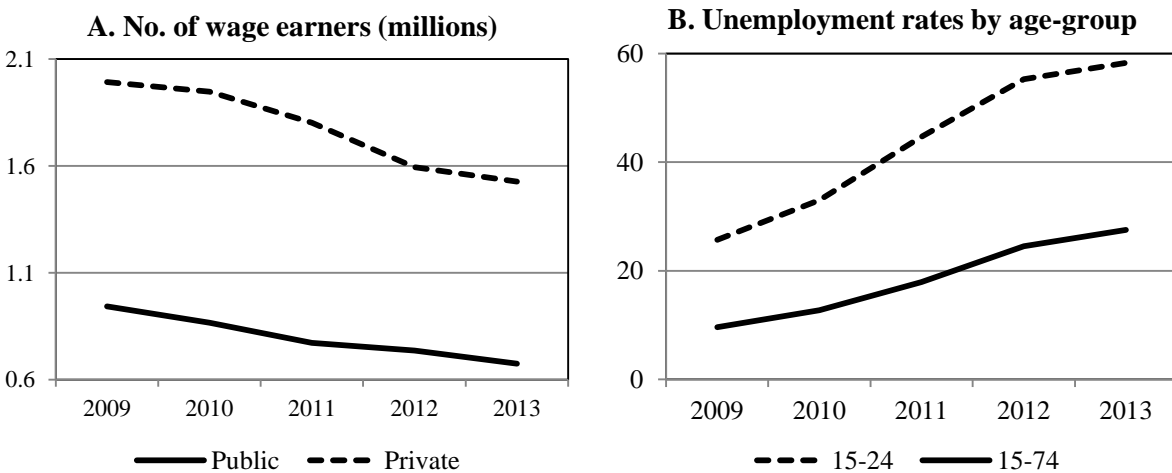
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**Figure 1. Measures of productivity and unit labour cost by sector (in nominal euros)**



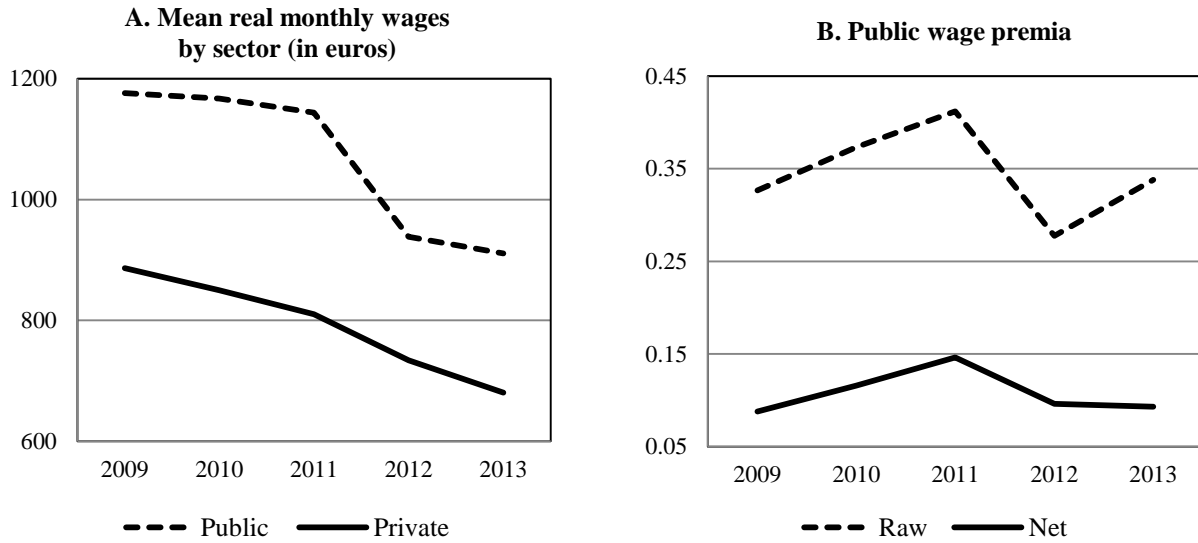
Notes: Raw data are from Eurostat (<http://ec.europa.eu/eurostat/data/database>), author's calculations.

**Figure 2. Employment and unemployment outcomes over 2009-2013**

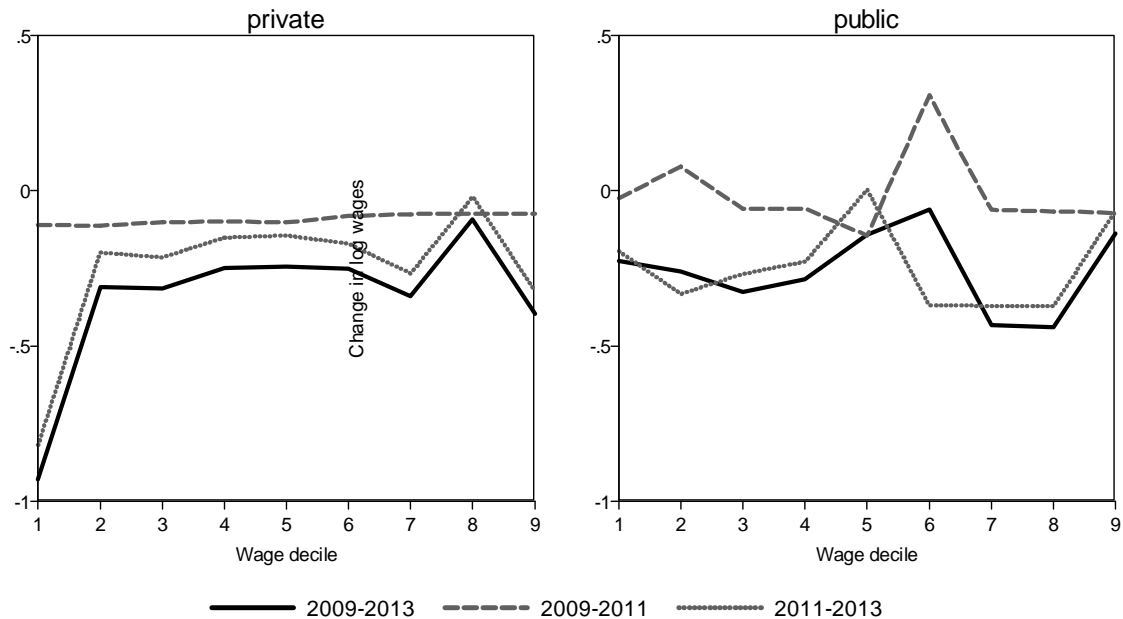


Notes: Data on public sector employment are from the Ministry of Administrative Reform ([http://apografi.yap.gov.gr/apografi/Flows\\_2009\\_2013.htm](http://apografi.yap.gov.gr/apografi/Flows_2009_2013.htm)). All other data are from the Eurostat (<http://ec.europa.eu/eurostat/data/database>).

**Figure 3. Wage patterns over 2009-2013 at the mean of the wage distribution**



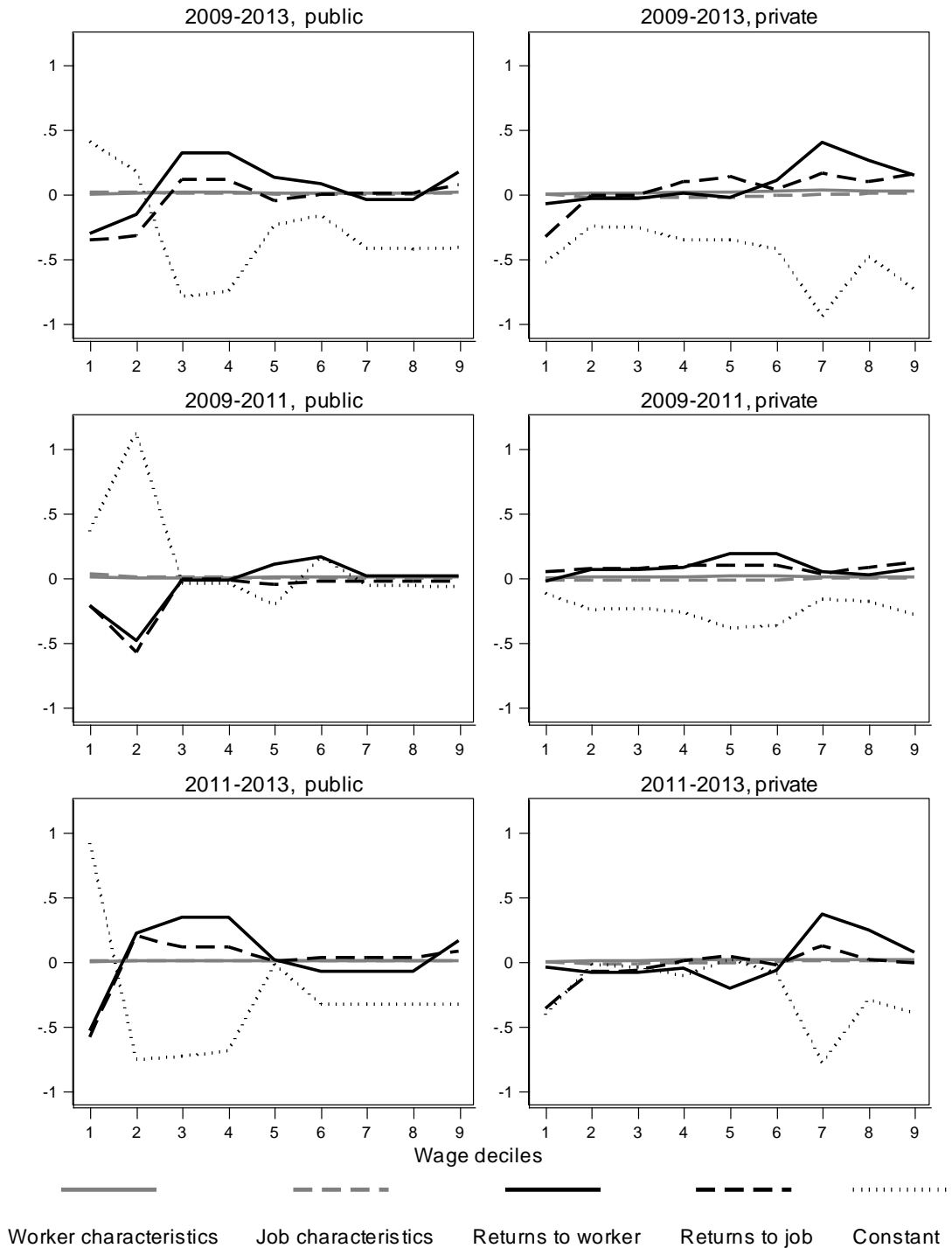
**Figure 4. Change in public and private wages across the wage distribution in selected periods**



**Figure 5. Public wage premia net of worker and job characteristics across the wage distribution by calendar year**



**Figure 6. Decomposition of wage-changes across the wage distribution**



**Table 1. Weighted means and frequencies of selected variables by sector and year**

	Public sector					Private sector				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Females	0.461	0.469	0.464	0.459	0.457	0.415	0.421	0.423	0.439	0.431
Education in years	14.78	14.96	15.14	15.24	15.45	12.42	12.56	12.75	13.16	13.14
Experience in years	21.50	21.62	22.11	22.25	21.88	18.69	19.08	19.27	19.15	19.74
Married/Cohabiting	0.678	0.688	0.702	0.694	0.703	0.555	0.572	0.570	0.574	0.596
Has child/ren	0.437	0.434	0.465	0.439	0.448	0.346	0.366	0.361	0.366	0.392
Foreign born	0.010	0.009	0.010	0.007	0.005	0.199	0.192	0.199	0.171	0.166
Part-time worker	0.029	0.026	0.024	0.021	0.020	0.066	0.074	0.082	0.110	0.140
Temporary worker	0.097	0.094	0.070	0.067	0.080	0.134	0.146	0.149	0.118	0.118
Small firm	0.212	0.203	0.208	0.169	0.153	0.563	0.564	0.562	0.520	0.509
Production sectors: secondary	0.070	0.064	0.054	0.056	0.057	0.328	0.305	0.275	0.245	0.236
Production sectors: tertiary	0.919	0.928	0.938	0.936	0.936	0.646	0.662	0.694	0.720	0.727
Occupation: White collar	0.788	0.790	0.813	0.808	0.793	0.553	0.570	0.596	0.637	0.636
Occupation: Blue collar	0.153	0.147	0.125	0.130	0.136	0.447	0.430	0.404	0.362	0.364
Nominal monthly wage in euros	1322	1373	1388	1150	1107	996.5	1000	983.2	900.1	827.5
Weekly hour of work	36.12	36.10	36.22	36.96	37.20	41.40	41.08	40.65	39.98	39.61
Public history	0.292	0.295	0.289	0.265	0.274	0.094	0.096	0.094	0.092	0.087
Observations	5,633	5,527	4,694	3,505	3,212	9,746	9,659	7,826	5,677	5,065

Notes: Public sector includes public services, public bodies, local governments, public utility enterprises, public or public-controlled banks, and public-controlled firms. Reference production sector is primary, and reference occupation category is armed forces.

**Table 2. Public-private wage structures under endogenous sector selection in selected years**

	2009			2011			2013		
	Public	Private	Selection	Public	Private	Selection	Public	Private	Selection
Female	-0.0666*** [0.0081]	-0.1355*** [0.0075]	-0.2126*** [0.0428]	-0.0475*** [0.0082]	-0.1461*** [0.0080]	-0.1426*** [0.0459]	-0.0632*** [0.0107]	-0.1182*** [0.0116]	-0.1207** [0.0580]
Education	0.0192*** [0.0016]	0.0153*** [0.0012]	0.0603*** [0.0079]	0.0208*** [0.0017]	0.0202*** [0.0014]	0.0512*** [0.0082]	0.0274*** [0.0022]	0.0233*** [0.0020]	0.0595*** [0.0103]
Experience	0.0167*** [0.0017]	0.0148*** [0.0011]	0.0484*** [0.0062]	0.0186*** [0.0016]	0.0140*** [0.0013]	0.0525*** [0.0070]	0.0235*** [0.0026]	0.0242*** [0.0020]	0.0360*** [0.0097]
Experience^2	-0.0002*** [0.0000]	-0.0002*** [0.0000]	-0.0003*** [0.0001]	-0.0002*** [0.0000]	-0.0002*** [0.0000]	-0.0003** [0.0001]	-0.0003*** [0.0001]	-0.0003*** [0.0000]	-0.0001 [0.0002]
Married	0.0381*** [0.0104]	0.0514*** [0.0085]	-0.0550 [0.0504]	0.0444*** [0.0104]	0.0696*** [0.0102]	-0.0238 [0.0554]	0.0368*** [0.0133]	0.0545*** [0.0142]	0.0159 [0.0660]
Children	0.0023 [0.0090]	0.0267*** [0.0080]	0.0570 [0.0455]	-0.0027 [0.0090]	0.0425*** [0.0094]	0.0590 [0.0504]	-0.0045 [0.0116]	0.0223* [0.0135]	0.0441 [0.0595]
Non-Greek	-0.1057** [0.0451]	-0.1194*** [0.0094]	-0.7423*** [0.1208]	-0.1523*** [0.0499]	-0.1289*** [0.0114]	-0.3949*** [0.1296]	0.1865* [0.1084]	-0.1189*** [0.0182]	-0.6820*** [0.2079]
Part-time	-0.6128*** [0.0490]	-0.4314*** [0.0245]	-1.2806*** [0.1075]	-0.6899*** [0.0520]	-0.5469*** [0.0259]	-1.4868*** [0.1289]	-0.6583*** [0.0636]	-0.4581*** [0.0299]	-1.4548*** [0.1508]
Temporary	-0.2902*** [0.0209]	-0.0744*** [0.0110]	0.1648*** [0.0623]	-0.3340*** [0.0230]	-0.0951*** [0.0123]	0.0769 [0.0717]	-0.2583*** [0.0276]	-0.1001*** [0.0190]	0.1924** [0.0918]
Small firm	-0.0294*** [0.0095]	-0.0460*** [0.0069]	-0.5090*** [0.0401]	-0.0602*** [0.0097]	-0.0645*** [0.0076]	-0.4570*** [0.0450]	-0.0276** [0.0136]	-0.1121*** [0.0116]	-0.5640*** [0.0589]
Weekly hours	0.0027*** [0.0008]	0.0075*** [0.0006]	-0.0489*** [0.0034]	0.0009 [0.0008]	0.0093*** [0.0007]	-0.0464*** [0.0039]	0.0049*** [0.0011]	0.0098*** [0.0010]	-0.0316*** [0.0042]
Constant	6.5033*** [0.0661]	6.2000*** [0.0521]	-0.1933 [0.2832]	6.5144*** [0.0678]	5.9286*** [0.0570]	-1.1197*** [0.3276]	6.0334*** [0.1375]	5.6631*** [0.0841]	-2.1980*** [0.4140]
Public history			0.4306*** [0.0473]			0.3766*** [0.0515]			0.3101*** [0.0645]
Rho	-0.0793 [0.0554]	-0.0997** [0.0483]		-0.0510 [0.0474]	-0.1417** [0.0705]		-0.0709 [0.0522]	-0.1474 [0.0995]	
Lamda	-0.02146	-0.02972		-0.01235	-0.04351		-0.01855	-0.05357	

Robust standard errors in brackets, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Controls: Sector dummies, occupation dummies, region dummies. Observations are 15379 in year 2009, 12520 in 2011, and 8277 in 2013. The Wald test statistics [and corresponding p-values] for the independence of the selection equations are 6.391 [0.041] in 2009; 5.364 [0.068] in 2011; and 4.184 [0.123] in 2013. Rho ( $\rho$ ) is the correlation coefficient between the error terms in the selection equation and the relevant wage equation. Multiplying this with the standard deviation of the errors of the wage equation ( $\sigma_u$ ) returns the coefficient on the inverse Mills ratio ( $\lambda$ ), which shows whether selectivity impacts directly on individuals' wages. Since  $\sigma_u > 0$ , the sign of the coefficient on  $\lambda$  is determined solely by  $\rho$ .



**Table 3. Blinder-Oaxaca decomposition of mean real wage changes by period, sector and type of characteristics**

	Full period		2009-11		2011-13	
	Public	Private	Public	Private	Public	Private
Raw wage difference	-0.2594 [0.0006]	-0.3222 [0.0006]	-0.0215 [0.0006]	-0.1073 [0.0005]	-0.2379 [0.0006]	-0.2149 [0.0007]
Selection-adjusted difference	-0.2457 [0.0012]	-0.3277 [0.0008]	-0.0407 [0.0010]	-0.1045 [0.0007]	-0.2050 [0.0011]	-0.2232 [0.0009]
Selection effect	-0.0137	0.0056	0.0192	-0.0028	-0.0329	0.0084
Endowment effects						
Total	0.0484 [0.0005]	0.0028 [0.0005]	0.0367 [0.0004]	-0.0071 [0.0004]	0.0128 [0.0005]	0.0038 [0.0005]
Worker	0.0252 [0.0003]	0.0377 [0.0002]	0.0177 [0.0002]	0.0132 [0.0002]	0.0053 [0.0002]	0.0216 [0.0002]
Job	0.0232 [0.0004]	-0.0349 [0.0004]	0.0190 [0.0003]	-0.0203 [0.0003]	0.0076 [0.0004]	-0.0179 [0.0004]
Price effects						
Total	-0.2941 [0.0012]	-0.3305 [0.0007]	-0.0774 [0.0010]	-0.0973 [0.0006]	-0.2178 [0.0011]	-0.2270 [0.0007]
Worker	0.0787 [0.0051]	0.1958 [0.0029]	0.1626 [0.0043]	0.0855 [0.0024]	-0.0817 [0.0051]	0.1132 [0.0031]
Job	-0.0731 [0.0042]	0.2143 [0.0030]	-0.0878 [0.0035]	0.1458 [0.0047]	0.0114 [0.0044]	0.0717 [0.0049]
Constant	-0.2997 [0.0078]	-0.7406 [0.0040]	-0.1522 [0.0062]	-0.3287 [0.0051]	-0.1475 [0.0078]	-0.4119 [0.0056]

Notes: Reported wage gap is in the logged wages. Analytical standard errors (calculated by the Delta method) are in brackets. Worker characteristics are: female, education, experience, marital status, whether has child/ren, foreign-born. Job characteristics are: sector, occupation, region, part-time contract, temporary contract, small firm, hours of work). Coefficients of dummy variables adjusted to reflect deviations from the mean rather than from the reference category (i.e., they sum up to zero over all categories).