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Abstract

We evaluate public-private sector wage differentials in Turkey for the years 2005 and 2011, a period marked by educational upgrading and restructuring in public employment. Using micro data from Household Labour Force Surveys we find a positive premium for low wage earners and a penalty of working in the public sector at the higher end of the distribution. Although the penalty has not disappeared, the price effect has increased, especially at the right end of the distribution owing to a relatively uneven wage increase in the private sector along the distribution, rather than an explicit public wage policy.

Keywords: public employment, wage differentials, decomposition, quantile regression.
JEL Classification: J31, J45, C31.

1. INTRODUCTION

Turkey's economy has undergone a major restructuring under the Justice and Development Party's successive single party governments following the 2001 crisis. After a decade of macroeconomic instability in the 1990s, public finance management has substantially improved. The governments have pursued and consolidated the central examinations for public sector recruitment that had started in 1999. Initially affecting low-skill employees, these examinations have gradually been expanded to comprise employees of all skill levels. In accordance with tight fiscal policies, and in continuity with the rationalization process, public employment policy aimed at enhancing productivity by recruiting better qualified employees and decreasing the share of public employment in total employment. Consequently, the level of education has increased much more than in the private sector and the share of public employment has decreased.

These transformations have contributed to the improvement of "government effectiveness"– a measure of the quality of public services - which has steadily increased from 0.16 to 0.36 from 2005 to 2011 (World Bank, *Worldwide Governance Indicators* - WGIs). Figure 1 shows the evolution of government effectiveness in comparison with the evolution of other indicators' average: late 1990s – early 2000s are marked by economic and political instability, single party governments take office in 2002 and 2005 onwards government effectiveness outperforms other governance indicators such as voice and accountability, political stability and absence of violence/terrorism and rule of law that have either stagnated or deteriorated.

Figure 1

This paper seeks at analyzing the public-private wage differential and its evolution in the context of public sector restructuring in terms of employment, tight fiscal policy and higher quality of public services. Using Household Labour Force Surveys (HLFSs), we specifically aim at answering the

following questions: Is there a public sector wage premium? What are the contributions of the composition and price effects at the mean and across the wage distribution?[1] How has the public wage premium evolved from 2005 to 2011, and why? Alongside the public-private wage gap analysis, we decompose real hourly wage increase within the public and private sector separately in order to compare the respective price effects and see whether the evolution observed in the premia has been the outcome of a greater price effect in either one of the sectors, i.e., whether upgrading in public employment has been accompanied by an explicit public wage policy or has indirectly benefitted from private sector wage dynamics.

We use both the Oaxaca-Blinder (Oaxaca, 1973; Blinder, 1973) decomposition technique for measuring the gap at the mean, and Melly (2005)'s decomposition using quantile regressions. We also compare the quantile decomposition (Melly, 2005) results with the Juhn-Murphy-Pierce (1993) (JMP) decomposition. In the next section we first discuss the factors that affect the public-private wage gap, and provide a summary of studies conducted in the case of Turkey. In a third section we present methodology and data; we discuss results in section four and finally provide concluding remarks.

2. WHY THE GAP?

The main question in the public-private wage gap literature has been to disentangle whether there is a premium in working in the public sector or not. Theoretically, although the premium can be found in either sector, overall the outcome depends on the specific context and necessitates empirical investigation. Notwithstanding vast differences in terms of magnitude and outlier cases, the evidence suggests that conditional upon individual, household and job-related characteristics, in a majority of cases the public wage premium is positive at the mean, higher for lower wages or lower qualifications,

[1] The vocabulary used for both effects vary. The composition or endowment effect is also called observed (observable) characteristic, and is captured by control variables. The price effect captures the rest, also called the unobserved (unobservable) characteristic, i.e., it is the component of the total or raw or unconditional wage gap that cannot be explained by the control variables, also called the adjusted or conditional pay gap, or the wage premium. The total, or raw or unadjusted, gap refers to the sum of both effects. Note that some studies use the term premium equivalently to the total, unadjusted, gap (Borjas, 2002).

and greater for women.[2] Basically the nature of the gap depends on a large number of non-monetary institutional factors affecting individual preferences, which need to be considered in relation with demand and supply dynamics in either sector.

Although our study does not empirically account for these institutional factors, it is useful to summarize the expected effects in order to discuss the results. These institutions entail: wage-setting procedures (indexation systems, minimum wage), the level of centralization of the public sector, unionization and negotiation power, employment protection legislation, size of the informal sector, working hours, and public sector allowances and side benefits.

Public premium is expected to be higher in countries having a centralized collective wage bargaining system in the public sector. Greater (lesser) unionization implies higher (lower) wages, notably workers with lower qualifications at the lower end of the distribution are most likely to be affected by collective bargaining outcomes and minimum wage setting where they exists. Moreover, in the public sector "it is often assumed that most workers will receive collectively bargained rates of pay, even if they are not themselves union members, practices that extend collectively bargained rates either as a matter of public policy, or because the practice is regarded as commensurate with the public sector's role as a 'good employer' and a 'fair employer'" (Blanchflower and Bryson, 2010). As a result, wage compression is generally higher in the public sector, and in most instances there is a penalty of working in the public sector for high wage earners (skilled workers) as opposed to a premium for low wage earners (unskilled workers).

In terms of employment protection if job security and tenure (and possibly returns to tenure/seniority) are higher in the public sector, it may be a selection criterion for risk-averse individuals, or low wage-earners having less marketable skills. Additionally, lower working hours in the public sector may increase premium, not only for individuals having a preference for shorter working hours (for women labour sharing is important within the household), but also for a larger share of the population if actual

[2] Among recent comparative empirical studies Christofides and Michael (2013), Depalo et al. (2013), and de Castro et al. (2013) estimate and analyze the gap for respectively 27, 10 and 26 EU countries, Mizala et al. (2011) for Latin American countries, and Lausev (2013) provides a literature survey comparing eastern European countries with developed economies. Countries with a stable or increasing premium constitute a minority.

working hours are higher than stipulated by the legislation and are under or uncompensated, as widely observed in developing economies' private sector. The existence of a large informal sector, similarly to long uncompensated working hours, may increase the supply elasticity of hourly wage in the formal private sector (thereby the public wage premium), especially for low-skilled workers who also account for a large share of informal employment. Finally, where allowances and side benefits (e.g. housing, transport, food, childcare, maternal leave practices, etc.) are higher in the public sector, the premium is likely to be lower.[3]

In addition to institutional factors, labour demand conditions that prevail in either sector are also important such that lower labour demand in the private sector is likely to increase the wage premium, in other words, the lesser the slack in the private sector the lower the public wage premium. In turn, such effects may vary according to skill level and along the wage distribution. On the other hand, labour demand in the public sector depends on a large number of factors of which fiscal pressure: in countries where the public sector is a large employer, the price effect is likely to be higher. In such cases the decrease of the role of the public sector implies a greater role for the private sector, and a transition to a more competitive wage policy where the premium for working in the public sector is expected to decrease, which has typically been the case of eastern European countries (Lausev, 2013), or the Troika countries that are currently undergoing tight fiscal policies and severe budget cuts reflected as public wage cuts (Christofides and Michael, 2013). As such a high public wage premium may be problematic in a country suffering from large public indebtedness and a high share of public employment; however this may not be the case for a country experiencing lesser fiscal pressure and a not too high public employment, i.e. lesser pressure on the wage bill.

In terms of gender-differentiated factors, the greater the magnitude of gender discrimination in the private sector the greater the difference of the premium between men and women. Again this may vary along the distribution: for instance, if the unexplained component for women is higher than that for

[3] In most developing countries, childcare supply is greater in the public sector, either because it is not a compulsory in the private sector or not respected. Similarly, maternal leave, even when legislation exists, is rarely fully applied in the private sector.

men for high wage earners then there is evidence for a glass ceiling effect affecting women (for an early contribution see Albrecht et al., 2003).

Public-private wage gap in Turkey

Although the literature on the public-private wage gap is vast, it remains quite scarce in Turkey due to the fact that the data set used for labour market analysis, the HLFS, does not explicitly account for public employment: the questionnaires only ask whether the individual works in the private sector. Upon request the Turkish Statistical Institute has provided the valuable information that the default to the question is being employed in the public sector. Hence, this is the first study examining the issue using HLFSs and adopting a definition of the public sector without having to deduce the information from sectoral activity.

The three studies that address the issue use budget surveys where the sector of employment (public - private) is directly asked for. Tansel (2005) uses the 1994 Household Expenditure Survey, Akhmedjonov and Izgi (2012) use the 2009 Household Budget Survey (HBS) and San and Polat (2012) use the 1994 Household Income Distribution and Consumption Expenditure Survey[4] and the 2008 Household Budget Survey. These studies bear a number of shortcomings that can be summarized as follows. First, the number of covariates and sample size are limited in the budget surveys. Second, the time period is limited to one year except in San and Polat (2012) who consider two years. Third, the definition of the dependent variable is problematic. Except Tansel who considers real hourly wages, there is no explicit definition in San and Polat (2012), and Akhmedjonov and Izgi (2012) use annual wages. Fourth, informality is a salient feature of Turkey's labour market, and in order to minimize bias, the public-private differential can be at best estimated by considering the formal private sector, which is only done by Tansel (2005). San and Polat (2012) include informal employees as a control dummy, and Akhmedjonov and Izgi (2012) do not raise the issue. Fifth, all studies consider

[4] Both Tansel (2005) and San and Polat (2012) refer to the same dataset (1994) fully named as: "Household Income and Consumption Expenditure Survey" (HICES). The survey has not been conducted between 1995 and 2001, and called the "Household Budget Survey" (HBS) 2002 onwards.

population from the age 15 onwards which is problematic in that it increases the risk of self-selection bias especially if entering the public sector requires higher level diplomas.

Tansel (2005) divides the public sector into two subsamples: public administration and state-owned enterprises (SOEs) and finds different premia. Unfortunately, the HLFSs do not contain such a distinction, nevertheless, our data contains detailed occupation and economic activity classification which controls for sectoral characteristics; more, employment in SOEs are much lower in the second half of the 2000s compared with 1994, following privatization policies. Also, the labour force surveys include NUTS2 regional breakdown (26 regions), this variable is instrumental in capturing the vast differences that exist in terms of living costs which may affect inter-regional wage differentials in the private sector; and regional compensations that are included in public wages. Only Tansel (2005) controls for regions, but the breakdown is limited to seven in the 1994 survey. San and Polat (2012) use the quantile decomposition, however their mean values are not very consistent with the values they find along the distribution, more the findings suggest that both the composition and price effects are declining along the distribution unlike what the literature suggests. The other two studies only consider decomposition at the mean.

3. METHODOLOGY

A difficult issue in public-private wage gap studies is the self-selection bias (or endogenous sector selection). A large number of techniques have been suggested in the literature for selectivity correction. The mostly widely used techniques are instrumental variables (IV) regressions and propensity score matching (PSM).[5] The only relevant type of instrumental variable is the one that can

[5] Another option would be using panel data –a feature that is absent from Turkey's HLFSs- and estimate fixed effects quantile regressions, which can still be a problem "unlike in linear models where the unobserved individual fixed effects can be differenced out and are thus omitted from the estimation, the individual fixed effects in a fixed effects quantile regression model have to be estimated along with the coefficients. As a result, it is very difficult to implement when the number of parameters involved here is so large. Further, only when the endogeneity of sector choice results from time-invariant individual heterogeneity, can a fixed effects model (either linear or quantile regression) solve the endogeneity issue. When sector choice depends on time-variant unobservables, fixed effects models are not helpful, and instrumental variables are required to deal with the endogeneity." (Cai and Liu, 2011, p. 371-372).

account for the bias, i.e., a variable that gives information concerning the individual *before* sector selection (ex-ante), unfortunately in most data sets appropriate variables are hard to find and variables that give actually information *after* sector selection (ex-post) are used: "To correct for endogenous sector choice, identification requires exclusion restrictions. In many studies, the data is not rich enough to provide appropriate instruments and identification assumptions are sometimes doubtful" (Melly, 2006). As such, Melly, among others, uses variables such as father's employment characteristics or mother's labour force status. Such information, or any ex-ante information relevant in assessing the bias is unavailable in our dataset, and we chose not to use ex-post variables. More, even the ex-ante instruments (or "background variables" after Melly) may not be appropriate as they may be correlated with "intergenerationally transmitted (unobservable) skills" (Siminski, 2013, p. 1916). Birch (2006) makes a short survey of quantile regressions where she concludes "that controlling for sample selection bias does not have any major effect on public sector wage premiums."

Another solution to the selection issue are PSM techniques which basically consist in finding individuals that match in both sectors according to control variables, who then constitute the non-biased sample used for directly measuring the premium along the new distribution. However, here raises a trade-off between having a large number of covariates which is desirable for controlling observables at best, and decreasing the number of individuals that fall within a common support region. The PSM then has two drawbacks: either the distributions obtained after PSM will contain too few individuals (especially in the public sector), or as a number of controls must be left out, the sample will actually continue bearing heterogeneities, or both. Unsurprisingly, the results we obtained from various PSM estimations leave us with an insufficient number of matching individuals (results available upon request).

Given these considerations we pursued our analysis leaving the issue aside, preserving initial distributions. Thus, we account for differences in characteristics through estimation techniques that decompose the total wage gap into observable and unobservable components, such as the Oaxaca-Blinder (O-B), Melly and JMP decompositions, and seek at minimizing selection by considering men and women separately, using a large number of control variables and omitting certain observations.

4. DATA AND DESCRIPTIVE STATISTICS

We use the HLFSs in 2005 and 2011,which benefit from a number of improvements recently brought by Turkish Statistical Institute (TurkStat): the HLFSs have been revised by the 2008 population projections;[6] since 2013 age is provided as a continuous variable (previously discrete) and sectoral classification of economic activity has been harmonized which allows us constructing a coherent sectoral breakdown, a valuable control variable given the substantial transformation in the sectoral composition of public employment.[7]

We restrict our sample by trimming 1% at both ends of the distribution to drop outliers, considering formal wage-earners (self-employed and unpaid family workers whose earnings are unreported are omitted) and population aged 21 years and above to minimize selection bias at earlier ages (e.g. Depalo et al., 2013; Dustmann and Van Soest, 1998): individuals not having completed university degree may not have the option to enter the public sector, notably if the public recruitment policies require tertiary diploma, which is the case for a large number of public jobs now in Turkey. The employer criterion (public/private) is used for the definition of employment. Where this information is not available, the default strategy may be inferring information from the sectoral classification of economic activities where public employment is typically defined as an individual working in the "Public administration and defence; compulsory social security" sector (category O in the NACE classification). This in turn bears a caveat in that the nature of sectoral activity, alongside other characteristics, may affect productivity (wage) differentials. The number of observations for men is 37904 and 51165, and for women 9220 and 15024, respectively for the years 2005 and 2011. Our dependent variable is log real hourly wages computed as the declared monthly wage divided by regular hours worked multiplied by 4.3.

[6] TurkStat established an Address Based Population Registration System (ABPRS) in 2007, 2009 onwards HLFSs have been revised by the 2008 based population projection.

[7] Classification of sectors of economic activity (NACE) has undergone a number of breaks throughout the period, such that the classifications were not compatible. Recently released microdata by TurkStat have been revised to harmonize sectoral classification (NACE rev.2).

The Kernel densities (Figure 2) reveal an increase in real hourly wages, in both sectors for both genders. The visual inspection suggests that public sector wages are more compressed in the public sector for both genders in accordance with the fair employer hypothesis. Distributions are more compressed for women than men, and the raw gap is a little larger for women. Although public wages are roughly the same in the public sector for both genders, real wages in the private sector for women are lower. More, the increase in private sector wages from 2005 to 2011 is less for women than men.

Figure 2

Table 1

Table 1 gives nationally representative figures of employment according to the public and private (formal and informal sectors) for all wage earners. This is the first study that gives public employment figures in Turkey, as HLFS samples are the only representative samples in terms labour market indicators. Overall the share of public employment in total wage employment (including informal employment) has decreased from 24.8% in 2005 to 19.7% in 2011, from 35.9 to 25.3% in total formal wage employment. The decrease (increase) in the share of public (private) employment has been faster prior to the 2008 crisis. More, the share of university graduates has increased within the sectors, mostly in the public sector: from 42.7 to 63.1% (14.4 to 18.3% in the formal private sector and 3.1 to 4% in the informal private sector).

The population statistics (**Table 2**) provides the full list of control variables[8]. The share of women is higher in the public sector; in relative terms, it has increased in all sectors mostly in the public (from 22.3 to 27.8) and informal sectors (from 20.1 to 23.7%), and least in the formal private sector (from 18.6 to 20.9%). Tenure is substantially higher in the public sector and has increased from 2005 to 2011 but decreased in both the formal and informal private sector. Working hours are lowest in public sector, and has decreased for all three sectors from 2005 to 2011, and the decrease has been least in the

[8] The aggregation tables of occupation and economic activity classifications are given in Annex 1and 2.

formal private sector. The educational level is highest in the public sector followed by the formal, then informal private sectors; and has increased in all three sectors from 2005 to 2011 reflecting the overall increase in the educational level of the economy. An interesting evolution has been the significant upgrading in the public where post-secondary educational level employees' share has increased from 42 to 62.7%. The bulk of the employees in the formal and informal private sectors have an educational level of primary and less than primary (respectively 49.3 and 66.2%) despite a decreasing trend (these findings are in conformity with the total sample values mentioned above).

In terms of occupation the public sector is characterized by a high share of skilled employees. From 2005 to 2011 there is a large decrease in the share of low-skilled occupations, especially elementary occupations, and an increase in high-skilled occupations, namely professionals (6 percentage points). Substantial change can also be observed in terms of sector of economic activity: public sector employees are mainly in the public administration, defence, education, human health and social work activities. Their share in the public sector has increased by more than 10 percentage points supporting the general rationalization process which has also entailed greater specialization in public services at the detriment of low-skilled activities that have been subjected to outsourcing. The bulk of employment in the private sector remains in the manufacturing (decreasing of ten percentage points in the formal sector) and wholesale and retail trade, transportation and storage, accommodation and food service activities.

Table 2

5. DECOMPOSITION RESULTS

The Oaxaca-Blinder and quantile decompositions for the public-private wage differentials are given in Table 3. The mean raw gap and premia are positive and high, and have slightly increased from 2005 to 2011 for both genders (women's premium increase has been highest). The premia at the mean for men and women are respectively 0.30 and 0.19 in 2005, and 0.37 and 0.31 in 2011. A number of reasons discussed above explain the positive premia at the mean such as wage setting procedures (central

government wage bargaining and existence of minimum wage[9] vs. weak union power in the private sector[10]), higher tenure (stability, job protection and higher returns to tenure[11]), shorter working hours (vs. long and underpaid or unpaid working hours in the private sector[12]), and labour market slack despite various allowances and side benefits (OECD, 2008) that would be expected to have a decreasing effect on the premium.

Table 3

Observed characteristics explain more than half of the total mean wage gap: 54 and 57 percent for men in 2005 and 2011 respectively; for women these values are higher although declining: 73 and 65 percent. Symmetrically, both the public wage premium and its contribution to the total gap have increased, more for women. The differences between genders may stem from both individual preferences of women for working in the public sector and greater discrimination against women in the private sector, assuming that the public sector has an equal pay policy.

The quantile regressions allow assessing the gap and decomposing it along the wage distribution. The raw wage differentials are positive throughout the distribution for both men and women; both in 2005 and 2011. The price effect dominates the composition effect at the lower end of the distribution, with a penalty at the end of the distribution. For men the composition effect exceeds the price effect after the 50^{th} (40^{th}) percentile in 2005 (2011), for women after the 30^{th} percentile in both years.

We also estimate the decomposition using JMP's methodology: the mean values are very similar with O-B decomposition, however values along the distribution does not provide expected results, as it does not capture heteroscedasticity as suggested by Melly: "The reason of the differences between our results and those commonly accepted in the literature is that quantile regression accounts for

[9]Comparing Turkey and the US Koçer and Visser (2009) show that weak social policies or collective bargaining mechanisms are likely to be compensated by minimum wage legislation as in the case of Turkey.

[10] See Duman (2014) for a recent comprehensive account on the weakness of collective bargaining institutions in Turkey.

[11] Returns to tenure in the public sector are higher and follow an unconditional compensation scheme regardless of position switch.

[12] On the prevalence of long working hours in Turkey see Toksöz (2008).

heteroscedasticity while others, like the JMP decomposition, assume independent error terms. However, the variance of the residuals expands as a function of education and experience and is smaller within unionized workers or certain sectors (public administration, manufacturing). The fact that the population is getting more educated, less unionized and that employment in sectors with low variance declines puts more weight on groups with higher within-group inequality. This is a composition effect and not an increase in the price of unmeasured skills as concluded traditionally." (Melly, 2005, p. 579). Indeed, the JMP decomposition results suggest that the difference between the price and composition effects along the wage distribution is substantially less than those obtained with the quantile decomposition. The price effect is overestimated (except for the first percentile) and increasingly so along the distribution, i.e., we observe a stable rather than an increasing gap between the composition and the price effect.

The inter-percentile variation of the price effect confirms a decrease in the second half of the distribution line with a penalty at the higher end of the distribution. The level of premia is increasing along the wage distribution, more in the first half (50^{th} – 10^{th} percentile) of the distribution compared to the second (90^{th} – 50^{th} percentile). In terms of the contribution of the price effect we find a decrease along the distribution with decreasing returns (faster after the median) for men (2005 and 2011) and women for the year 2011 only (Table 3).

Evolution of the gap

Between 2005 and 2011 the premium has increased all along the distribution with varying magnitudes: for men it has increased more in the first half of the distribution, whereas for women it has increased more in the second half of the distribution. More strikingly, contributions of premia increase for both genders (mostly for women as expected given the higher increase in the level) which has resulted in a decrease of the contribution of the penalty for the higher percentiles; and/or an increase in the contribution of the premium at the higher end of the distribution (Table 4, Figure 3). A similar evolution is observed in Chile and Uruguay in Mizala et al. (2011) who attribute this evolution to public policy: "[t]his could be explained by the implementation of a human resources management

reform, aiming to attract and retain highly-skilled workers in the public sector". However, as discussed earlier, such a finding may as well be the result of private sector wage dynamics.

Table 4

Figure 3

Public policy or market dynamics?

To disentangle the issue, we consider the wage gaps within sectors, public and private separately, between the years 2005 and 2011. We investigate whether the increase in the contribution of the price effect at the right end of the distribution is the result of a public or private wage policy. In the first case, one would expect a higher increase of the price effect favouring skilled employees in the public sector. In the latter case the pay gap should be the outcome of a lower increase of the price effect for high wage earners in the private sector.

The bottom panel of Table 4 (Panel B) gives the Melly decomposition results within the public and private sector separately for both and women. Overall wages have increased in both sectors for all deciles. Increases in premia are higher and relatively more equal along the distribution in the public sector in conformity with the argument of an egalitarian wage indexation policy, compared to the private sector where the premium is decreasing.

Consequently, comparing the two years, we yield two contrasted explanations for the evolution of the public-private wage gap as we observe two different wage policies within each sector at each end of the distribution. The widening public-private wage gap at lower deciles is a result of public wage policy after controlling for the composition effect. However moving towards the right end of the distribution as the wage increase is more unequal in the private sector. This implies that the increase in the public-private premium, and the decrease in the penalty, at the higher end of the distribution are

largely due to a relatively lower increase of the price effect in the private sector. In contrast, the price effect is not significantly different across the distribution in the public sector.

The fact that price effects are higher at the lower end of the distribution in both sectors may be attributed to the institutional wage setting, notably the existence of a minimum wage which also serves as a reference pay for private sector low wage earners. More, low-skilled men have benefitted from a higher increase in the price effect in the public sector relatively to the private sector. This may be due to the centralized collective wage bargaining, a greater job protection and the opportunities of tenure-related wage increases in the public sector. Unexpectedly, the prevalence of informal employment, especially among low-skilled workers, does not seem to dampen wage increase at the lower end of the distribution in the private sector. This corroborates the argument that the minimum wage is also a reference pay for the informal sector.

Figure 4

Turning to the contribution of the price effect within each sector (Figure 4), the picture becomes clearer: it is fairly stable along the distribution until the 70th percentile, higher in the private sector. A striking break occurs at the 80th percentile where the contribution of the price effect decreases in the private sector, and gets below the contribution of the public sector; the decrease is much more substantial for women. These imply that the increase in the contribution of premia at the higher deciles observed above has been the result of a decrease in the contribution of the price effect in the private sector against a relatively more even increase in the contribution of the price effect along the distribution in the public sector. As the decrease has been significantly more for women, the impact on women's premia at the higher deciles has been higher. To sum up, notwithstanding differences in the respective distributions, [13] there has been a greater discrimination in the private sector in higher deciles, more against women than for men. Hence, the penalty in working in the public sector has

[13] Differences in distributions (public vs. private sectors and these vs. the distributions of the public-private wage gap) explain why the percentiles where the contribution of the price effect to total public-private wage gaps increase do not match exactly with the percentiles at which the contribution of the price effect in the private sector gets below that of the public sector.

decreased for women and led to a convergence of their premia with men's premia at the higher end of the distribution. This finding is incompatible with the long-term trend identified by Borjas (2002) in the US labour market. He finds that over the long run (1960-2000) men's premium is stable, whereas women's premium is decreasing with initially very high values where: "[t]his decline in the pay advantage of women employed in the public sector partly reflects the significant improvement in economic opportunities that private sector female workers experienced over the past few decades." This may be the outcome of either an unequal pay for equal job, for which the policy implication would be the implementation and enforcement of measures aiming at applying equal pay for equal jobs; or a glass ceiling effect, which would necessitate policies facilitating women's access to positions of responsibility.

Last, but not least, demand and supply dynamics certainly affected the variation of the wage structure within the private sector. The literature reveals a decrease of the overall wage inequality in Turkey (Bakış and Polat, 2014) as in Latin America (Gasparini and Lustig, 2011; Lustig et al., 2013) during the 2000s. This is consistent with our findings which suggest that, controlling for composition, the price effect has increased more rapidly for low wage earners compared to high wage earners. Although we do not test directly for the determinants, the evidence suggests that in Turkey, alongside the wage increase in low-skilled jobs (which together with the minimum wage explain part of the premium for low-wage workers, Bakış and Polat, 2014), the demand for high-skilled workers did not keep pace with the expansion of supply in higher education in the private sector. The story for high skilled workers can be analyzed in Tinbergen's framework of race between technology and education (Acemoğlu, 2002). However, in Turkey, it seems that the expansion of tertiary education has been greater than technological change –if any. This is in line with the fact that the composition effect is higher and the price effect lowest at the right end of the distribution in the private sector.

While these arguments account for quantities, another feature that has been brought to light by Card and Krueger (1990) and only recently been debated in the case of less advanced economies is the quality of education. The increase in educated workforce may have caused a signalling issue on the market for educated employees due to increased heterogeneity in diploma quality. Bakış et al. (2013)

show that in Turkey this may also have been the case as the variance of returns has increased in the second half of the 2000s within higher educated workers, notwithstanding an increase in their real hourly wages (raw). The degradation in education quality, especially in higher education, works complementarily with Tinbergen's race, amplifying the quantitative supply effect of education.

The conclusion is that public-private wage differentials may increasingly be the outcome of private sector wage dynamics rather than public wage policy per se, especially at the higher end of the distribution. While the contrasted evolution of the price effect along the distribution within the private sector is decreasing wage inequality, it may be contributing to the increase (decrease) in the premium (penalty) of public wages for the educated workforce.

6. CONCLUSION

The total public-private wage gap in Turkey is positive both at the mean and along the wage distribution. Although the composition effect dominates at the mean, the price effect is decreasing along the distribution with a penalty at the higher end. Employees at the lower (higher) end benefit (suffer) from higher public wage premia (penalty). Comparing the evolution between 2005 and 2011, the raw gap has increased without much change along the distribution. However, we find that the contribution of the price effect to the raw gap has increased at the right end and that the penalty decreased although it did not disappear.

The question than is whether this evolution has been the outcome of a public or private wage policy. This is an important issue for other emerging countries where the enhancement of government effectiveness needs to be addressed together with private sector dynamics. Considering wage differentials within the sectors, our results suggest that this has rather been the outcome of a lower price effect in the higher percentiles in the private sector contrasted with a more equal pattern in terms of price effect along the public wage distribution.[14] Consequently, upgrading in public employment has been consistent with a sound fiscal management both quantitatively (decreased share of public

[14] More, private sector wage dynamics may also have contributed to the improvement of income distribution and relative poverty (in monetary terms) alongside public policy.

employment) and qualitatively (enhancement of government effectiveness). It has also been a less costly wage policy without having to increase the premium for high-skilled workers since the price effect remains relatively low in the private sector.

Differences between the two sectors are assessed as the result of contrasted wage setting mechanisms due to factors stemming from both institutional and, supply and demand factors. Turkey's public employment policy is highly centralized and the wage adjustments are subject to collective bargaining; as a result of which wage increases are more stable (equal) along the distribution validating the "fair employer" hypothesis.[15] On the other hand, unionization and unions' power in the private sector are very weak and practically inexistent for high-skilled workers, as elsewhere.[16] In terms of demand and supply dynamics within the private sector, increased supply in higher educated workforce, with possibly lower quality, are factors that may also explain the slower increase of the price effect at the higher end of the distribution relatively to the lower end.

Increased premium, or decreased penalty, in working in the public sector for high-skill employees presents a trade-off between enhanced productivity in the public sector and decreased ability of the private sector to compete and attract productive workforce. However, as this trend is an outcome of a lower wage increase in the private sector, ultimately the future outcome will depend on the private sector wage policy -insofar as the public sector does not alter its wage and fiscal policy-, and demand and supply dynamics on the labour market.

[15] Comparing premia in France, Italy and Great Britain, Ghinetti and Lucifora (2013) highlight that in a context of centralized wage setting as observed in France, this is an expected outcome.

[16] Unfortunately the HLFS questionnaires do not ask for union membership. Even then, it is doubtful whether these would control for what they are meant to. Typically, although there is some evidence that public employees are more unionized than their private counterparts they do not have the right to strike; and "collective bargaining" in the public sector is an institution that originates from a historically centralized public wage policy that is not much correlated with the existence of unions, or rate of unionization.

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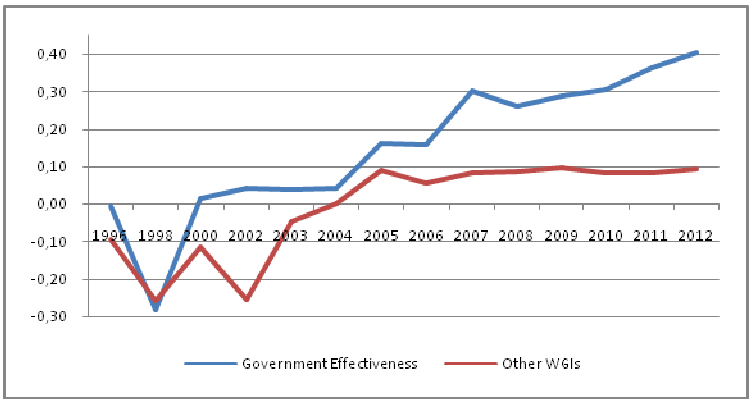
TABLES AND FIGURES:

Figure 1 Evolution of governance indicators in Turkey (1996-2012)



Source: Worldwide Governance Indicators, 1996-2012

Figure 2 Public and Private Sector Wage Distributions (Kernel densities)

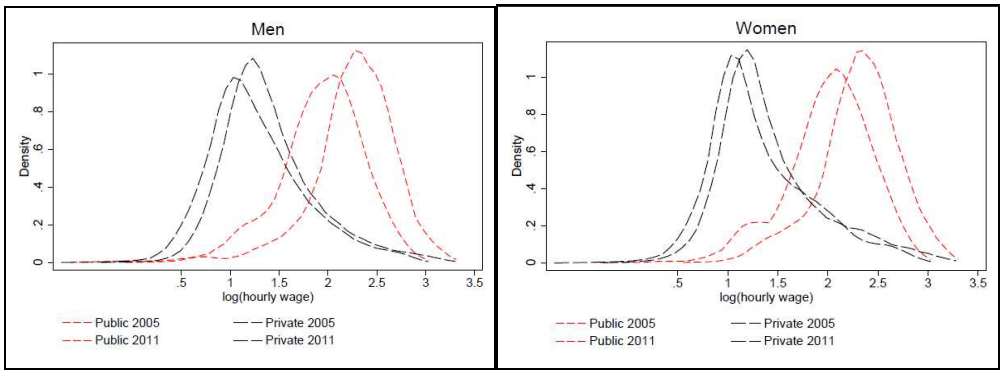


Table 1 Evolution of employment by sector (wage earners only, age 15 and above)

Years	Total weighted				Share In total employment (%)				Share within total employment of each sector (%)			
	Public formal	Private formal	Private informal	Total	Public formal	Private formal	Private informal	Total	Public formal	Private formal	Private informal	Total
	Total				Total							
2005	2.690.560	4.810.564	3.339.665	10.840.789	25	44	31	100				
2006	2.646.136	5.300.274	3.353.564	11.299.974	23	47	30	100				
2007	2.572.229	5.932.813	3.201.868	11.706.910	22	51	27	100				
2008	2.509.712	6.635.122	2.891.594	12.036.428	21	55	24	100				
2009	2.444.717	6.535.899	2.696.825	11.677.441	21	56	23	100				
2010	2.519.781	7.169.713	2.819.695	12.509.189	20	57	23	100				
2011	2.658.246	7.855.508	2.996.327	13.510.081	20	58	22	100				
	Post secondary				Post secondary				Post secondary			
2005	1.148.612	694.8	102.498	1.945.910	59	36	5	100	43	14	3	18
2006	1.233.862	813.909	106.088	2.153.859	57	38	5	100	47	15	3	19
2007	1.274.219	934.939	112.889	2.322.047	55	40	5	100	50	16	4	20
2008	1.325.243	1.106.077	109.173	2.540.493	52	44	4	100	53	17	4	21
2009	1.392.469	1.159.464	105.676	2.657.609	52	44	4	100	57	18	4	23
2010	1.530.272	1.233.815	107.822	2.871.909	53	43	4	100	61	17	4	23
2011	1.676.537	1.434.122	120.067	3.230.726	52	44	4	100	63	18	4	24
	Secondary				Secondary				Secondary			
2005	872.194	1.518.643	540.372	2.931.209	30	52	18	100	32	32	16	27
2006	808.279	1.706.312	571.108	3.085.699	26	55	19	100	31	32	17	27
2007	751.206	1.922.945	553.343	3.227.494	23	60	17	100	29	32	17	28
2008	680.658	2.135.790	483.205	3.299.653	21	65	15	100	27	32	17	27
2009	608.004	2.054.313	460.206	3.122.523	20	66	15	100	25	31	17	27
2010	576.971	2.169.706	444.193	3.190.870	18	68	14	100	23	30	16	26
2011	583.444	2.346.471	451.852	3.381.767	17	69	13	100	22	30	15	25

Authors' calculations from various HLFSs

Table 2 Population statistics

	2005				2011			
	Sample		Omitted	Total	Sample		Omitted	Total
	Public Mean	Private formal Mean	Informal Mean	Mean	Public Mean	Private Formal Mean	Informal Mean	Mean
Gender (woman)	22.3%	18.6%	20.1%	20.0%	27.8%	20.9%	23.7%	22.9%
Urban	80.5%	88.4%	78.9%	83.7%	79.9%	85.9%	71.5%	81.9%
Tenure	12.5	5.4	5.5	7.4	12.9	4.7	2.9	6.1
Tenure^2	2.2	0.6	0.8	1.1	2.5	0.5	0.4	0.9
Age	38.0	32.5	34.9	34.6	38.9	33.7	36.6	35.3
Age^2	15.1	11.2	13.2	12.8	15.9	12.0	14.6	13.3
Actual Working hours	43.4	54.8	56.6	52.2	41.3	53.5	53.9	51.1
Number of household members	3.9	4.0	4.7	4.2	3.6	4.0	4.8	4.1
No schooling	0.7%	1.4%	9.6%	3.4%	0.3%	2.2%	12.9%	3.8%
Primary and less than primary	24.5%	53.3%	71.8%	50.4%	14.7%	49.3%	66.2%	45.3%
High school	18.3%	16.0%	8.7%	14.6%	11.0%	14.8%	9.1%	12.9%
Vocational high school	14.5%	15.2%	6.4%	12.6%	11.3%	15.4%	6.9%	12.9%
Post-secondary	42.0%	14.2%	3.6%	18.8%	62.7%	18.2%	4.8%	25.0%
Never married	12.3%	27.4%	24.7%	22.6%	15.4%	27.6%	24.8%	24.6%
Married	86.0%	71.0%	72.0%	75.3%	81.8%	69.6%	70.8%	72.4%
Divorced	1.2%	1.3%	2.0%	1.5%	2.2%	2.4%	3.2%	2.5%
Spouse died	0.5%	0.4%	1.3%	0.6%	0.5%	0.4%	1.2%	0.6%
Agriculture, forestry and fishing	0.9%	0.6%	9.4%	3.0%	0.8%	0.9%	11.0%	2.8%
Mining and quarrying and other industry	4.2%	1.4%	0.5%	1.9%	2.7%	2.1%	0.7%	1.9%
Manufacturing	3.7%	44.8%	23.6%	28.0%	1.6%	35.6%	20.5%	25.7%
Construction	1.3%	5.1%	17.5%	7.4%	0.4%	7.9%	16.9%	8.0%
Wholesale and retail trade, transportation and storage, accommodation and food service activities	5.2%	30.7%	32.1%	24.1%	3.0%	29.6%	29.9%	24.1%
Information and communication + Financial and insurance activities + Real estate activities	4.3%	4.3%	1.0%	3.4%	1.7%	5.3%	2.4%	4.0%
Professional, scientific, technical, administration and support service activities	1.9%	5.8%	2.8%	3.9%	0.3%	11.5%	3.3%	7.6%
Public administration, defence, education, human health and social work activities	75.9%	3.9%	3.4%	23.2%	86.6%	4.6%	6.6%	22.1%
Other services	2.8%	3.5%	9.8%	5.0%	3.0%	2.4%	8.8%	3.8%
Legislators, senior officials and managers	6.0%	4.3%	2.4%	4.2%	7.9%	4.4%	2.3%	4.8%
Professionals	29.3%	5.3%	1.5%	10.8%	35.2%	4.9%	1.2%	10.5%
Technicians and associate professionals	14.4%	10.5%	3.5%	9.7%	13.5%	10.0%	3.3%	9.5%
Clerks	14.3%	11.4%	4.0%	10.2%	16.6%	12.3%	4.0%	11.6%
Service workers and shop and market sales workers	12.0%	13.7%	17.7%	14.3%	11.7%	15.9%	22.7%	16.3%
Skill agricultural and fishery workers + Craft and related workers + Plant and machine operators and assemblers	14.0%	42.5%	44.9%	35.4%	8.6%	36.9%	37.8%	31.2%
Elementary occupations	10.0%	12.2%	26.1%	15.4%	6.5%	15.7%	28.5%	16.2%

Note.- The table includes all covariates except regions.

Table 3 Summary results – Oaxaca-Blinder, Melly and JMP decompositions for public-private wage differentials

	2005	2011	2005	2011	2005	2011	2005	2011
	MELLY MEN		MELLY WOMEN		JMP MEN		JMP WOMEN	
Total	0.648	0.864	0.686	0.878	0.649	0.864	0.685	0.878
Composition	0.349	0.492	0.5	0.571	0.320	0.472	0.402	0.523
Price	0.299	0.371	0.187	0.307	0.329	0.391	0.283	0.355
10th percentile								
Total	0.588	0.836	0.675	0.836	0.588	0.847	0.685	0.878
Composition	0.182	0.223	0.288	0.390	0.222	0.416	0.402	0.523
Price	0.405	0.613	0.387	0.446	0.345	0.415	0.283	0.355
50th percentile								
Total	0.794	0.969	0.852	1.050	0.775	0.971	0.848	1.048
Composition	0.511	0.592	0.746	0.799	0.389	0.540	0.506	0.640
Price	0.283	0.377	0.105	0.251	0.356	0.414	0.328	0.385
90th percentile								
Total	0.457	0.668	0.46	0.560	0.487	0.668	0.468	0.573
Composition	0.627	0.783	0.580	0.629	0.260	0.381	0.303	0.345
Price	-0.170	-0.115	-0.12	-0.069	0.258	0.328	0.187	0.243
Obs.	37904	51165	9220	15024	37904	51165	9220	15024
Contribution of composition at the mean	54%	57%	73%	65%	49%	55%	59%	60%
Contribution of the price (premium)								
10th percentile	69%	73%	57%	53%	59%	49%	41%	40%
50th percentile	36%	39%	12%	24%	46%	43%	39%	37%
90th percentile	-37%	-17%	-25%	-12%	53%	49%	40%	42%
Differences in premia								
50-10	-0.122	-0.236	-0.282	-0.195	0.011	-0.002	0.046	0.030
90-50	-0.453	-0.492	-0.223	-0.320	-0.098	-0.086	-0.142	-0.142
Differences in contributions of premia								
50-10	-0.333	-0.344	-0.450	-0.294	-0.128	-0.064	-0.025	-0.037
90-50	-0.729	-0.561	-0.379	-0.363	0.072	0.065	0.012	0.057

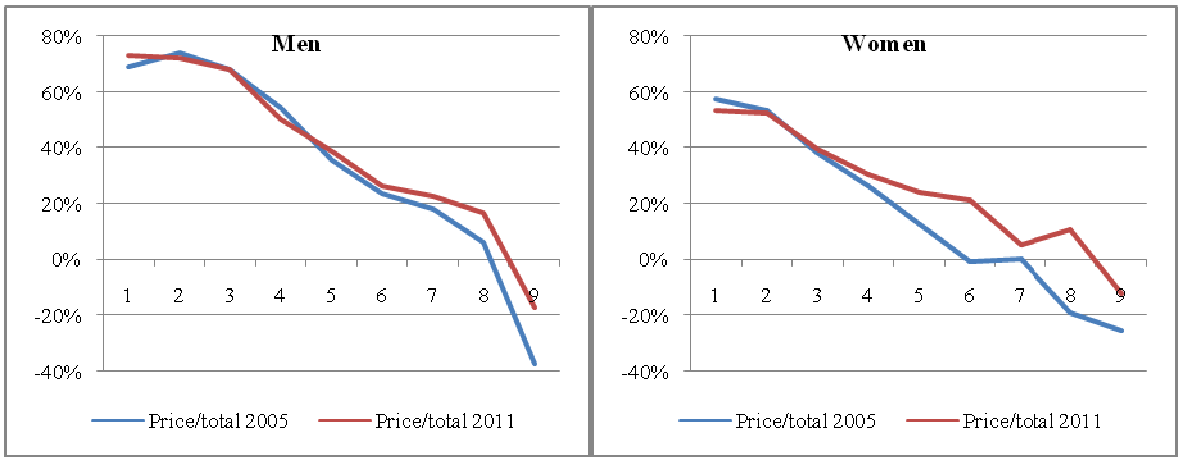
Note.- Mean values in the Melly Quantile regression columns are Oaxaca-Blinder results.

Table 4 Quantile decomposition results by percentiles

PANEL A	PUBLIC-PRIVATE WAGE DIFFERENTIALS															
	Men 2005				Men 2011				Women 2005				Women 2011			
	Total	Composition	Price	Price/total	Total	Composition	Price	Price/total	Total	Composition	Price	Price/total	Total	Composition	Price	Price/total
p10	0.588	0.182	0.405	69%	0.836	0.223	0.613	73%	0.675	0.288	0.387	57%	0.836	0.390	0.446	53%
p20	0.744	0.192	0.552	74%	0.956	0.262	0.693	73%	0.762	0.357	0.405	53%	0.987	0.470	0.517	52%
p30	0.754	0.239	0.515	68%	1.019	0.325	0.693	68%	0.875	0.539	0.336	38%	1.019	0.613	0.405	40%
p40	0.783	0.357	0.426	54%	1.009	0.500	0.509	50%	0.852	0.629	0.223	26%	1.049	0.731	0.318	30%
p50	0.794	0.511	0.283	36%	0.969	0.592	0.377	39%	0.852	0.746	0.105	12%	1.050	0.799	0.251	24%
p60	0.754	0.575	0.178	24%	0.990	0.730	0.260	26%	0.822	0.829	-0.007	-1%	1.037	0.814	0.223	22%
p70	0.720	0.589	0.131	18%	0.900	0.693	0.207	23%	0.693	0.693	0.000	0%	0.924	0.875	0.049	5%
p80	0.619	0.580	0.039	6%	0.833	0.693	0.140	17%	0.636	0.756	-0.120	-19%	0.811	0.724	0.087	11%
p90	0.457	0.627	-0.170	-37%	0.668	0.783	-0.115	-17%	0.462	0.580	-0.118	-25%	0.560	0.629	-0.069	-12%
PANEL B	**WITHIN SECTOR WAGE DIFFERENTIALS (2005-2011)**															
	Public men				Private men				Public women				Private women			
	Total	Composition	Price	Price/total	Total	Composition	Price	Price/total	Total	Composition	Price	Price/total	Total	Composition	Price	Price/total
p10	0.436	0.223	0.213	49%	0.187	0.028	0.159	85%	0.300	0.087	0.21	71%	0.139	0.000	0.139	100%
p20	0.387	0.095	0.293	76%	0.176	0.000	0.176	100%	0.324	0.049	0.28	85%	0.099	0.000	0.099	100%
p30	0.403	0.073	0.330	82%	0.139	0.000	0.139	100%	0.282	0.028	0.25	90%	0.139	0.000	0.139	100%
p40	0.346	0.069	0.277	80%	0.120	-0.028	0.148	123%	0.308	0.065	0.24	79%	0.110	0.000	0.110	100%
p50	0.336	0.034	0.302	90%	0.160	0.000	0.160	100%	0.290	0.046	0.24	84%	0.092	-0.016	0.107	117%
p60	0.335	0.057	0.278	83%	0.099	0.000	0.099	100%	0.307	0.043	0.26	86%	0.092	0.000	0.092	100%
p70	0.289	0.051	0.237	82%	0.109	0.000	0.109	100%	0.261	0.030	0.23	89%	0.030	0.000	0.030	100%
p80	0.313	0.056	0.257	82%	0.099	0.041	0.058	59%	0.270	0.046	0.22	83%	0.095	0.101	-0.006	-6%
p90	0.255	0.016	0.239	94%	0.041	0.010	0.030	74%	0.261	0.049	0.21	81%	0.172	0.087	0.085	49%

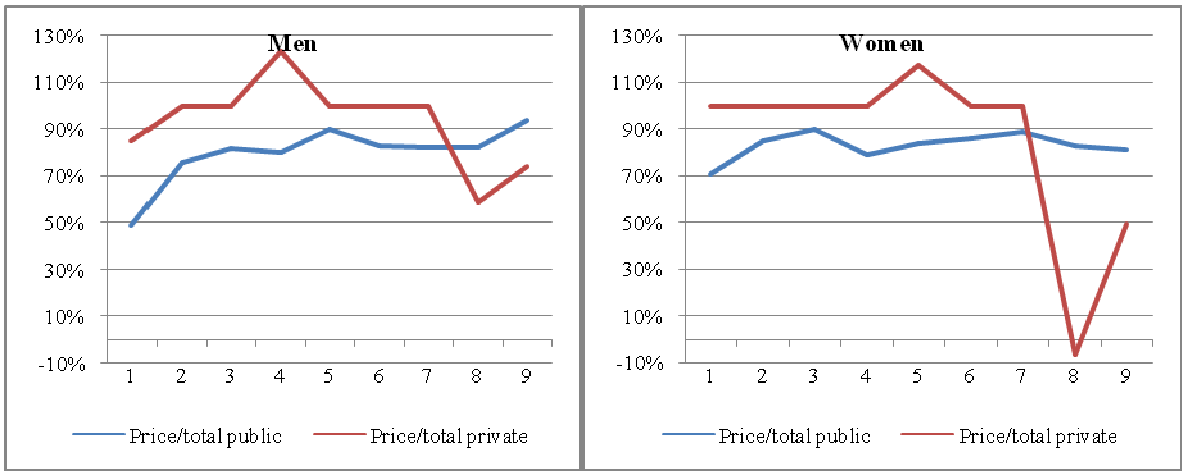
Note.-The Melly decomposition using probit link is estimated includes covariates in table 2. Omitted categories are: no schooling for education, never married for marital status, agriculture, forestry and fishing for sectoral activity, and legislators, senior officials and managers for occupational classification.

Figure 3 Contributions of the price effects to public-private total wage differential



Derived from Table 4

Figure 4 Contributions of the price effects to wage differentials within sectors from 2005 to 2011



Derived from Table 4

Annex 1 Broader groupings- ISCO88 and NACE rev2 to ISIC (9 to 7)

ISCO88	Skill level	Aggregation
1. Legislators, senior officials and managers	-	1
2. Professionals	4	2
3. Technicians and associate professionals	3	3
4. Clerks	2	4
5. Service workers and shop and market sales workers	2	5
6. Skill agricultural and fishery workers	2	
7. Craft and related workers	2	6
8. Plant and machine operators and assemblers	2	
9. Elementary occupations	1	7

Note.- Group 6, 7 and 8 have been aggregated to make up for one group because number of observations were insufficient in either the public sector.

Annex 2 High level aggregation of ISIC rev4 (21 to 9 sectors)

NACE Rev. 2	High-level aggregation ISIC rev.4/ NACE rev.2	Our aggregation
A Agriculture, forestry and fishing	1 A Agriculture, forestry and fishing	isic1
B Mining and quarrying C Manufacturing D Electricity, gas, steam and air conditioning supply E Water supply, sewerage, waste management and remediation activities	2 B, C, D and E Manufacturing, mining and quarrying and other industry	isic2*
C Manufacturing	2a C Of which: manufacturing	isic3
F Construction	3 F Construction	isic4
G Wholesale and retail trade; repair of motor vehicles and motorcycles H Transportation and storage I Accommodation and food service activities	4 G, H and I Wholesale and retail trade, transportation and storage, accommodation and food service activities	isic5
J Information and communication	5 J Information and communication	isic6
K Financial and insurance activities	6 K Financial and insurance activities	
L Real estate activities	7 L Real estate activities	
M Professional, scientific and technical activities N Administrative and support service activities	8 M and N Professional, scientific, technical, administration and support service activities	isic7
O Public administration and defence; compulsory social security P Education Q Human health and social work activities	9 O, P and Q Public administration, defence, education, human health and social work activities	isic8
R Arts, entertainment and recreation S Other service activities T Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use U Activities of extraterritorial organizations and bodies	10 R, S, T and U Other services	isic9

* Manufacturing excluded

High level aggregation according to ""high-level SNA/ISIC aggregation A*10/11" in Eurostat (2008) "NACE Rev.2. Statistical classification of economic activities in the European Community", http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-07-015/EN/KS-RA-07-015-EN.PDF and http://unstats.un.org/unsd/cr/registry/docs/i4_SNA.pdf

Sectors 5, 6, and 7 have been aggregated to make up for one group because number of observations was insufficient in the public sector