CRISEI

Centro di Ricerca Interdipartimentale in Sviluppo Economico e Istituzioni

Discussion Paper Series

Wage gaps and gender discrimination in the private and public sectors: the case of Italian graduate young workers

Maria Rosaria Carillo, Alessandro Sapio

CRISEI - Università di Napoli - Parthenope

Università degli Studi di Napoli - Parthenope

CRISEI

Wage gaps and gender discrimination in the private and public sectors: the case of Italian graduate young workers

M.R. Carillo*, A. Sapio*

*Department of Economic Studies, Parthenope
University of Naples

Wage gaps and gender discrimination in the private and public sectors: the case of Italian graduate young workers[*]

Maria Rosaria Carillo[†]   Alessandro Sapio[‡]

July 5, 2012

Abstract

The issues of gender discrimination and segregation in the Italian labour market are analyzed in this paper, with a view to understanding whether the public sector is able to mitigate discriminatory outcomes. Based on the analysis of a sample of graduate workers observed 5 years after their degree, provided by the AlmaLaurea consortium, we find: (i) network-based job search channels are more intensely used by women and in the private sector, even when controlling for public examinations; (ii) vertical segregation in similar across sectors; (iii) women employed in the public sector are characterized by higher job satisfaction; (iv) in an Oaxaca-Blinder decomposition of wage differentials across genders, the share attributable to discrimination in the public sector is lower.

1 Introduction

The economic literature on differences between public and private labour markets is focused mainly on the differences in wage structure between the two sectors (Ehrenberg and Schwarz, 1986; Bender, 1998; Katz and Krueger, 1991).[1] As commonly suggested in this literature, public sector workers on average receive positive wage premia vis-a-vis comparable workers doing comparable jobs in the private sector, and consequently, a large part of the literature on this theme tries to explain what determines such wage premium and in general the differences in the wage structure between the two sectors.

One relevant but seldom studied aspect is the different propensity in the two sectors for gender discrimination. In fact, the empirical works on this matter show that gender wage gaps and vertical segregation are lower in the public sector than in the private sector. Arulampalam et al. (2007) and Gregory and Borland (1999) find that the mean gender wage gap is considerably smaller in public sector jobs while the distribution of relative wages varies dramatically across sectors. Gregory and Borland (1999) argue that these differences in wage structures are not surprising given that wage setting in the public sector occurs in a political environment whereas private sector decision making occurs in a market environment. Moreover, anti-discrimination legislation may be more aggressively enforced in the public sector, and there is evidence that occupational integration has been faster in the public sector. The public sector differs from the private sector also with respect to gender segregation. Mora and Ruiz-Castillo (2004) and Dolado et al. (2002) find that gender occupational segregation in the private sector is higher than in the public sector, respectively in Spain and in US and EU samples. Whether these characteristics of the public sector make it more efficient than the private sector in allocative terms is an open question. Yet, to the extent that inequality is a distortion that can hamper economic growth, the public sector can promote growth by mitigating labor market differences between women and men.

In this paper, we compare the performances of the Italian public and private sectors with respect to gender parity. The relevance of this research question is demonstrated by the exponential growth in female labour market participation and employment rates (Bettio 1988, Carillo 1995). These trends

---

[1]A special issue of "The Manchester School" (vol. 75, n. 4, July 2007) has been dedicated to public-private wage differentials. The case of Italy has been analyzed by Brunello and Dustman (1997) and Comi and Ghinetti (2002).

have been paralleled by fast growth in female education attainments (Goldin 2006). Both phenomena suggest that a considerable share of employment growth, both in quantitative and in qualitative terms, is due to women. This notwithstanding, in all industrialized countries one finds sharp wage differentials against women (Flabbi 2001). Taking the above aspects into account, one concludes that a large share of the new labor force is underpaid, and that such inefficiency affects the share of population that has mostly contributed to recent economic growth via its fast growth in human capital investments. Analyzing gender wage gaps across public and private sectors can provide insights on the ability of the public sector to neutralize such inefficiencies.

Our gender-based comparison between the public and private sector focuses on different aspects of gender discrimination. First of all, not all job searching strategies affect gender-based inequalities alike: discriminatory attitudes by employers may be facilitated if jobs are found by means of informal and network channels; or, gender discrimination in formal job search channels can push women to rely on informal channels. Second, vertical occupational segregation can prevent women from reaching high hierarchical positions and the associated income and power benefits. Third, wage discrimination and differences in job satisfaction, together, can penalize the remuneration of women in both monetary and non-monetary terms.

The empirical analysis of this paper exploits a dataset from the Almalaurea 2007 survey, which provides information on Italian young workers who graduated in 2002, 2004, and 2006. We focus on the job conditions of graduates five years after the attainment of their degrees, i.e. on the 2002 cohort. AlmaLaurea is an online labour market intermediation service managed by a consortium of 64 public and private Italian universities, co-financed by the Italian Ministry of Education. AlmaLaurea manages a database that collects information on college graduates curricula and, conditional on their permission, grants firms electronic access to curricula upon the payment of a fee. With high students' participation rates and with more universities joining each year, the information managed by AlmaLaurea covers about 78% of Italian graduates. Bagues and Sylos Labini (2009) have shown that graduates from universities that joined the AlmaLaurea consortium in 1996 and 1997 enjoy a lower probability of unemployment, a positive effect on wages and a higher job satisfaction than statistically similar individuals who graduated in non-Almalaurea universities. Further empirical analyses using the AlmaLaurea dataset are included in AlmaLaurea's annual reports on the

3

graduates' employment conditions, published since 2004, as well as in a series of AlmaLaurea working papers.[2]

The paper is structured as follows. Section 2 is devoted to the analysis of gender-based differences in job search channels. Differences in channels are observed across genders and across sectors; networks are more intensely used by women and in the private sector, even when controlling for the public sector bias in favor of public examinations. Vertical occupational segregation is examined in Section 3. While similar across sectors, vertical segregation in the public sector is mainly due to managerial and teaching positions; in the private sector qualified clerks and consultants play a major role in this respect, along with managerial positions. Differences in job satisfaction rates and sources are found in Section 4: women are more satisfied in the public sector. The issue of wage discrimination is investigated through an Oaxaca-Blinder decomposition. We find that the share of wage differentials across genders that can be explained by observable traits is around one half in the private sector, and above 60% in the public sector, suggesting that wage discrimination in the public sector is milder. Conclusions and insights for future research are outlined in Section 6.

2   Job search methods

As stressed in the literature on social networks, a large share of individuals and their jobs through referrals or contacts provided by relatives, friends and acquaintances, and the use of informal referrals is purposive (Holzer 1988, Montgomery 1991, Calvo-Armengol and Jackson 2004). It has been estimated that about 52% of workers in the USA in 1999 found her jobs through personal relationships, 39% in Spain, 33% in France and 24% in Italy (Calvo-Armengol 2004). The main reason why social ties are so widely used is that network connections help reducing informational asymmetries (Topa 2001). On the one hand, employers are not fully informed on the productivity of potential employees before hiring them, and can overcome this informational barrier by using the employees' social ties to collect information. On the other hand, workers in imperfect labor markets can use social ties to reduce the high job search costs. However, referrals tend to be made by individuals belonging to the same social group - e.g. same gender or ethnic group

---

[2]See the websites: http://www.almalaurea.it/en/universita/occupazione/ and http://www2.almalaurea.it/en/universita/pubblicazioni/wp/.

(homophily, or inbreeding bias). As an implication, labor markets strongly based on informal links are likely to widen the existing inequality and can give rise to occupational segregation with respect to both gender and ethnic groups (Buhai and van der Leij 2006; Montgomery 1992).

In the AlmaLaurea 2007 survey, young graduate workers have been asked to indicate their job search method, choosing from either of nine categories, which we have aggregated into two groups: network-based and non-network methods, plus the residual category 'other methods'. Network-based job search include referral, request for referral, continuation of family business; non-network methods include direct call, open competition, continuation of stage, journals/notice boards, personal initiative. As it seems clear, the latter methods do not rely on the exploitation of personal ties, as it is instead the case with the former methods. Hereby we only focus on workers interviewed five years after graduation - namely, those who graduated in 2002. The reason is that individuals graduated very recently might accept job offers whom they see as just ways to escape unemployment or preliminary steps towards achieving their preferred occupation. Hence data on workers one or three years after graduation might reflect more chance than choice.

Table 1: Distribution of AlmaLaurea graduate young private and public workers by job search method.

Sector	Channel	Men (%)	Women (%)	Total (%)
Public	Network-based	6.3	6.2	6.3
	Non-network	74.8	65.4	68.5
	Other	18.9	28.4	25.2
	Total	100.0	100.0	100.0
Private	Network-based	20.0	20.8	20.4
	Non-network	74.5	71.2	72.7
	Other	5.5	8.0	6.9
	Total	100.0	100.0	100.0

The distribution of AlmaLaurea young public and private graduate workers by job search methods is reported in Table 1. The table shows that networks are more frequently used in the private sector, and that there exist differences among men and women, although not very wide. More information is gained by running χ^2 tests in order to assess whether men and women access to the private and public sector by means of significantly different channels.

First, we have run identity tests concerning the distribution of graduate private and public workers across job search methods, and the distribution of male and female graduate workers (in a given sector) across job search methods. Table 2 (upper panel) shows that null hypotheses of identity can be rejected at the 95% significance level, meaning that job search method vary across sectors and across genders.[3] A closer look at the results, based on detailed information not shown in the table, reveals that network-based job search strategies are less effective in the public sector. However, in self-reporting information on job search, individuals can conceal whether they used personal ties to bias the results of public examinations in their favor. Moreover, we find that women rely less on the non-network channels. One explanation for this pattern is that women need greater reliance on personal ties than men in order to overcome discrimination. This interpretation in consistent with evidence by Bagues and Esteve-Volart (2010) on Spanish data, showing that women tend to be discriminated against even in public examinations, specifically when the share of female evaluators is greater.[4]

Second, we have performed tests of independence, whereby we ask whether there is any association between the distributions of graduates by sector, gender, and job search methods. The χ^2 values reported in the lower panels of Table 2, again, exceed the 95% critical values, revealing that the individual differences in job search strategies are linked to gender and sectoral differences. Cramer's V statistic, a measure of the statistical association, is also reported. V assumes values between 0 (no association) and 1 (perfect association). The estimated values are all above 0.50, confirming the lack of independence result.

3   Occupational gender segregation

Occupational gender segregation refers to differences in the amounts of people of each gender across occupations. In other words, some jobs are not offered to or are not demanded by women and are mainly held by men, and vice

---

[3]The results concerning the public sector may be driven by the overwhelming share of public sector jobs obtained by open competition; and that the residual category 'other methods' could disturb the results. For these reasons, the tests are performed also on a sub-sample that does not include the options 'other methods' and 'open competition', and surprisingly we still find the same results. The "no answer" option has been excluded, as the corresponding low number of observations would bias the χ^2 test results.

[4]Recall that we have classified open competitions as a non-network job search method.

Table 2: χ^2 tests of identity between the public sector and private sector distributions of graduate young workers with respect to job search methods, and χ^2 tests of independence between job search methods and sectors, and between job search methods and genders within each sector. Legend: * = null hypothesis not accepted at 95% significance level.

Test	Comparison	Specification	χ^2	d.f.	V
Identity	Public vs. private	All channels	3765.9*	9	-
		exc. open compet.	1411.4*	8	-
		exc. open compet., other methods	99.5*	7	-
	Men vs. women, public	All channels	31.7*	9	-
	Men vs. women, private	All channels	47.5*	9	-
Independence	Channels vs. sectors	All channels	12110.0*	8	0.8116
		exc. open compet.	6868.3*	7	0.6515
		exc. open compet., other methods	3698.6*	6	0.5140
	Channels vs. genders, public	All channels	1364.4*	8	0.5122
	Channels vs. genders, private	All channels	3404.9*	8	0.5076

versa. Gender segregation against women is *horizontal* when female occupations are concentrated in few sectors, *vertical* when women mainly hold low positions in the occupational ladder. In the former case, women are mainly discriminated in recruitment, whereas in the latter they are discriminated in promotion.

Occupational segregation by sex is observed in many different countries, under different political regimes, and in different religious, social and cultural environments (Anker 1997). Detecting it and understanding its determinants is extremely important, because segregation is detrimental to economic efficiency, to market flexibility, and to the long-term prospects of human capital accumulation by women.

Economic theory offers at least three explanations of segregation. From a labor supply viewpoint, women have preferences for jobs with high starting pay, low returns to experience, and low penalties for temporary withdrawals, such as maternity leaves. Women are better off with flexible work schedules because this allows them to deal with childcare duties. On the labor demand side, women are likely to be more costly than men even if they earn the same wage, because maternity and childcare can imply higher absenteeism, higher turnover rates, and paid maternity leave. This limits the occupations

for which women can qualify. In addition to this, Becker (1971) proposed that if male employers are prejudiced against female workers, they would bear disutility from hiring them. Of course, all of these explanations do not take account of protective legislation at the national and international level prohibiting e.g. night work and jobs that require carrying heavy loads (Anker 1997).

In this paper, we only deal with vertical segregation, which is rather sharp in Italy and in all other advanced economies (see Emerek et al. 2003). Analyzing the AlmaLaurea data reveals that the distribution of men and women graduate young workers across private sector positions is not the same as across public sector positions. As from Table 3, women are less than half among managers and qualified clerks in the private sector, whereas a better balance is achieved in the public sector.

Table 3: Incidence of graduate young female workers in the various positions of the occupational ladder, with respect to the total number of graduate young workers interviewed within the AlmaLaurea 2007 survey 5 years after their degree.

Positions	Public (%)	Private (%)
Managers	51.8	33.1
Qualified clerks	66.9	48.1
Executive clerks	70.4	64.5
Teachers	78.2	84.6
Project workers/contractors	65.1	65.8

Further information is obtained by analyzing vertical segregation with respect to positions and contract types. Specifically, we compute the Duncan index (Duncan and Duncan 1955) and the Karmel-MacLachlan index (Karmel and MacLachlan 1988) separately for the public and private sectors, with respect to positions and contract types. The Duncan index (D) is interpreted as the percentage of individuals in each groups that has to be removed without replacement for segregation to disappear. The Karmel-MacLachlan index (I_p) is a measure of how many workers ought to be reallocated (with replacement) for segregation to disappear, but under the constraint that the occupational structure and the shares of men and women in the total occupation be preserved.[5] The results are in Table 4. For each sector (public,

---

[5]See Appendix for formal definitions of the occupational segregation indicators, and

Table 4: Duncan and Karmel-MacLachlan indices of gender segregation by positions in the occupational ladder, public and private sectors. The indices are decomposed into components associated to different positions.

Sector	Positions	M_j	F_j	$\frac{M_j}{M}$	$\frac{F_j}{F}$	$\frac{1}{2}\left|\frac{F_j}{F}-\frac{M_j}{M}\right|$	$\frac{1}{T}\left|F_j-a(M_j+F_j)\right|$
Public	Managers	225	242	26.0	14.0	6.00	2.68
	Qualified clerks	156	315	18.1	18.1	0.00	0.02
	Executive clerks	32	76	3.7	4.4	0.35	0.15
	Teachers	206	738	23.8	42.5	9.35	4.15
	Other	83	59	9.6	3.4	3.10	1.38
	Project workers/contractors	161	300	18.6	17.3	0.65	0.30
	Without contract	1	5	0.1	0.3	0.05	0.01
($a = 0.6676$	$T = 2599$)					$D = 19.5$	$I_p = 8.69$
Private	Managers	436	216	14.3	6.1	4.10	2.03
	Qualified clerks	1855	1717	60.6	48.5	6.05	3.03
	Executive clerks	257	467	8.4	13.2	2.40	1.19
	Teachers	43	236	1.4	6.7	2.65	1.30
	Other	81	129	2.6	3.6	0.50	0.24
	Project workers/contractors	347	668	11.3	18.9	3.80	1.87
	Without contract	39	109	1.4	3.0	0.80	0.45
($a = 0.5366$	$T = 6600$)					$D = 20.3$	$I_p = 10.11$

private) and position (managers, qualified clerks, executive clerks, teachers, project workers/contractors, without contract, other), the table reports the number of male workers (M_j), the number of female workers (F_j), their ratios with respect to totals $(\frac{M_j}{M}$ and $\frac{F_j}{F})$, and the shares of the above mentioned indices which are imputable to individual occupations (last two columns). The D and I_p indices are indeed obtained as the sum of the differences (in absolute value) reported, respectively, in the penultimate and in the last column.

It turns out that occupational segregation is slightly higher in the private sector. About 20.3% of men or women workers ought to change occupation in the private sector for segregation to disappear, whereas this is only 19.5% in the public sector. This evidence is confirmed by the Karmel-MacLachlan index. As shown by the upper part of Table 4, last two columns, most of the public sector segregation is due to gender differences in managerial positions (a male-dominated occupation) and teachers (a female-dominated

---

Watts (1998) for a review of the literature.

Table 5: Duncan and Karmel-MacLachlan indices of gender segregation with respect to contract types. The indexes are decomposed into components associated to different contract types.

Sector	Contracts	M_j	F_j	$\frac{M_j}{M}$	$\frac{F_j}{F}$	$\frac{1}{2}\left\|\frac{F_j}{F}-\frac{M_j}{M}\right\|$	$\frac{1}{T}\left\|F_j-a(M_j+F_j)\right\|$
Public	Tenured	310	482	35.9	27.8	4.05	1.80
	Apprenticeship	20	36	2.3	2.1	0.10	0.05
	Temporary	365	887	42.3	51.2	4.45	1.97
	Project jobs	129	263	14.9	15.2	0.15	0.11
	Other temporary	38	61	4.4	3.5	0.45	0.20
	No contract	1	5	0.2	0.2	0.00	0.04
($a = 0.6677$	$T = 2597$)					$D = 9.2$	$I_p = 4.17$
Private	Tenured	2386	2281	78.0	64.3	6.85	3.39
	Apprenticeship	35	55	1.1	1.6	0.25	0.11
	Temporary	229	392	7.5	11.1	1.80	0.89
	Project jobs	255	546	8.3	15.4	3.55	1.76
	Other temporary	116	163	3.8	4.6	0.40	0.20
	No contract 39	109	1.3	3.0	0.85	0.45	
($a = 0.5368$	$T = 6606$)					$D = 20.3$	$I_p = 10.11$

occupation). In the private sector, gender segregation against women is more uniform across positions, albeit more pronounced in the case of managers and qualified clerical assistants. Based on these results, we can claim that occupational segregation is quantitatively and qualitatively different in the public and private sector.

Results from the analysis of segregation according to contractual types are provided in Table 5. There, the j subscript refers to contract types. These results confirm the underlying tendency previously detected. Gender differences in the public sector are mainly due to tenured and temporary jobs, in which, according to our elaborations, men prevail. In the private sector, segregation is signaled also by the higher share of female project workers and contractors.

4   Job satisfaction

Job satisfaction has become a relevant research issue in labor economics after the pioneering contributions by Flanagan et al. (1974), Hamermesh

(1977), Freeman (1978) and Borjas (1979). While it is true that job satisfaction is hard to measure, satisfaction is worth analyzing as it is an essential non-monetary source of individual welfare, is a major determinant of labor mobility decisions, and is related in a rather subtle and insightful way with key labor market variables, such as wages and unionization.

A few works on job satisfaction have dealt with satisfaction differentials between the public and private sector. Katz and Krueger (1991) observed that many blue collars are ready to queue for a public sector job, albeit wage differentials do not seem to be large enough as to justify this. Reasons could be the availability of better working conditions and career perspectives. The analysis of US data in Heywood et al. (2002) does not reveal any significant difference in satisfaction across sectors, after controlling for fixed effects and for the sorting of individuals with high propensity to enjoy satisfaction from a public sector job. The estimates of a probit model in Ghinetti (2007) on data from the 1995 Bank of Italy Households, however, show that public sector jobs guarantee higher satisfaction due to stability of the job and the feeling of receiving greater consideration by colleagues.

Few works have examined job satisfaction differentials across genders. In a sample of US data, Clark (1997) found that women are more satisfied on the job than men. Ghinetti (2007) shows that while Italian female workers are more satisfied than male workers in terms of job stability, their jobs are rarely consistent with their cultural interests and their educational backgrounds, resulting in less satisfaction.

Hereby we aim to reappraise the evidence on job satisfaction differentials across sectors and genders, using the job satisfaction indicators provided by AlmaLaurea, concerning graduate young workers interviewed 5 years after graduation. Interviewed graduates have been asked to rate their current job according to a scale from 1 (lower satisfaction) to 10 (highest satisfaction) regarding a number of aspects: job security, coherence with educational background, learning potential, prestige, coherence with cultural interests, social usefulness, autonomy on the job, involvement in decision processes, schedule flexibility, leisure time, workplace, relationship with colleagues, earning prospects, career prospects.

The AlmaLaurea data show that sources of job satisfaction differ both across genders and sectors. In the public sector, social usefulness of the job is the single aspect that provides greatest satisfaction, along with the relationships with colleagues and the autonomy on the job. Lower satisfaction is due to career and earning prospects, along with job stability and the con-

tract type. This sounds in line with the high share of young graduate workers with temporary jobs in the public administration. The private sector yields high satisfaction in terms of relationship with colleagues, autonomy, and the acquisition of skills. Private sector jobs however are quite costly in terms of leisure time and only allow for limited career prospects.

We have tested whether the average satisfaction is significantly different across sectors, using t tests. In the public sector, women tend to be overall more satisfied. Yet, men claim to be more satisfied with regards to job stability, recognition, flexibility of the schedule and career prospects. These differences may have to do with the fact that men are more likely to hold tenured and high-ranked positions. As to private sector jobs, women are better satisfied with regards to social usefulness, whereas men are more satisfied in all other aspects. The private sector thus seems to be less suited to provide equality of treatment across genders.

5 Gender wage gaps

It has been widely reported that female workers earn on average less than male workers in virtually all of the developed economies (REFERENCES). Several theoretical explanations have been given for this evidence. First, different career achievements might simply hide differences in preferences among women and men: as previously mentioned, women may prefer jobs characterized by lower returns to experience and lower penalties for temporary interruptions. Relatedly, women may have a comparative advantage in family work, making it optimal for them to supply less hours on the labor market, or to pursue less ambitious careers. Finally, one may argue that female workers earn less because they are discriminated. This means that a wage gap would exist even between a man and a woman endowed with the same productivity, the same preferences and supplying the same number of hours (Becker 1971; Phelps 1972). Although discrimination as such does not determine any distortion, it feeds into further sources of inequality - for instance, it deters labor market participation and human capital investments.

Most of the empirical works on the gender wage gap have highlighted that individual differences in preferences and productivity alone cannot account for the observed differences in earnings (Filoso and Papagni 2007, Flabbi 2001). In this respect, there is some evidence that the private sector discriminates more than the public sector (Dell'Aringa et al. 2007). The average

monthly earnings data on graduate young workers collected by the AlmaLaurea consortium seem to confirm both facts: female graduates employed in the public sector earn on average 13.7% less than male graduates in the same sector. The gap is even wider in the private sector: 24.5%. These gaps might be due to the fact that women are more often employed in part-time jobs, but if we focus on full-time workers, the gap is still there (13.6% and 19.4% respectively in the public and private sector).[6]

5.1 Estimating wage equations

We thus come to the question of how much of the observed gender wage differentials is left unexplained after controlling for idiosyncratic differences among genders and jobs. In the approach introduced by Oaxaca (1973) and Blinder (1973), the unexplained component of wage gaps is taken as evidence of gender discrimination. The Oaxaca-Blinder method features two stages: (i) estimation of multiple linear regression models, separately for men and women; (ii) decomposition of the fitted wage gaps.

In the first stage, we have splitted the AlmaLaurea sample of graduate young workers in four subsamples, resulting from the intersection of genders (men, women) and sectors (public, private). We have thus estimated four linear regression equations, one for each subsample:

$$\log w_{ij} = X'_{ij}\beta_{ij} + \epsilon_{ij} \tag{1}$$

where i stands for the generic gender, and j for the generic sector. $\log w$ is the vector of (logarithmic) average monthly net wages in Euros, X is a matrix including individual characteristics and information on the type of job, β_{ij} is the vector of regression coefficients, and ϵ_{ij} is a vector of error terms, Normally distributed with zero mean and finite variance by assumption.

The X matrix includes the following regressors. 'married' and 'children' are binary variables aimed to control for the fact that married women with children typically devote more hours to family work. 'degree type' (science and technology vs. humanities and social sciences), the position in the occupational ladder (teachers and clerical assistants; managers being the residual category), the type of contract (tenured job, temporary job, apprenticeship) and the sector (agriculture, industry, services) allow to control for irreducible differences among jobs. 'Geographic localization' (North and Centre; South is

---

[6]Self-employed individuals are excluded from the sample.

residual) captures the differences among local labor markets, a major issue in Italy, due to the North-South gap in per-capita income. 'degree requirement' is a binary variable equal to 1 if holding a college degree is a prerequisite for getting the job, and is a way to account for differences in the returns to education. We also include the job satisfaction indicator, described in the previous section. Job satisfaction might be negatively correlated with wage, because lower wages are more easily accepted in exchange of higher satisfaction on the job. On the other hand, in segmented labor markets, workers endowed with stronger bargaining power might be able to obtain jobs that are at the same time better paid and sources of greater satisfaction (Poggi 2007). In addition, the efficiency wage model proposed by Akerlof (1984) suggests that high wages are seen by workers as a gift, thereby increasing their satisfaction level and fostering their effort. Finally, we have also included a dummy variable to account for impact the job search methods on wages, with a view to capturing the impact of network-based search on wages. The existing evidence on this issue is mixed. Pistaferri's (1999) estimates imply negative wage premia for jobs found through networks in Italy. Pellizzari (2010) concludes that wage premia and wage penalties from using family and friends' ties in job search are equally frequent across European countries, and tend to disappear when one considers tenured jobs. This seems to suggest that wage premia and penalties arise from demand-supply mismatches. In a sample of Italian graduates, Sylos Labini (2004) finds that, ceteris paribus, the use of professional networks in job search brings a wage premium, whereas the use of family ties leads to less paid jobs.

Table 8 reports the estimated regression coefficients. The final specification does not include some variables whose coefficients turned out not to be statistically significant - specifically, job search method, sectors, the family variables, as well as geographic localization (in the public sector) and contract types (in the private sector). Such a lack of significance deserves a few comments. A priori expectations that women are paid less because of their role within the family do not have empirical support in the AlmaLaurea dataset. This is in line with the widespread evidence of high rates of unemployment among skilled young workers in Italy and, relatedly, that Italian young men and women tend to get married and have children relatively late. The lack of geographical wage differences in the public sector was expected, as public-sector wages are set by law. Less expectedly, heterogeneity in job search methods does not imply significant wage gaps. Consider, however, that our data cannot distinguish between professional and family ties. Opposite ef-

14

fects on wages as those suggested by Sylos Labini (2004) and Pellizzari (2010) may have canceled out in our sample.

The coefficients associated to the college degree type are significant, and in particular it seems that holding a degree in technology and science yields on average higher wages. In passing, notice that women have a higher propensity to enroll in humanities courses, thereby missing high wage opportunities. The estimated coefficient for contract types is higher in the public sector. The coefficient to the 'degree required' is significant - and positive - only in the private sector. The returns to education are thus higher in the private sector. The occupation ladder positions coefficients are negative: as expected, clerks and teachers earn less than managers (the residual category). Thus the wage gap between men and women is also due to women being less often allowed to reach the top levels of the hierarchy. Full-time jobs yield higher wages in both sectors, whereas there is a wage premium to apprenticeship only in the public sector. Interestingly, the tenured job coefficient in the public sector is positive for women, but negative for men. This might suggest that, all else being given, male workers with temporary jobs in the public sectors are paid more than male temporary workers employed in private companies, whereas the opposite occurs for women. As previously observed, women are less likely to hold a tenured job, which based on the above results might partly explain the wage gap. Job satisfaction is positively correlated to wage, supporting the segmentation and efficiency wage hypotheses. Finally, there are geographical differences in wages only in the private sector. The coefficients for North and Center are higher for women, meaning that women are more exposed to the possibly adverse conditions of the local labor market. The geographical gap is instead very small in the public sector. The R^2 is between 35 and 50%, rather high value for a cross-sectional regression model.

5.2 Oaxaca-Blinder decomposition results

Once we have assessed the impact of individual characteristics on wages across genders and sectors, our aim is to identify how much of the observed wage gap is due to discrimination. Towards this goal, we shall rely on the widely used Oaxaca-Blinder decomposition. Consider the linear models previously estimated:

$$\log w_{mj} = X'_{mj}\beta_{mj} + \epsilon_{mj} \tag{2}$$

Table 6: Estimated coefficients of the wage equation. Dependent variable: logarithm of the monthly net earnings. Legend: *= 5% statistical significance; **= 1% statistical significance.

Variables	Public		Private	
	Men	**Women**	**Men**	**Women**
	β_m	β_w	β_m	β_w
Scientific/technical degree	0.135**	0.147**	0.076**	0.054**
Degree requirement	–	–	0.031**	0.042**
Qualified clerks	-0.308**	-0.188**	-0.292**	-0.248**
Executive clerks	-0.252**	-0.219**	-0.322**	-0.341**
Teachers	-0.455**	-0.285**	-0.636**	-0.596**
Other clerks	-0.193**	-0.142**	-0.511**	-0.426**
Project workers/contractors	-0.426**	-0.281**	-0.393**	-0.466**
Full-time	0.422**	0.417**	0.462**	0.462**
Tenured job	-0.087**	0.041*	–	–
Apprenticeship	-0.150*	-0.086	–	–
Log(Satisfaction)	0.217**	0.168**	0.167**	0.142**
North	–	–	0.101**	0.161**
Center	–	–	0.050**	0.099**
Intercept	6.622**	6.518**	6.664**	6.510**
R^2	0.469	0.354	0.391	0.497
N. obs.	797	1535	2771	2731

$$\log w_{fj} = X'_{fj}\beta_{fj} + \epsilon_{fj} \tag{3}$$

where the subscript m stand for 'male', and f for 'female'. The difference between the expected values of log-wages in sector j reads

$$R_j = \overline{\log w}_{mj} - \overline{\log w}_{fj} = \overline{X'}_{mj}\hat{\beta}_{mj} - \overline{X'}_{fj}\hat{\beta}_{fj} \tag{4}$$

and can equivalently be written as

$$R_j = (\overline{X'}_{mj} - \overline{X'}_{fj})'\hat{\beta}_{fj} + \overline{X'}_{fj}(\hat{\beta}_{mj} - \hat{\beta}_{fj}) + (\overline{X'}_{mj} - \overline{X'}_{fj})'(\hat{\beta}_{mj} - \hat{\beta}_{fj}) \tag{5}$$

The first term in the summation on the right-hand side is the fraction of the wage gap explained by gender differences in average individual characteristics. The second term is the difference between the estimated coefficients,

i.e. the gap between the labor market valuations of labor supplied by men and women. The last addendum measures the interaction between the previous terms. If individuals with identical characteristics received different wages, then

$$E(\hat{\beta}_{mj} - \hat{\beta}_{fj}) = 0 \tag{6}$$

Whenever this condition were not met, a wage gap would appear that cannot be justified by a productivity gap, and it is presumably due to discrimination.

The previous formulation is based on the presumption that, without discrimination, the wage structure of men would prevail - this is represented by the parameter β_{mj}. However, in that case male workers would not have any earning benefit from discrimination, and there is no strong reason to believe this. One may reasonably assume that the prevailing wage structure without discrimination would be mid-way between the men and the women wage structures. Correspondingly, an alternative formulation of the Oaxaca-Blinder decomposition is based on the fictitious parameter (Neumark 1988):

$$R_j = (\overline{X'}_{mj} - \overline{X'}_{fj})'\beta^* + \left[\overline{X'}_{fj}(\hat{\beta}_{mj} - \beta^*) + \overline{X'}_{mj}(\beta^* - \hat{\beta}_{fj})\right] \tag{7}$$

In the literature it is commonly assumed that β^* is alternatively equal to $\hat{\beta}_{mj}$, $\hat{\beta}_{fj}$, or to an average between these two values (cf. Reimers 1983).

The results of the two- and three-part decompositions are summarized in Table 7. Comparing the sectors reveals that the 'unexplained' component of the wage gap is about 50% in the private sectors, well above the 40% share estimated for the public sector. As a conclusion, our analysis shows that a gender wage gap exists in both sectors, but also that the public sector discriminates much less.

6 Conclusion

In this paper we have analyzed the gender wage and occupational gaps in the public and private sector, using data from the 2007 AlmaLaurea survey on young workers interviewed 5 years after graduation. The data show that both in the public and in the private sector, ceteris paribus men and women do not have the same wage and career opportunities. In the private sector,

Table 7: Oaxaca-Blinder decomposition of the gender wage gap between graduate young male and female workers in the AlmaLaurea 2007 database.

Sector	Decomposition	Explained (%)	Unexplained (%)	Interaction (%)
Public	3 parts	58.5	32.5	8.7
	2 parts, $\beta^* = 0.5\hat{\beta}_{mj} + 0.5\hat{\beta}_{fj}$	63.2	36.8	
	2 parts, $\beta^* = \hat{\beta}_{mj}$	67.5	32.5	
	2 parts, $\beta^* = \hat{\beta}_{fj}$	58.9	41.1	
Private	3 parts	52.1	50.5	-2.6
	2 parts, $\beta^* = 0.5\hat{\beta}_{mj} + 0.5\hat{\beta}_{fj}$	50.8	49.2	
	2 parts, $\beta^* = \hat{\beta}_{mj}$	49.5	50.5	
	2 parts, $\beta^* = \hat{\beta}_{fj}$ 52.1	47.9		

there is evidence of occupational segregation, with women being concentrated mainly in the lower steps of the occupational ladder and often employed in non-tenured jobs. A significant share of the observed gender wage gaps is not justified by differences in productivity. Further, women claim to be less satisfied then men as regards earning and career prospects. In contrast, the public sector seems much less inclined to discriminate between male and female workers: occupational segregation in the public sector is lower and mostly due to the high share of female teachers; the estimated degree of wage discrimination is smaller, and gives women a higher degree of job satisfaction.

It is worth noting that the AlmaLaurea survey is about graduate workers, which are supposedly less exposed to gender discrimination than other components of the workforce, and more open to de-segregation policies. Therefore, finding gender segregation and discrimination in such a sample would suggest that inequality of treatment among genders is perhaps even stronger in the workforce at large. Our results also suggest that the public sector can endorse a key function in avoiding the emergence of such distortions, which could hamper economic growth and allocative efficiency.

Appendix

a) Dissimilarity index.

The dissimilarity index, introduced by Duncan and Duncan (1955), is defined as

$$D = 1\frac{1}{2}\sum_j \left| \frac{F_j}{F} - \frac{M_j}{M} \right| \qquad (8)$$

where F_j and M_j denote, respectively, the number of women and men employed in occupation j, whereas F and M indicate the total number of employed female and male workers. The dissimilarity index takes values between 0 and 100, and can be seen as the percentage of each group that has to be removed, without replacement, for segregation to disappear.

b) The Karmel-MacLachlan index.

Karmel and MacLachlan (1988) defined the following index:

$$I_p = \frac{1}{T}\sum_j |F_j - a(M_j + F_j)| \qquad (9)$$

where T and a denote respectively the total employment and the share of women; F_j and M_j have been defined above. Then index measures how much female employment in each employment category (F_j) departs from the number of women who would be employed in occupation j without segregation, which is equal to $a(F_j + M_j)$. The Karmel-MacLachlan index can be seen as the number of employed workers who should be reallocated (with replacement) in such a way as to remove segregation, but preserving the employment structure and the shares of women and men in the overall employment level.

References

Akerlof G. (1984), Gift Exchange and Efficiency-Wage Theory: Four Views, American Economic Review 74(2): 79-83.

Alesina A., Danninger S., Rostagno M.V. (2001), Redistribution through public employment: The case of Italy, NBER Working Paper 7387.

Anker R. (1997), Theories of occupational segregation by sex: an overview, International Labour Review 136 (3).

Arulampalam W., Booth A., Bryan M. (2007), Is there a glass ceiling over Europe? Exploring the gender pay gap across the wage distirbution, Industrial and Labor Relations Review 60(2): 163-186.

Bagues M., Esteve-Volart B. (2010), Can gender parity break the glass ceiling? Evidence from a repeated randomized experiment. Review of Economic Studies 77: 13011328

Bagues M., Sylos Labini M. (2009), Do On-Line Labor Market Intermediaries Matter? The impact of AlmaLaurea on University-to-Work transition, in D. H. Autor (ed), NBER volume Studies of Labor Market Intermediation, pp. 127-154. Chicago: University of Chicago Press.

Becker G. (1971), The Economics of Discrimination, University of Chicago Press.

Bettio F. (1988), The Sexual Division of Labour. The Italian Case, Clarendon Press, Oxford.

Blinder A.S. (1973), Wage discrimination: reduced form and structural estimates, Journal of Human Resources 8(4): 436-455.

Borjas G.J. (1979), Job satisfaction, wages and unions, Journal of Human Resources.

Brunello G., Dustman C. (1997), Le Retribuzioni nel Settore Pubblico e Privato in Italia: un Paragone Basato su Dati Microeconomici, in C. Dell'Aringa (ed.), Rapporto Aran sulle Retribuzioni 1996, Franco Angeli, Milano.

Buhai S., van der Leij M. (2006), A Social Network Analysis of Occupational Segregation, Tinbergen Institute Discussion Paper n. 016/1.

Calvo-Armengol A. (2004), Job Contact Networks, Journal of Economic Theory 115(1): 191-206.

Calvo-Armengol A., Jackson M.O. (2004), The Effects of Social Networks on Employment and Inequality, American Economic Review 94(3): 426-454.

Carillo M. R. (1995), Dinamica di Lungo Periodo dei Tassi D'Attivita' e Mutamenti Strutturali: Un'Applicazione al Caso Italiano, Economia Marche 14(2): 221-262.

Clark A.E. (1997), Job satisfaction and gender: Why are women so happy at work?, Labour Economics 4(4): 341-372.

Comi S., Ghinetti P. (2002), La Distribuzione dei Salari in Italia: un Confronto tra Pubblico e Privato, Rivista Internazionale di Scienze Sociali 110: 163-186.

Dell'Aringa C., Lucifora C., Origo F. (2007), Public Sector Pay and Regional Competitiveness. A
First Look at Regional Public-Private Wage Differentials in Italy, The Manchester School 75(4): 445-478.

Dolado J., Garcia-Serrano C., Jimeno J. (2002), Drawing lessons from the boom of temporary jobs in Spain, Economic Journal 112(480): F270-F295.

Duncan O.D., Duncan B. (1955), A methodological analysis of segregation indexes, American Sociological Review 20(2): 210-217.

Ehrenberg R., Schwarz J. (1986). Public-sector labor markets. Chapter 22 in Handbook of Labor Markets, vol. 2, p. 12191260. Elsevier.

Emerek R., Figueiredo H., Gonzales P., Gonas L., Rubery J. (2003), Indicators on Gender Segregation, DP 2003/02, Centro de Estudos de Economia Industrial, do Trabalho e da Empresa, Universidade do Porto.

Filoso V., Papagni E. (2007), Le differenze di genere nei redditi e nella soddisfazione del lavoro dei laureati, in Consorzio Interuniversitario AlmaLaurea (ed.), IX Rapporto sulla condizione occupazionale dei laureati, il Mulino.

Flabbi L. (2001), La discriminazione: evidenza empirica e teoria economica, in Brucchi Luchino (eds), Manuale di Economia del Lavoro, Il Mulino.

Flanagan R., Straus G., Ulman L. (1974), Worker discontent and workplace behavior, Industrial Relations 13(2): 101-123.

Freeman R.B. (1978), Job satisfaction as an economic variable, NBER Working Paper no. 225.

Ghinetti P. (2007), The public-private job satisfaction differential in Italy, Labour 21(2): 361-388.

Goldin C. (2006), The Quiet Revolution That Transformed Women's Employment, Education and Family, American Economic Review Papers and Proceedings 96(2): 1-21.

Gregory R.G., Borland J. (1999), Recent developments in public sector labor markets, Chapter 53 in Handobook of Labor Economics, vol. 3, part C, p. 35733630. Elsevier.

Hamermesh D. (1977), Economics of job satisfaction and worker alienation, in Ashelfelter O., Oates W., Essays in Labor Market and Population Analysis.

Heywood J.S., Siebert W.S., Wei X. (2002), Worker sorting and job satisfaction: the case of union and government jobs, Industrial and Labour Relations Review 55(4): 595-609.

Karmel T., MacLachlan M. (1988), Occupational sex segregation - Increasing or decreasing?, Economic Record 64(3): 187-195.

Katz L.F., Krueger A.B. (1991), Changes in the structure of wages in the public and private sector, NBER Working Paper no. 3667.

Montgomery J. D. (1991), Social networks and labor-market outcomes: Toward an economic analysis, American Economic Review 81(5): 1408-1418.

Montgomery J. D. (1992), Social networks and persistent inequality in the labour market, mimeo, Northwestern University.

Mora R., Ruiz-Castillo J. (2004), Gender Segregation by Occupations in the Public and the Private Sector. The case of Spain, Investigaciones Economicas 28(3): 399-428.

Neumark D. (1988), Employers' discriminatory behaviour and the estimation of wage discrimination, Journal of Human Resources 23(3): 279-295.

Oaxaca R. (1973), Male-female wage differentials in urban labour markets, International Economic Review 14(3): 693-709.

Pellizzari M. (2010), Do Friends and Relatives Really Help in Getting a Good Job?, Industrial and Labor Relations Review 63(3): 494-510.

Phelps E.S. (1972), The Statistical Theory of Racism and Sexism, American Economic Review 62(4): 659-661.

Pistaferri L. (1999), Informal Networks in the Italian Labor Market. Giornale degli Economisti e Annali di Economia 58: 355-376.

Poggi A. (2007), Do satisfactory working conditions contribute to explain earning differentials in Italy? A panel data approach, Labour 21(4/5): 713-733.

Reimers C.W. (1983), Labour market discrimination against Hispanic and black men, Review of Economics and Statistics 65(4): 570-579.

Sylos Labini M. (2004), Job Search Methods and Outcomes for the Employed and Unemployed: an empirical investigation on the Italian Labor Market. Mimeo, Sant'Anna School of Advanced Studies.

Topa G. (2001), Social interactions, local spillovers and unemployment, Review of Economic Studies 68(2): 261-295.

Watts M. (1998), Occupational gender segregation: Index measurement and econometric modelling, Demography 35(4): 489-496.