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WHAT CAN MONOPSONY EXPLAIN OF THE GENDER WAGE DIFFERENTIAL IN ITALY?

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What Can Monopsony Explain of the Gender Wage Differential in Italy?[1]

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Abstract

Purpose: This paper studies gender wage differentials in Italy using first-order predictions of monopsony-search models. It compares empirical predictions of these models against other competing ones of wage determination in non-competitive settings.

Methodology/Approach: The paper looks at the empirical relevance of the model in terms of third degree wage discrimination among men and women by estimating the labour supply elasticity to the individual firm. It also tests the monopsony model using a "natural" experiment. Italian administrative longitudinal data from INPS are used.

Findings: Women have lower elasticity of labour supply to the individual firm: employer size regressions indicate larger effects (and consequently lower elasticity) for women as predicted by the monopsony model. Using the theoretical dynamic monopsony-search model of Burdett and Mortensen (1998), wage elasticity of separations and recruits confirm this result. Using relative men/women employment effects resulting from institutional changes in wage indexation mechanism (Scala Mobile), it is found that relative male employment responded differently in the two periods to the exogenous relative increase in the wage differential, as predicted by the monopsony model. Search frictions explain about 50% of the gender differential.

Research Limitations/Implications: No role for discrimination. Better controls for rents and union status would be needed. More rich firm data would be needed.

Originality/Value of the Paper: The paper is one of the few attempts of testing implications of monopsony models in unionised labour markets, as Italy, after some important reforms in wage bargaining agreements. The change in institutional agreements is an interesting test for different theories of wage determination.

Keywords: Monopsony, Gender Wage Differentials, Elasticity of Labour Supply, Employer Size-Effect, Scala Mobile, Italy.

Paper Type: Research Paper

1 Introduction

What can monopsony explain of the gender wage differential? Which is the relative importance of market forces and institutions in determining the earnings gap between men and women? Is Italy an interesting case to study these issues? This paper tries to answer above questions by directly looking at the empirical implications of a standard monopsony-search model on administrative data.

In a labour market with search frictions, firms can (third degree) wage discriminate and pay lower wages to the group of workers that has lower elasticity of labour supply.[1] Hence, a first necessary step is to provide an unbiased estimate of the labour supply elasticity. This is not a simple task, as wages and employment are simultaneously determined in equilibrium, and standard regression equations suffer from endogeneity problems. Secondly, there is a bunch of other candidate theoretical explanations for gender wage differentials and related labour market stylised facts. This calls for a second important question I try to answer in this study: which is the role of such theoretical models in labour markets (as Italy) characterised by centralised bargaining agreements and strong union power?

Theoretically reconciling the search model with standard union barganing models of wage determination is not straightforward. As Manning (2003) suggests, models of union wage determination do not consider labour supply elasticity as an issue, as firms in highly unionised sectors can attract all workers instantaneously. Hence, a necessary assumption to be made is that labour supply is not infinitely elastic even for union bargained wages. On the other hand, the presence of unions in a monopsony model generates interesting inter-sectorial effects on wage and employment, as firms in non-unionised markets are forced to raise wages to attract workers. If this "wage competition" effect is important in the labour market is one further question this paper tries to answer.

In the empirical application, I use Italian administrative data from INPS to provide different estimates of the elasticity of labour supply for men and women; this allows me to provide a quantitative measure of the relative importance of search frictions in determining the gender wage differential, the rest being productivity differentials and discrimination. To overcome the endogeneity problem of these estimates, I also exploit an institutional change in the wage bargaining structure at the beginning of the 1990s as an experiment to test the importance of the monopsony model against other competing theories of wage

[1] I refer to labour elasticity to the individual firm, and not to the market as a whole. The latter is usually estimated somewhat higher for women. For Italy, Aaberge *et al.* (1999) confirm this result.

determination. The exogenous variation in relative wages of men and women determined by the abolition of a wage indexation mechanism (Scala Mobile) allows to identify the relative employment effect of relative demand shifts that are not correlated to relative demand shocks. By comparing results obtained before and after the abolition of the Scala Mobile, I provide interesting insights for the workings of the labour market.[2]

This paper contributes to the growing literature on monopsony and search (see Manning, 2003 and Burdett and Mortensen, 1998).[3] In particular, it is one of the few papers explicitly looking at gender differentials in a monopsony-search perspective; this is somewhat surprising, as these models postulate fundamental differences in search behaviour of men and women, something one would expect when looking at the data for turnover and wages.[4] In fact, these differences are mirrored in behavioural parameters of search and monopsony models. Just to mention a few, higher turnover for women implies they invest less in the labour market, decreasing the arrival rate of offers and increasing the job destruction rate. Also, if firms have monopsony power in setting wages, by compressing the wage distribution, they reduce incentives to search for better jobs, decreasing upward mobility. Finally, women can have some comparative advantage in homework, increasing their productivity and limiting their chances in the labour market.[5]

[2]My paper doesn't provide an evaluation of the effects of the abolition of Scala Mobile on gender wage differentials, but simply uses this as a test of theories of the labour market. Erickson and Ichino (1995) discuss the importance of this indexation mechanism for the dynamics of gender differentials in Italy with particular attention to returns to education. Using household information on earnings and education from the Bank of Italy, Manacorda (2004) looks at the importance of Scala Mobile on the compression of the wage distribution and subsequent increase of inequality between 1977 and 1993.

[3]Card and Krueger (1995) discuss the importance of monopsony to study the employment effects of the minimum wage. Boal and Ransom (1997) and Bhaskar *et al.* (2002) provide general reviews and evidence.

[4]Altonji and Blank (1999) discuss in detail the importance of different sources of the differential, stressing the importance of the search approach. Boeri *et al.* (2005) give an overview of the main stylised facts in the labour market with focus on gender issues and policy debates.

[5]Using matched employer-employee data from Norway, Barth and Dale-Olsen (2009) offer robust evidence of higher elasticity of labour supply for men, showing monopsonistic wage discrimination is an important component of the gender wage differential. Green *et al.* (1996) study the importance of monopsony to explain the employer-size wage effect against other competing explanations in the UK. Their results indicate women benefit more than men for working at larger firms. Manning (1996), using the introduction of the Equal Pay Act in Britain in the 1970s as an experiment to test theories of wage determination, highlights the relative role played by imperfect competition to explain patterns in relative wage and relative employment. He actually finds that after the legislated increase in wages for women, there was no substantial decrease in employment, contrary to what is predicted by the competitive model.

Empirically studying gender wage differentials in such a framework using Italian data can offer some general insights about the workings of the labour market that are beyond the simple quantitative analysis of the dynamics of gender gap. In fact, most studies in this field are referred to the US and the UK, typical examples of decentralised wage setting labour markets (Teulings and Hartog, 1998). Testing first order predictions of the search model in an environment in which wage bargaining agreements are centralised with strong union presence and (apparently) no space left for employers' wage policies, allows me to discuss the relative importance of frictions, market forces and unions in wage determination.

The rest of the paper is organised as follows. In section 2, I present the theoretical dynamic model of oligopsony and derive empirical predictions to be tested in the data. Then, in section 3, I look at the empirical implications of this model using various econometric techniques and obtain different measures of the labour supply elasticity. In this section I also test the importance of the model using a natural experiment and conduct a robustness analysis. After discussing my results, I offer some conclusions in the last section.

2 The Dynamic Search Model of Oligopsony

In this section, I present a very simple version of the standard monopsony-search model in the dynamic modern version provided by Burdett and Mortensen (1998). The labour market is an environment in which there are information frictions, workers search for jobs and firms post wage offers. Firms exert some monopsony power on their workers and make equal profits by following different wage policies: high paying firms reduce quit rates and increase their labour force but make less profits per worker; on the other hand, low paying firms loose their workers because of quitting, but make more profits out of each worker they employ. The model features an equilibrium distribution of wage offers and provides important empirically testable implications regarding the relation between wage offers, employment and job duration.[6]

The economy is populated by a mass of workers of size M, while U denotes the number of unemployed; there is also a continuum of identical firms that use labour as only factor of production. The value of leisure is b, common to all workers, while p denotes their productivity. While employed, workers earn a wage w and face both an

[6] The exposition below follows Manning (2003). See Bhaskar *et al.* (2002) for definitions of oligopsony.

exogenous probability of arrival of new job offers λ and the possibility of job destruction at rate δ. Workers quit only for a better wage offer, while firms post wages in the support of the wage offer distribution $F(w)$. Employment L at time t evolves as follows

$$L_t = [1 - s(w_t)]L_{t-1} + R(w_t), \tag{1}$$

where $s(w_t)$ and $R(w_t)$ are the separation rate and recruitment flow respectively. In a steady state, with constant level of employment, the flow of separations is equal to the flow of recruits, so that employment can be written as

$$L(w) = \frac{R(w)}{s(w)}. \tag{2}$$

Taking logs and differentiating, I get

$$\varepsilon_{Lw} = \varepsilon_{Rw} - \varepsilon_{sw}. \tag{3}$$

This equation indicates that to calculate the elasticity of labour supply curve facing the firm ε_{Lw} is necessary to estimate the elasticity of recruits and separations to the wage ε_{Rw} and ε_{sw}. The separation rate is given by

$$s(w) = \delta + \lambda[1 - F(w)], \tag{4}$$

while the recruitment rate reads as

$$R(w) = \lambda U + \lambda \int^{w} f(x)L(x)dx. \tag{5}$$

The separation rate depends on the exogenous job destruction shock δ and the quitting probability, the latter is determined by the arrival rate of offers λ and the relative position of the firm in the wage distribution. On the other hand, the recruitment rate depends on recruits from unemployment and the capacity of the firm to attract other workers.

To obtain the elasticity of separations and recruits to the wage, I differentiate both separation and recruitment functions with respect to the wage

$$\begin{aligned} s'(w) &= -\lambda f(w), \\ R'(w) &= \lambda f(w)L(w). \end{aligned}$$

Then, write the elasticity of separations

$$\varepsilon_{sw} = \frac{s'(w)w}{s(w)} = \frac{-\lambda f(w)w}{s(w)} = \frac{-\lambda f(w)wL(w)}{R(w)} = -\frac{R'(w)w}{R(w)} = -\varepsilon_{Rw} \tag{6}$$

where the steady state condition $s(w) = R(w)/L(w)$ is used. The above expression simply says the elasticity of separation is equal (in absolute value) to the elasticity of recruits; hence, to estimate the elasticity of labour supply, one just needs the elasticity of separations. The model clearly predicts steady state employment will be higher the lower is the separation rate, and the higher is the recruitment rate.

Using the steady state condition (2) and equations (4) and (5), the equilibrium flow condition reads as

$$(\delta + \lambda[1 - F(w)])\, L(w) = \lambda U + \lambda \int^{w} f(x)L(x)dx.$$

As firms paying the lowest wages do not attract any worker from other firms, their size $\underline{L}$ is given by

$$\underline{L} = \frac{\lambda U}{\lambda + \delta}. \tag{7}$$

Equilibrium unemployment is obtained when flows in and out are the same, i.e., $\delta(M - U) = \lambda U$. Inserting this definition in equation (7) I obtain

$$\underline{L} = \frac{kM}{(1+k)^2}, \tag{8}$$

where $k = \lambda/\delta$ is a summary measure of labour market frictions, i.e., the ratio between the arrival rate of offers and the job destruction rate. Equilibrium profits are given by $\pi = (p - w(L))L$ for all firms. This completes the description of the model; I now turn to discuss its empirical implications.

Firstly, high wage firms attract more workers and face lower probabilities of loosing their workforce, so larger firms pay higher wages on average and there is an employer size-wage effect.[7] Two more propositions establish further empirical predictions of the monopsony-search model.

Proposition 1 (Green et al., 1996) *In equilibrium the employer size-wage effect is, given firm size, increasing in the equilibrium level of profits.*

This proposition says that, if there is an employer-size wage effect, the latter is increasing in the level of profits. As profits are higher when monopsony is higher, it is important to identify segments of the labour market where profits (and monopsony) are higher. These are identified by the second proposition.

[7] Note the size effect is the reciprocal of labour supply elasticity $\varepsilon_{wL} = \frac{1}{\varepsilon_{Lw}}$.

Proposition 2 (Green et al., 1996) *1) If unions reduce profits, the employer-size wage effect is weaker in the union sector. 2) If firms set wages, for a given employer size, the elasticity of wages with respect to firm size ε_{wL} is decreasing in $k = \lambda/\delta$ if $k > 1$ and increasing if $k < 1$.*

The intuition is the following: if unions increase wages, keeping productivity constant, the difference between p and w in the profit equation is reduced. The second part is a little more complicated. As the lowest offered wage in equilibrium is the value of leisure b, equilibrium profits can be written as $\pi = (p - b)\underline{L}$, where $\underline{L} = \frac{kM}{(1+k)^2}$ is the size of the smallest firm. An increase in the arrival rate of offers or a reduction in the job destruction rate has a positive effect on k, allowing workers to climb the wage ladder quickly; this reduces the size of the smallest firm $\underline{L}$ and consequently equilibrium profits. As equilibrium profits are positively related to the employer size-wage effect in Proposition 1, higher arrival rates and lower job destruction rates are associated to smaller employer size-wage effects. The second part of Proposition 2 calls for identification of groups of workers that have different k's. Men and women are natural candidates for this test, as the fact that $k > 1$ has strong support in the literature.[8]

As Barth and Dale-Olsen (2009) discuss, the level of labour market frictions (low arrival rates of offers λ and high job destruction rate δ) is expected to be different between men and women for a couple of reasons. Labour market history of men, in terms of wages, promotions, mobility, and unemployment has bigger impact on their spouses than the other way around. Hence, women should have higher job destruction rates. Domestic responsibilities within the household, as child rearing, have larger effect on women's career; again, the job destruction rate should be higher. What is more, higher turnover for women implies they invest less in the labour market and choose sectors and occupations in which turnover gains are lower; this reduces the arrival rate of offers. If firms compress the wage distribution, lower dispersion reduces incentive to search and then reduces arrival rate of offers. Finally, women can have some comparative advantage in homework, increasing their productivity at home and limiting their chances in the labour market; again, this reduces the arrival rate of offers.

[8] See Jolivet *et al.* (2006) for European Countries and US; see Sulis (2007) for Italy.

3 Estimating the Elasticity of Labour Supply

In previous section, I show the elasticity of labour supply can be derived in two alternative ways; the first approach just estimates wage elasticities of separations, while the latter inverts the employer size-wage effect.[9] In fact, assuming the labour market is monopsonistic, and search frictions are important determinants of wages, the positive relationship between firm size and wages can be interpreted as an upward labour supply curve (Manning, 2003).

However, the positive correlation between employment and wages can be also explained by other competing theories of wage determination.[10] On the one hand, there are the traditional neoclassical explanations in which size differentials can be determined by heterogeneity in the quality of labour and compensating wage differentials; on the other hand, assuming the labour market is not competitive, the rent sharing hypothesis seems to be the most appealing to explain the employer size-wage effect.[11]

As Brown and Medoff (1989) discuss, the positive relation between employment and wages can be due to sorting of high quality workers and high quality firms in presence of higher capital intensity and capital-skill complementarity. Hence, empirically controlling for observed and unobserved worker quality, the employer-size effect in wage equations should disappear, or be reduced. On the other hand, outside options of high quality workers should be the same at any firm; as a consequence, holding the wage rate and job tenure constant, empirical quit rates should be the same across different firms. Similar predictions regarding quit rates are shared by the classical theory of compensating wage differentials. As Brown and Medoff (1989) put, if larger firms offer undesirable working conditions as "greater reliance on rules and less freedom of action and scheduling, more impersonal atmosphere, or longer commuting," they are forced to pay higher wages to attract the same quality of labour. Controlling for job, occupation and sector characteristics in a wage equation should eliminate (or reduce) the size differential. Again, in this case, quit rates should be positively correlated to firm size when holding the wage

[9] Another possibility is to provide structural estimation of transition parameters in an equilibrium search model for both men and women. In that framework, the relative role of productivity differentials and discrimination is also identified. See Bowlus (1997) and Sulis (2007) for examples in this direction.

[10] Brown and Medoff (1989) and Oi and Idson (1999) provide evidence on the size effect and discuss alternative explanations. My treatment follows the former paper.

[11] There are other possible explanations for the size effect, as "unionisation threat," efficiency wages, and "labour pools." However, as Manning (2003) suggests, these are sometimes too vague and difficult to test with available data.

constant but not working conditions.

If one is ready to abandon the perfectly competitive environment, the employer size effect can be also explained by the rent sharing hypothesis. The latter predicts product market power generates rents that are shared between workers and firms. As Teulings and Hartog (1998) discuss, predictions of the monopsony and rent sharing model are very similar regarding wages, rents and tenure, and it is difficult to discriminate between the two theories. Controlling for industry effects in a wage equation should help to test the importance of rents, as these are related to product market characteristics.

However, there is a much more powerful test of the rent sharing model against the monopsony one that is particularly interesting for the purposes of this study. One possibility is to test if the employer size wage effect is higher in sectors in which rents are higher, the other is to test if the size effect is higher for the group of workers that has higher bargaining power and then more likely to get these rents. As discussed in Propositions 1 and 2, one possibility to discriminate between the two is to test if higher employer size effects are found in the union sector; if unions are more likely to be in sectors in which product market regulation generates rents, then information on union density at the sector level can help to identify sectors in which rents are higher.[12] However, the most powerful test to discriminate among the two theories is to compare the employer size wage effect for men and women. As their bargaining power is higher, rent sharing predicts higher size effects for men in the union sector, while monopsony predicts higher employer size effects for women in the non union sector. Before testing these propositions, I briefly describe the data.

3.1 Data

The data used in this study is from the Italian Administrative Social Security Archive (INPS) where detailed information about labour market histories of workers employed in the private sector is available for the period 1985-1996. Standard variables for workers as age, occupation, area of work and sex are matched with relevant information about the firm they are currently working at, as sector of activity, bargaining agreement, and average number of employees. Given the longitudinal structure of the data, it is possible to track the entire career of workers and easily construct measures of experience and

[12] Note this in not the only view of union behaviour, as Checchi and Lucifora (2002) discuss, exposure to international shocks can increase unionisation and provide insurance against unemployment risk.

tenure. For the sample of full time workers there is also information on the number of weeks paid; two measures of earnings are available, gross yearly and weekly wages.[13]

In Table 1, I report descriptive statistics for the sample used in the estimation. First, note that women's yearly wages are about 20% lower than the ones for men, while weekly wages are about 17% lower.[14] Women work 37 weeks per year, against 39 for men. The sample is composed by relatively young workers, average age is about 35 years for men against 32 for women; the two groups show standard differences in the amount of experience and tenure accumulated, with men having more years of both. The distribution of workers across firm size indicates women are slightly more concentrated at small firms and in the service sector, while they are absent from the construction sector.[15] Finally, a significant proportion of women works under a "public contract", the latter is typical in the service sector; more than 70% of employees works under a national contract, while the firm bargaining agreement covers about 2.5% of men against 1.8% of women.

3.2 The Employer Size-Wage Effect

In previous parts, I discuss empirical proposition that can be tested in the data, they are mostly referred to the employer size-wage effect, so the starting point of the empirical analysis is to look at the correlation between wages and employer size. This returns an estimate of the elasticity of wages to employment ε_{wL}, and indirectly of the labour supply elasticity ε_{Lw}. Proposition 2 states a necessary condition for monopsony to explain the gender wage differential is that the size effect is higher for women (so that elasticity of labour supply is lower).

To get started, I regress the log of yearly wages on the log of employment and an interaction between employment and a dummy which is equal to one for women.[16] In column (1) of Table 2, I include controls for the number of weeks paid; results indicate

[13] See Contini (2002) for details about this data.

[14] Statistical tests of mean difference have been performed on the most important variables used in this study, returning p values close to zero.

[15] These data confirm workers are concentrated at small firms in Italy.

[16] The regression without any controls returns an estimate (standard error) on the log of employment equal to 0.148 (0.0065) and for interaction -0.0197 (0.0052), R^2 =0.16. I also regress the log of yearly wages against dummies for employment size including all controls, where the benchmark is the group 1-5. Coefficients for men are as follows: 6-15 (0.06), 16-99 (0.12), 100-499 (0.21), 500+ (0.31); they are all statistically significant. There is also evidence of larger effects for women, coefficients of interaction terms between sex and size dummies are 6-15 (-0.001), 16-99 (0.002), 100-499 (0.010), 500+ (0.045). An F test for the overall significance of interaction terms returns a p value equal to zero.

Table 1: Descriptive Statistics

	Men		Women	
variable	average	st dev	average	st dev
yearly wage	21105	14519	16749	12116
weekly wage	662	383	551	269
weeks paid	39.37	17.39	37.48	18.01
age	35.76	11.66	32.23	10.38
experience	4.14	3.10	3.70	2.978
tenure	2.94	2.77	2.72	2.641
apprentices	0.051	0.220	0.059	0.236
blue collars	0.669	0.470	0.438	0.496
white collars	0.279	0.448	0.502	0.499
1-5	0.180	0.384	0.210	0.407
6-15	0.181	0.385	0.190	0.392
16-99	0.255	0.435	0.253	0.434
100-499	0.149	0.356	0.143	0.351
500+	0.233	0.422	0.202	0.401
fishing	0.008	0.091	0.003	0.060
mining	0.042	0.202	0.009	0.099
manufacturing	0.429	0.494	0.380	0.485
construction	0.149	0.356	0.011	0.106
commerce	0.141	0.349	0.184	0.387
transport	0.063	0.243	0.014	0.118
credit	0.057	0.232	0.089	0.285
services	0.107	0.309	0.306	0.461
national contract	0.797	0.401	0.713	0.452
regional contract	0.004	0.069	0.004	0.065
firm contract	0.025	0.156	0.018	0.135
provincial contract	0.012	0.112	0.006	0.078
public contract	0.058	0.234	0.165	0.371
no contract	0.046	0.210	0.038	0.191
unknown contract	0.054	0.226	0.054	0.226
observations	968504		500535	

Wages are expressed in 000s of 1996 Italian Lira; durations are in years. Region and year dummies not reported.

the elasticity of employer size is equal to about 6.5%, the latter being the increase in wage associated to a 1% increase in employment. The interaction coefficient indicates there are no statistically significant differences between men and women. In the second column, I add further controls, as these should control for (observed) worker quality.[17] The size effect is reduced to 4%, but still survives; what is more, the interaction coefficient is positive indicating women benefit slightly larger size effects. Results in column (3) include further controls for bargaining agreement and sectorial dummies, these should control for the presence of rents in the product market in which these firms operate. Again, the coefficient is reduced but still estimated higher for women. Note the coefficient on the gender dummy turns out to be positive; however, this doesn't reflect the whole gender effect as all variables have been interacted with the gender dummy.[18]

Evidence of higher size effects for women indicates their elasticity of labour supply is lower and firms can wage discriminate paying them lower wages; however, the monopsony model has further empirical predictions that can be tested in the data. In what follows, I explore in more detail the importance of unions in wage determination, this is particularly important for the purpose of this study. Part 1 of Proposition 2 suggests that if unions reduce profits, the employer size effect should be lower in the union sector, contrary to what is predicted by the rent sharing hypothesis that suggests higher size effects in the union sector. Since I don't have direct data on union density and coverage across sectors, I do construct a dummy equal to one for workers in credit or service sectors and interact it with the log of employment.[19] Results in column (4) indicate workers in less unionised sectors benefit more from working at large firms; finally, in column (5) I consider the employment effect for women in less unionised sectors, the size effect is the largest possible.

Discussion above doesn't consider another important aspect of the employer size wage effect, bigger firms tend to attract more workers and to retain them longer, this generates a positive relationship between wages and tenure. What is more larger firms can provide more training, increasing their workers' productivity and consequently their wages. There

[17] Most of these variables are clearly endogenous; I discuss this problem at various stages; in particular, I explicitly address the endogeneity of tenure. For the moment, tenure is just a proxy for worker's quality.

[18] Bargaining agreement is endogenous and should be adequately instrumented; see Checchi and Pagani (2005) for a solution to this problem. However, analysis of such issues is beyond the scope of this paper.

[19] Boeri et al. (2001) indicate union density decreased from 33 to 17% and from 38 to 29% in these two sectors during the period 1980-1997. Manufacturing, construction and transport have union density above 40%. Regressions in column (4) and (5) clearly don't include dummies for sectors.

Table 2: The Employer Size-Wage Effect

Dependent variable	(1)	(2)	(3)	(4)	(5)
Log Yearly Wage	OLS	OLS	OLS	OLS	OLS
Log Employment	0.0645***	0.0414***	0.0392***	0.0377***	0.0429***
	(0.0039)	(0.0026)	(0.0032)	(0.0028)	(0.0028)
Women	-0.105***	0.0467***	0.394***		
	(0.0091)	(0.0149)	(0.0377)		
Women × Log Empl.	-0.00325	0.00511**	0.0109***		
	(0.0028)	(0.0020)	(0.0024)		
No Union				0.0285	
				(0.024)	
No Union × Log Empl.				0.0268***	
				(0.0031)	
NoUnionWomen					-0.0387
					(0.030)
NoUnionWomen × Log Empl.					0.0216***
					(0.0031)
Controls					
Weeks paid	Yes	Yes	Yes	Yes	Yes
Age, experience and job	No	Yes	Yes	Yes	Yes
Sectorial dummies	No	No	Yes	No	No
Bargaining agreement	No	No	Yes	Yes	Yes
Tenure	No	Yes	Yes	Yes	Yes
Year and region	No	Yes	Yes	Yes	Yes
Constant	7.700***	7.194***	6.840***	7.085***	7.014***
	(0.011)	(0.0085)	(0.024)	(0.0087)	(0.0084)
Observations	1469039	1468595	1468595	1468595	1468595
R^2	0.81	0.84	0.84	0.84	0.84

In columns (1), (2), and (3) all the controls are interacted with dummy "Women", in column (4) they are interacted with dummy "No Union", while in column (5) with dummy "NoUnionWomen"

Robust standard errors at firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

is an important literature that studies returns to tenure that clearly suggests this variable is endogenous in a wage equation as it is correlated with the match and individual unobserved components, and should be properly instrumented to estimate unbiased returns to tenure (see Dustmann and Meghir, 2005). In particular, if men and women have different labour market attachment and different propensities to quit their jobs, one could expect there are sizeable differences in returns to tenure (and experience). Hence, providing an unbiased estimate of the effect of tenure on wages and separation probabilities could help to quantify the importance of selection effects due to different job search behaviour of men and women.[20]

Previous results indicate important predictions of the monopsony search model are verified in the data, women benefit from larger employer size wage effects; consequently their elasticity of labour supply is lower and firms can pay them lower wages. What is more, the presence of unions appears to increase wages in less unionised sectors, indicating search frictions and monopsony are important determinant of wage differentials in Italy. However, this is not the whole story; in fact, the dynamic model of oligopsony stresses the importance of transitions in the labour market as a potential source of gender wage differentials; which I analyse in the next subsection.

3.3 Wage Elasticities of Separations

The dynamic model of monopsony by Burdett and Mortensen (1998) discussed in the theoretical section shows that the equilibrium level of employment is the ration between recruitment and separation rates, i.e., $L(w) = \frac{R(w)}{s(w)}$. Taking logs and differentiating, the labour supply elasticity can be written as follows

$$\varepsilon_{Lw} = \varepsilon_{Rw} - \varepsilon_{sw}. \tag{9}$$

[20] Exploiting the longitudinal dimension of the data, tenure is instrumented with deviations from its own mean over the duration of the job, polynomial terms are also included as further instruments. By construction, these instruments are not correlated to individual and match specific effects, as these are constant over the duration of the match. The first stage F test returns a value well above 10 indicating the correlation between the instruments and the endogenous variables is strong. However, the p value of the Sargan overidentification test is equatl to 0.00 indicating these instruments are not orthogonal to the error term. Results for IV estimation indicate again, the size effect is higher for women. I also run a regression including all controls but tenure, results indicate the size effect (standard error) is 0.0388 (0.0033) for men, while the interaction term is 0.0111 (0.0024). All results are available upon request.

Estimating the wage elasticity of separations is relatively simple, while it is more difficult to estimate the wage elasticity of recruits. However, following Manning (2003), in previous section, I show that in a steady state equilibrium the elasticity of separations and recruits are the same, $\varepsilon_{sw} = -\varepsilon_{Rw}$ (see equation (6)); the intuition behind this result is very simple: one separation corresponds to a recruit, conditional on the fact it is related to the wage.[21]

As Barth and Dale-Olsen (2009) put, to get an estimate of the elasticity of labour supply, what is essentially needed is an estimate of the separation elasticities to wages ε_{sw}, i.e., the probability of job change on the log of (previous) wage. In Table 3 I summarise results from the analysis of these separation functions.[22] In column (1) I just consider the effect of previous wage on the probability of job changing; as expected, high wage workers are less likely to change their job; this effect is stronger for men than for women, indicating their mobility choice can be related to different reasons than the wage. In column (2), I add controls as in OLS regressions; results confirm that high wage workers are less likely to quit their jobs. What is more, holding the wage and other characteristics constant, workers are less likely to leave larger firms. This evidence clearly supports the theory of monopsony against the compensating wage differential theory, that predicts higher probability of job changing from large firms when holding the wage constant.

In column (3) I also control for previous tenure. As Manning (2003) suggests, one can endlessly discuss regarding the opportunity of including tenure in these regressions as it is clearly endogenous; actually, wages, tenure and employment are jointly determined and their simultaneous effects on the probability of separations has to be adequately considered. The theoretical model also predicts tenure is the inverse of the quit rate, hence tenure and employment are strictly related.[23] In general, including tenure, a smaller

[21] I assume separations to non-employment and recruitment from non-employment are not related to wages. In a previous version of the paper, I also considered this issue and obtained separate estimates of wage elasticity of separations to employment and non-employment. However the only possibility to identify the cause of separations is to consider as quits job changes with an intervening period of non employment less or equal to one month, the rest being layoffs.

[22] As for the employer size effect, I also estimate these probit models using dummies for employment size and including all controls, where the benchmark is the size group 1-5. Coefficients for men are as follows: 6-15 (0.0133), 16-99 (0.006), 100-499 (-0.037), 500+ (-0.084). There is also evidence of smaller larger effect for women, coefficients are 6-15 (0.039), 16-99 (-0.017), 100-499 (-0.136), 500+ (-0.096). Coefficients are all statistically significant, apart for men in the class 16-99.

[23] In this sense, results reported in columns (2) to (4) of Table 3 can be interpreted as sensitivity checks of previous specifications.

coefficient on the wage is expected, as these variables are positively related. Results in column (3) indicate no effect of tenure on the probability of job change; whereas coefficient for previous wage and previous employment don't change. As expected, when previous wage is not considered, as in column (4), tenure turns out to be negative and statistically significant; part of this effect is shifted to a stronger negative effect of employment.[24]

Having obtained wage elasticities of separations, I have indirectly obtained an estimate of the elasticity of recruits (with inverse sign), so I can proceed to calculate the elasticity of labour supply. Using results in columns (3) my estimate is equal to 0.938 and 0.706 for men and women respectively. Again, these estimates indicate lower labour supply elasticity for women.[25]

3.4 Evidence from a "Natural" Experiment

Although previous results clearly indicate monopsony has an important role in shaping the gender wage differential, estimates of the labour supply elasticity still suffer from a crucial weakness. As wages and employment are simultaneously determined in equilibrium by labour demand and supply, these estimates suffer from standard endogeneity problems. What is really needed to offer evidence of a monopsonistic labour market is an unbiased and consistent estimate of the labour supply elasticity.

As wages are jointly determined with employment, there will be a correlation between the error term and the covariates, hence the model is not identified. In principle, as Manning (2003) suggests, what is really needed to correctly estimate the labour supply elasticity is a firm level demand shock that doesn't affect supply, so that exogenous shifts in labour demand trace out the supply curve. The instrument should have an impact on the particular firm but not on the market as a whole, i.e., it shouldn't increase the overall level of wages and it should influence supply only indirectly through the wage.[26]

[24] In regressions not reported, previous tenure is instrumented with deviations from its own mean over the duration of a match. In this case, results change substantially as the effect of wages is reduced and that for employment is increased, while tenure has a positive effect on the probability of job change. This is not really surprising; as Mortensen (1988) discusses, holding the wage constant, for a concave wage-tenure profile, higher tenure implies lower wage growth on the job, and then higher probability of job changing. In fact, including tenure helps to capture the indirect effect this variable has on the wage.

[25] In the last subsection I calculate the predicted wage differential and estimate the part of the gender differential due to search frictions.

[26] Sullivan (1989), Boal (1995), Falch (2003), Staiger et al. (2004), and Hirsch and Schumacher (2004) are examples of applications to different labour markets that can be considered as very close to the ideal

Table 3: Separation Elasticities to the Wage

Dependent variable	(1)	(2)	(3)	(4)
Change of Job	Probit	Probit	Probit	Probit
Log Wage	-0.613***	-0.470***	-0.469***	
	(0.0060)	(0.0047)	(0.0052)	
Women × Log Wage	0.0703***	0.116***	0.116***	
	(0.0061)	(0.0067)	(0.0071)	
Log Employment		-0.0272***	-0.0271***	-0.0549***
		(0.0064)	(0.0063)	(0.0053)
Women × Log Employment		-0.0101*	-0.0101*	-0.00396
		(0.0057)	(0.0056)	(0.0046)
Tenure			-0.000463	-0.0637***
			(0.0029)	(0.0026)
Women × Tenure			-0.000270	0.0157***
			(0.0035)	(0.0034)
Controls	No	Yes	Yes	Yes
Constant	4.990***	4.325***	4.324***	0.979***
	(0.052)	(0.060)	(0.062)	(0.044)
Observations	1232411	1232026	1232026	1232026
Pseudo R^2	0.17	0.29	0.29	0.24

All the controls are interacted with dummy "Women"

Controls are as in column (3) of Table 2

Robust standard errors at firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

One possibility is that of using exogenous (legislated) variation in wages that is driven by institutional factors, which is the case in the natural experiment literature. However, these changes have an effect on the population as a whole, so there is no control group to evaluate the effects of this intervention. In this case, identification of causal effects is still possible by looking at different effects of this change across different parts of the wage distribution or across different time periods.

The Italian industrial relations system provides an excellent opportunity to address this issue; until 1992, an automatic indexation mechanism called Scala Mobile (SM) was adjusting wages to the cost of living to protect workers from loss in their purchasing power.[27] Clearly, the SM had a substantial impact on the wage distribution by compressing wage differentials. Giving the same absolute wage increase to all workers, the SM had larger impact on women as their wages where lower and more likely to be observed at the bottom of the wage distribution (see Manacorda, 2004).[28]

The abolition of the SM at the beginning of the 90s, and the subsequent exogenous increase in the relative wage differential between men and women, should have an impact on relative employment of these two groups. If labour markets are competitive, an increase in the relative wage differential in favor of men should be negatively related to relative employment of this group of workers, as they become relatively more expensive to hire (demand side effect).[29] However, if the labour market is monopsonistic, the increase in relative wages of men can have a *positive* effect on their relative employment, the reason being that the labour supply to the individual firm is positively sloped. Of course, relative wage and employment differentials are also influenced by other factors that should be properly controlled, as sectorial shifts of the workforce, and its variations in educational

textbook model of monopsony. These are referred to nurses, school teachers, workers in the coal mining sector; most of them use natural experiments and IV estimates to identify the effects they want to study. Fakhfakh and Fitzroy (2006) use firm data to test the monopsony model providing evidence of strong size effects and positive effects of employment expansion on wages.

[27] See Erickson and Ichino (1995) for a first evaluation of the effects of SM on gender differentials in the 1970s and 1980s and Manacorda (2004) for a recent application to analyse fall and rise in wage inequality in Italy.

[28] In other words, the SM was operating as a minimum wage.

[29] Note also this is true in the right to manage model with unions where firms are on their demand curve.

levels.[30]

To calculate relative wage and employment differentials between men and women, I proceed as follows. First, for each firm in the sample, I calculate the ratio between the average wages of men and women in the years 1986, 1990, 1992 and 1996. Second, for each firm, I multiply the proportion of men and women as represented in the sample of workers by the number of workers currently employed at the firm, obtaining the (predicted) number of men and women employed at each firm in the four years; this allows me to calculate relative employment at each firm. The two subperiods of interest are 1990-1986 (before the abolition of the SM) and 1996-1992 (after).[31]

The descriptive statistics indicate that the relative wage differential was about 19% in 1986, then during the period 1990-1986 there has been a reduction equal to about 1.8 percentage points. Correspondingly, in 1986 the calculated employment rate of men was 80% higher than the one for women; during the period before the abolition of the SM, the relative employment of men decreased by about 8.8%. After the abolition of the SM, in the period 1992-1996, the relative wage differential was substantially reduced by 2.3 percentage points, with a decrease in relative employment of 8.6%. In 1996, the relative employment rate differential was equal to 74%.[32] In other words, although relative wages of men decreased by different amounts in the two periods, relative employment fell by 8% in the two periods. This evidence is perfectly compatible with the monopsony model, that predicts I should observe smaller drop in relative employment after the abolition of the SM. In what follows, I turn to estimate relative employment effects using proper econometric techniques.

As a first step, I run the following regression equation

$$\left[\log\left(\frac{\overline{w}_M}{\overline{w}_W}\right)_{j,t} - \log\left(\frac{\overline{w}_M}{\overline{w}_W}\right)_{j,t-4}\right] = \alpha + \beta\left[\log\left(\frac{\overline{w}_M}{\overline{w}_W}\right)_{j,t-4}\right] + \gamma X_{j,t} + \varepsilon_{j,t} \qquad (10)$$

where j denotes the firm, $X_{j,t}$ is a set of controls for sectors of activity, $\varepsilon_{j,t}$ is the error

[30] Before proceeding, it is important to mention that the data is a representative sample of workers in the population. Of course, the ideal would be to have a sample of firms, but as long as this data is missing, I use information on firms these workers are currently employed at.

[31] The initial number of observations is equal to 1469039. I drop all observations with only one employee (62187 observations, 4.23% of the sample) and those workers at firms with only men or only women (the latter were 683492 for men (46.50%), 329004 for women (22.40%)).

[32] This figures are comparable to those reported for wage inequality across the two periods by Manacorda (2004). The employment rate in 1985 calculated from Labour Force Surveys was equal to 74% for men against 35% for women. In 1994 the employment rate of women increased to 38% while men's one decreased to 66%.

term, and years of analysis are $t = 1990, 1996$ and $t-4 = 1986, 1992$. As Manning (1996) discusses, "a set of industry dummies has to be included so that shocks to the relative non-pecuniary attractiveness of employment in different industries are not important."

In equation (10) I regress for each firm the change in the relative wage differential on the initial relative wage differential; this is done separately for the two periods, 1986-1990 and 1992-1996. I expect a larger rise in relative wage of men at firms where their relative wage was initially low; in particular, for the SM to have an effect on the evolution of the gender wage differential, I do expect this effect to be stronger in the period after the abolition of the wage indexation mechanism. In fact, during the period 1986-1990, strong collective bargaining agreements should have stronger impact on the reduction of the differential as the SM was sustaining wages at the bottom of the wage distribution, where women were more concentrated. Results in columns (1) and (2) of Table 4 indicate the expected negative relation between initial relative wage differential and its changes, but no significant difference in the size of the coefficient in the two periods.

However, to identify the labour supply curve to the individual firm, I do need to compare changes in relative wages to changes in relative employment; so the second regression to be estimated reads as follows

$$\left[\log\left(\frac{\overline{L}_M}{\overline{L}_W}\right)_{j,t} - \log\left(\frac{\overline{L}_M}{\overline{L}_W}\right)_{j,t-4}\right] = \alpha + \beta\left[\log\left(\frac{\overline{w}_M}{\overline{w}_W}\right)_{j,t} - \log\left(\frac{\overline{w}_M}{\overline{w}_W}\right)_{j,t-4}\right] + \gamma X_{j,t} + \varepsilon_{j,t} \tag{11}$$

where $X_{j,t}$ contains dummies for sector of activity and a variable controlling for relative changes in the percentage of white collars against blue collars as a proxy for the relative change in skills at each firm.[33]

Equation (11) is estimated for both periods, before and after the abolition of SM. In fact, before the abolition of the SM, relative wage changes were mostly driven by institutional factors, hence I should observe a strong negative relation between changes in relative employment and changes in relative wages. As women are relatively more expensive to hire during this period, their relative employment should be lower (employment is determined by labour demand). On the other hand, if the market is monopsonistic, after the abolition of the SM, the magnitude of the coefficient on relative wages should be strongly reduced. If firms can hire as many workers as they desire, increase in relative

[33] As Manning (2003) suggests, there could be a positive correlation between relative wage changes and relative demand shifts determining a bias the coefficient on relative wage changes (this happens when market factors are more important).

Table 4: Evidence of Relative Employment Effects from a "Natural Experiment"

Dependent Variable	Change in Relative Wage		Change in Relative Employment			
	OLS		OLS		IV	
	before	after	before	after	before	after
	(1)	(2)	(3)	(4)	(5)	(6)
Initial Relative Wage	-0.760***	-0.744***				
	(0.034)	(0.035)				
Change in Rel. Wage			-0.170***	-0.127***	-0.0690***	-0.0468***
			(0.0040)	(0.0041)	(0.0065)	(0.0067)
Change in Skills			-0.130***	-0.142***	-0.130***	-0.142***
			(0.0053)	(0.0054)	(0.0053)	(0.0054)
Sectorial dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.113	0.0710	-0.208***	-0.0819***	-0.219***	-0.0667***
	(0.071)	(0.095)	(0.041)	(0.013)	(0.041)	(0.013)
Observations	100902	86936	92117	78864	92117	78864
R^2	0.39	0.42	0.04	0.04	0.04	0.03

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

wages can be positively associated to changes in relative employment. In other words, the abolition of SM provides a test for discriminating between the monopsony model and the competitive (or union) model. Results of the analysis are summarised in columns from (3) to (6) of Table 4, in which I first use standard OLS regression and then use IV to take into account of the endogeneity problem for relative wages.

As already noted, changes in relative wages of men are strongly negatively correlated with the relative wage differential at the beginning of each period.[34] On the other hand, as expected, changes in relative wages of men have always a negative effect on their relative employment. Interestingly, there is a stronger negative relationship in the first period;

[34] I also control for relative skill composition of workers by adding on the right hand side the difference in percentage of white collars and blue collars employees at that firm in different periods. This should proxy for relative demand shocks in employment and technological progress, as expected the coefficient on relative male employment is negative.

when firms choose the optimal combination of workers to employ, they choose to hire less men as their wages are higher. This indicates that firms before the abolition of the SM are on their demand curve, no matter if the "correct" model is the competitive or the right-to-manage model with unions. However, after the abolition of the SM, the relationship between relative employment and wages turns out to be weaker; this is exactly what in principle is predicted by the monopsony model.

Finally, in the last two columns of Table 4, I report results for instrumental variable estimates. To solve the endogeneity problem discussed above, I instrument the change in relative wage of men with their relative wage at the beginning of the period. As I show in columns (1) and (2) of the same Table, this variable is strongly correlated with changes in relative wages, but shouldn't be directly correlated to changes in relative employment. Using IV, evidence of a negative relation between relative wages and relative employment persists, but it is significantly reduced; again the coefficient for relative wages after the abolition of the SM is smaller than the one estimated in the first period.[35]

3.5 Robustness: Weekly Wages

One important aspect of the gender differential is the relative importance of participation decisions of men and women; in particular, transitions in and out of the labour force can have important influence on the wage differential. As discussed above, there are many reasons to expect women's job destruction rates to be higher; hence, taking into account the problem of interruptions is important to better understand the gender differential. In previous parts, this problem is considered by taking into account the number of weeks paid, in that case, the employer size effect is reduced by half when this control is included. In this subsection, I conduct a robustness analysis using information on weekly wages provided by the INPS data; I do expect larger differences in labour supply elasticity between men and women.

In Table 5, I report results for the employer size wage effect when considering this new measure of earnings. Results are substantially similar to those obtained with yearly

[35] The relevance of instruments is considered through an F test on the overall significance of excluded instruments in the first stage regressions, separately performed for the two periods. Both tests always return a value bigger than 10, hence, excluded instruments are relevant for the estimation of relative employment effects. Unfortunately, the quality of instruments and the validation of their use is not performed by checking their orthogonality with the error term. The latter condition can be verified with standard overidentifying restriction tests on excluded instruments, but the equation is exactly identified.

wages, the elasticity of employment to the wage is slightly higher for men when no controls are included; however, it turns higher for women when controls are included. Results in columns (4) and (5) confirm that women in non union sectors get higher wages from working at large firms, as predicted by the monopsony model. Inverting the size effect, the obtained estimate of labour supply is lower than the one estimated with yearly wages.

As previously mentioned, when estimating the labour supply elasticity using wage elasticities of separations, I do expect even greater differences, as these estimates do take explicitly into account the importance of transitions and interruptions; in fact, results in Table 6 clearly indicate a huge gap in elasticity of separations. The wage elasticity of separations estimated in column (3) is about twice as large for men than for women. As expected, previous employment has always a negative effect on the separation probability, while tenure has a negative statistically significant effect. Finally, weekly wages are used to analyse relative employment effects related to the abolition of the SM. Results reported in Table 7, are extremely interesting. Estimates reported in columns (3) and (4) indicate again negative effects on relative employment of men for an increase in their relative wages, although the negative impact is substantially reduced in the second period, as the monopsony model predicts. What is more, the effect turns out to be positive and statistically significant when using IV methods. This result confirms previous expectations of higher monopsony power when considering weekly wages, and clearly indicates monopsony is very important to explain the gender wage differential in Italy. In the next subsection, I discuss my results in comparison with the literature and provide general insights can be derived from this study.

3.6 Discussion

In this paper, I analyse the importance of search frictions in explaining the gender differential; I provide an extensive analysis of the monopsony model using Italian labour market data and try to reconcile the search and monopsony model with union bargaining models of wage determination. I also offer evidence of the importance of the employer size-wage effect across different sectors. As Teulings and Hartog (1998) suggest, cross country comparison is sometimes absent, and robust evidence on these stylised facts from single countries is necessary. In this respect, evidence from Italy, with centralised bargaining system and strong union presence is important in a literature essentially concerned with the UK and the US.

Table 5: The Employer Size-Wage Effect, Weekly Wages

Dependent Variable	(1)	(2)	(3)	(4)	(5)
Log Weekly Wage	OLS	OLS	OLS	OLS	OLS
Log Employment	0.0778***	0.0440***	0.0405***	0.0400***	0.0455***
	(0.0043)	(0.0029)	(0.0034)	(0.0031)	(0.0030)
Women	-0.119***	0.0992***	0.447***		
	(0.0100)	(0.014)	(0.037)		
Women × Log Empl.	-0.00769**	0.00421*	0.0108***		
	(0.0031)	(0.0022)	(0.0024)		
No Union				0.118***	
				(0.0174)	
No Union × Log Empl.				0.0256***	
				(0.0034)	
NoUnionWomen					0.0665**
					(0.028)
NoUnionWomen × Log Empl.					0.0196***
					(0.0034)
Controls					
Weeks paid	No	No	No	No	No
Age, experience and job	No	Yes	Yes	Yes	Yes
Sectorial dummies	No	No	Yes	No	No
Bargaining agreement	No	No	Yes	Yes	Yes
Tenure	No	Yes	Yes	Yes	Yes
Year and region	No	Yes	Yes	Yes	Yes
Constant	6.071***	5.297***	4.954***	5.190***	5.127***
	(0.014)	(0.0085)	(0.024)	(0.0089)	(0.0087)
Observations	1469039	1468595	1468595	1468595	1468595
R^2	0.24	0.45	0.47	0.47	0.44

In columns (1), (2), and (3) all the controls are interacted with dummy "Women", in column (4) they are interacted with dummy "No Union", while in column (5) with dummy "NoUnionWomen"

Robust standard errors at firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Separation Elasticities to the Wage, Weekly Wages

Dependent Variable	(1)	(2)	(3)	(4)
Change of Job	Probit	Probit	Probit	Probit
Log Wage	-0.409***	-0.108***	-0.0986***	
	(0.021)	(0.011)	(0.010)	
Women × Log Wage	0.234***	0.0508***	0.0467***	
	(0.017)	(0.012)	(0.012)	
Log Employment		-0.0692***	-0.0660***	-0.0700***
		(0.0059)	(0.0056)	(0.0054)
Women × Log Employment		-0.00947*	-0.0114**	-0.00979**
		(0.0051)	(0.0049)	(0.0047)
Tenure			-0.0674***	-0.0679***
			(0.0026)	(0.0026)
Women × Tenure			0.0256***	0.0258***
			(0.0034)	(0.0034)
Controls	No	Yes	Yes	Yes
Constant	1.560***	1.215***	1.201***	0.704***
	(0.13)	(0.068)	(0.067)	(0.042)
Observations	1469039	1232026	1232026	1232026
Pseudo R^2	0.01	0.13	0.14	0.13

All the controls are interacted with dummy "Women"

Controls are as in column (3) of Table 5

Robust standard errors at firm level in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Evidence of Relative Employment Effects from a "Natural Experiment," Weekly Wages

Dependent Variable	Change in Relative Wage		Change in Relative Employment			
	OLS		OLS		IV	
	before	after	before	after	before	after
	(1)	(2)	(3)	(4)	(5)	(6)
Initial Relative Wage	-0.601***	-0.624***				
	(0.032)	(0.035)				
Change in Rel. Wage			-0.167***	-0.0180**	-0.0895***	0.279***
			(0.0075)	(0.0080)	(0.015)	(0.014)
Change in Skills			-0.125***	-0.142***	-0.128***	-0.144***
			(0.0053)	(0.0055)	(0.0053)	(0.0055)
Sectorial Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.0936**	0.0400*	-0.207***	-0.0601***	-0.216***	-0.0221*
	(0.038)	(0.021)	(0.041)	(0.013)	(0.042)	(0.013)
Observations	100902	86936	92117	78864	92117	78864
R^2	0.31	0.35	0.03	0.03	0.03	0.01

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The labour supply elasticity estimated from wage elasticities of separations using yearly wages is equal to 0.938 for men and 0.706 for women. The gender wage differential predicted by a monopsony model is calculated using the method below proposed by Barth and Dale-Olsen (2009):

$$\frac{\overline{w}_W - \overline{w}_M}{\overline{w}_M} = \frac{\varepsilon_W - \varepsilon_M}{\varepsilon_M(\varepsilon_W + 1)},$$

and it is equal to about 15%. To calculate the relative contribution of search frictions to the gender wage differential, it is necessary to derive an estimate of the gap due to productivity differences.[36] For this purpose, I estimate a standard a wage equation with experience, experience squared, age, age squared, tenure, tenure squared, occupation and women dummies. The latter is equal to 25% and should proxy the observed gender gap; then, dividing the former by the latter, I obtain that monopsony is able to explain about 56% of the gender differential in Italy.[37]

The empirical evidence also indicates that the monopsony model can explain part of the employer size-wage differential. In a labour market in which unions are traditionally very strong, evidence of higher wage premia in less unionised sectors can be interpreted as an effect of wage competition across firms, as predicted by the monopsony model. The monopsony model is also a very interesting theoretical framework to interpret the relative employment effect generated by exogenous changes in relative wages after the abolition of the Scala Mobile.

Having obtained these estimates, one wonders if they are in line with those obtained for other countries with different or similar characteristics. In this respect, the corporatism index provided by Teulings and Hartog (1998) can help in positioning Italy with respect to other countries. As Italy ranks higher than the UK in this respect, lower employer size effects are expected in this case. It turns out that results obtained by Manning (2003) for the UK using the BHPS confirm this prediction.

[36] Of course, more data would be needed to control for observed and unobserved productivity. Needless to say, with this method, the role of discrimination cannot be calculated.

[37] The predicted gender differential obtained with weekly wages is much higher than the coefficient on women in the wage equation; in this case, it is not possible to obtain a quantitative measure of the importance of monopsony to explain the differential.

4 Concluding Remarks

In this paper, I study gender wage differentials using first order predictions of the dynamic monopsony-search model with frictions. In particular, I exploit equilibrium relations and empirical implications of the theoretical model in terms of wage regression and separation functions to analyse the dynamics of gender wage differentials in Italy.

Results indicate that women have somewhat larger benefits from working at bigger firms and consequently lower labour supply elasticity, as predicted by the monopsony model; this result is also confirmed when testing for larger size effects in less unionised sectors, indicating interesting spillover effects of union wages in less unionised sectors. An estimate of the labour supply elasticity calculated using separation functions shows again important differences in transition rates, and predicts lower labour elasticity for women; as a consequence, firms can wage discriminate and pay lower wages to this group of workers.

Finally, the institutional change in wage indexation mechanism at work in Italy (Scala Mobile) shows a different correlation between the relative changes in male/female employment and relative changes in the gender wage differential before and after its abolition. I interpret this results in favor of the monopsony model against the labour demand model (with unions), that seemed a good theoretical benchmark for the period before the reform. Robustness checks conducted with weekly wages reinforce my results.

The aim of this paper was to try to shed some light on the capacity of a monopsony model to interpret some stylised facts we observe in labour market data. Despite Italian's labour market is often considered as strongly centralised with powerful unions, the empirical evidence offered in this paper shows that is not the whole story and that changes in the institutional framework give employers some monopsony power. I estimate that about half of the gender differential can be explained by search frictions, the rest being productivity differentials and discrimination. Recognising this fact, helps to better understand the workings of the labour market and to improve policy prescriptions.

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