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**Working Paper**

## The Effects of Unions on Wage Inequality : The Italian Case in the 1990s

IZA Discussion Papers, No. 1385

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Checchi, Daniele; Pagani, Laura (2004) : The Effects of Unions on Wage Inequality : The Italian Case in the 1990s, IZA Discussion Papers, No. 1385, Institute for the Study of Labor (IZA), Bonn

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IZA DP No. 1385

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The Italian Case in the 1990s**

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November 2004

# **The Effects of Unions on Wage Inequality: The Italian Case in the 1990s**

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Discussion Paper No. 1385  
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## **ABSTRACT**

### **The Effects of Unions on Wage Inequality: The Italian Case in the 1990s\***

In this paper we analyse the contribution of union activity to reducing earnings inequality. Given the specific nature of the system of industrial relations, Italian unions may contribute to inequality reduction through either national bargaining (i.e. reducing between-sector differentials) and/or local bargaining (i.e. reducing within-establishment inequality). After reviewing aggregate evidence on the first dimension, we explore the second route making use of matched employer-employees data-set, surveyed in 1995 by Eurostat. We pay great care to the potential endogeneity of local bargaining, and we find that the widespread adoption of local bargaining, by reducing the implicit price of individual characteristics, effectively contributes to inequality reduction.

JEL Classification: J31

Keywords: unions, wage inequality

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\* Paper presented to the conference on "Distribuzione del reddito e crescita in Italia" (Bologna – 4/6/2004). We thank our discussant, Marco Leonardi, for helpful comments. Usual disclaimers apply.

## 1. Union presence in Italy and some previous results

In recent decades a large increase in wage inequality has taken place in many western countries. This phenomenon started during the 1980s in the US, while in most European continental countries it emerged only at the beginning of the 1990s. The offered explanations are both economic and institutional. Among the former, reasons commonly cited are the change in productive structure due to deindustrialization, the process of globalization, skilled biased technical change, modification in labour supply due to migration from developing countries and to an increase in the female participation rate. Erosion of the real value of the minimum wage and a generalised reduction of union influence in wage setting are the main institutional causes of the increase in wage inequality (for all, Katz and Autor, 1999; on the sociological side see also Alderson and Nielsen, 2002).

In Italy, wage inequality decreased strongly until the first half of the 1980s and started to increase sharply only in the early 1990s, remaining substantially stable in the second part of the decade (Brandolini et. al., 2001). Various studies (Sestito, 1992; Erickson and Ichino, 1995; Manacorda, 2004) explain this trend referring to institutional factors. The role played by institutions is often analysed considering the impact of de-unionisation. In Italy, however, the automatic extension of the centrally-set wage to non-unionised workers implies that de-unionisation per se does not produce direct effects on wage distribution. Indeed, the major role in explaining the past trend in Italian wage inequality was played by a nation-wide wage indexation mechanism (the so-called *Scala Mobile*) that contributed greatly to wage compression until its complete abolition at the beginning of the 1990s, when wage differentials started opening up. With respect to this issue, Manacorda (2004) shows that during the 1980s Italy was affected by the same tendency towards more wage dispersion, determined by changes in market forces, as in the US, and he demonstrates that, had the *Scala Mobile* been inoperative, wage inequality would have increased similarly to the US.

With the abolition of the wage indexation mechanism, a reform of the Italian bargaining system was introduced in July 1993, when a landmark agreement was signed between the government, the entrepreneurial association and workers' unions (and reconfirmed in December 1998). Since then, the bargaining structure can be described as a two-tier system: national contracts are expected to preserve the purchasing power of wages, whereas decentralised wage bargaining at firm level should be devoted to rent-sharing when surplus is made available<sup>2</sup>. Before 1993, the Italian wage system consisted of a combination of nation-wide wage indexation, a system of national contracts signed for each wage sector, some territorial agreements (as in the case of food and construction workers) and a limited number of big companies signing workplace agreements<sup>3</sup>. By far the most significant component was given by wage indexation, which produced a significant decline in wage differentials, both between sectors and between jobs<sup>4</sup>.

The post-July 1993 observed dynamics of wage inequality was the outcome of two determinants: on one side, the national contracts reduced between-sector, between-region and between-firm wage inequality, since they set the equivalent of a minimum wage, varying by sector and qualification, but not for example by firm size. By fixing occupational scales within each sector, national contracts set a ceiling to wage differentials between blue and white collars, whereas cadres and managers were left out of the influence of union activity. On the other side, firms had the possibility to reopen the wage differentials by resorting to unilateral wage concessions and/or by signing wage contracts at firm level, thus creating a wage drift. Since this second channel was totally uncoordinated, we would have expected an increase in between-sector, between-region and between-firm earnings inequality. However, bargaining at firm level may have acted as a limitation to wage concessions and/or to

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<sup>2</sup> The national pact signed on 23/7/1993 establishes three main points with respect to the bargaining pattern: 1. Bargaining pattern consists of a first level nation-wide collective bargaining and of a discretionary second level of bargaining at firm or territorial level 2. The length of nation-wide wage contract is two years. Nation-wide wage bargaining is centred on the respect of the target inflation rate set by government. 3. Firm's wage bargaining must be linked to measures of labour productivity.

<sup>3</sup> See Brunello and Checchi (2000) for a review of the pre-existing contractual system.

<sup>4</sup> See the detailed account of the working of the Italian wage indexation system contained in Eriksson and Ichino 1995. Additional evidence is reported in Prasad and Utili (1998).

promotions, thus potentially reducing within-firm inequality. The overall contribution of local bargaining to aggregate wage inequality is therefore ambiguous<sup>5</sup>. The present paper tries to shed some light on this issue.

The scarce availability of micro-data containing reliable information on both wages and the type of bargaining has so far limited the possibility to investigate this issue for Italy.

Dell'Aringa and Lucifora (1994) estimate the impact of union wage policies comparing the dispersion of earnings in the sector covered by local collective agreements and in the non-covered sector, considering the standard deviation of log wage as a measure of wage dispersion. Using data referring to the metal-mechanical engineering industry for the year 1990 (thus, before the 1993 wage agreement) they provide descriptive evidence that across establishments wage dispersion was higher in the no-(local) bargaining sector; in order to control for the fact that differences in earnings dispersion may have been due to differences in characteristics that might be correlated with firm bargaining and could affect wage distribution (independently of union wage policies), they replicate the analysis for narrowly defined groups (e.g. firm size and geographical location) obtaining similar results. By means of a variance decomposition exercise they show that local bargaining took place where workers had more homogeneous characteristics, and even after controlling for this sorting, wages remained less dispersed in the covered sector. Finally, they find that union pay policies reduced wage differentials for both measured and unmeasured average characteristics.

To analyse the effect of unions on within-establishment wage dispersion, they interact both the local bargaining dummy and the establishment union density variable with skill level dummies, and find that while local bargaining had no significant effect on within-firm wage inequality, higher union density reduced skill differentials: egalitarian pay policies were stronger as the firm's union density grew<sup>6</sup>. Considering the total effect of unionism on wage dispersion, the analysis reveals that overall wage dispersion is higher in the no-(local) bargaining sector, since the positive white-/blue-collar wage gap is more than outweighed by the within-sector dispersion reducing effect.

Lucifora (1999) investigates through a cross-country analysis the role that trade unions, the structure of collective bargaining and the existence of regulation on wages (e.g. mandatory extension provisions for collective bargaining) played in determining the wage distribution and the incidence of low pay across some OECD countries, including Italy. The author shows that union density and coverage were negatively correlated with the incidence of low paid workers, thus helping to reduce wage dispersion in the lower part of the wage distribution.

Dell'Aringa et al (2004) explore the patterns of wage inequality in Belgium, Ireland, Italy and Spain using micro-data from a large matched employer-employee data set drawn from the European Structure of Earning Survey (ESES) for the year 1995, thus operating under the July 1993 wage agreement<sup>7</sup>. The focus of the paper, however, is exclusively on the within-firm wage inequality. At a descriptive level, they report that average (unconditional) intra-establishment pay inequality, as measured by the coefficient of variation, is higher in presence of local bargaining (for Italy, the average value is 0.274 with only centralised bargaining and 0.353 when ~~also~~ a firm bargaining is also present). However, turning to conditional analysis the results reverse: regressing the coefficient of variation on an establishment's average workers characteristics and on other establishment level controls, they

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<sup>5</sup> Notice that, as the effects of the national contracts are extended to all workers independently of their union affiliation, one way to evaluate the impact of Italian unions on wage inequality consists in studying the differences in wage distributions determined by the presence of local bargaining.

<sup>6</sup> They also consider the effect of union density on wage dispersion by separately analysing the bargaining and the no bargaining sectors. The results show that for blue-collar workers skilled differentials are reduced only in non-covered establishments, while for white-collar workers a strong egalitarian effect of union density is found only in covered firms.

<sup>7</sup> The 1993 wage agreement started to be applied in 1994 since a previous agreement signed in July 1992 established that no wage increase could be accorded until the end of 1993. However, not all sectors signed new contracts in this year. For example, the metal-mechanical engineering industry signed a new contract in January 1996 (see Casadio et. al, 2004). Thus the ESES data, which refers to 1995, report wages determined in some cases with the "new rules" and in other cases with the "old rules".

obtain that the existence of a decentralised agreement reduces within-firm wage dispersion<sup>8</sup>. Decomposing the difference in wage inequality between covered and not covered establishments using the Oaxaca technique, it results that the largest part of this difference (around 80%) is explained by observed differences in personal and establishments characteristics, while only around 20% is explained by different returns to these characteristics. In order to control for average workforce characteristics, they implement a two-stage procedure: from the first stage residuals of a standard Mincerian equation, they compute the within-establishment coefficient of variation and regress it on firm and average workers characteristics. The results confirm that the effect of local bargaining on wage inequality is generally statistically insignificant, but negative<sup>9</sup>. On the whole, the paper shows that the association between decentralised bargaining and within-firm wage inequality is at best negative or not statistically significant.

## 2. Aggregate evidence

In the absence of consistent data on the dynamics of contractual and actual wages, we had to resort to aggregate information. Since 1977, the Italian Institute of Statistics has been producing an index of contractual wages, with a 14-sector and 2-qualification disaggregation<sup>10</sup>. These indices keep information of the effects of national contracts, while leaving outside the wage drift attributable to local bargaining and/or unilateral concessions. However, in the absence of a published series of employment weights and of initial (or terminal) wage levels, it is impossible to compute an aggregate series of wage inequality. In order to get round this limitation, we have taken the level of contractual wages and salaries recorded in 2002 in a local survey for the employees of four sectors (mechanical, textile, food and chemical workers)<sup>11</sup>, and we have backwardly reconstructed the level of contractual wages, starting from 1977. As weights, we have taken the number of employees in standard units from national accounts<sup>12</sup>. In a similar manner, we have obtained an estimate of the actual wages by computing the average gross salary in each of the four sectors<sup>13</sup>. Using these series we can construct some between-sector inequality measures, thus obtaining some clues on the role of national bargaining on the evolution of wage differentials.

Looking at Figure 1, we see a phenomenon that has already been noticed by analysts, that is the progressive slow down of the contractual wage vis a vis the average wage paid by firms<sup>14</sup>. This phenomenon begins after the initial reform of the wage indexation system in 1984, but the gap widens after 1993 (corresponding to the vertical line). This is partly due to the discontinuous wage realignments caused by national contracts expiry and to the weakening of national unions.

If we now consider two inequality measures that can be easily computed from aggregate data (namely the coefficient of variation and the Gini concentration index – respectively shown in Figures 2 and 3), we notice that between-sector actual wage inequality exhibits a downward trend from 1993, whereas the corresponding measure computed on contractual wages reveals an opposite trend from the early 1980s. While from these graphs we cannot say anything about the trends of overall wage inequality, still we are left in doubt with respect to the role of national bargaining, which could reveal inequality enhancing instead of inequality reducing (as argued in the previous section).

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<sup>8</sup> The effect is stronger the higher the establishment's mean seniority and the larger the plant's size.

<sup>9</sup> Dell'Aringa et al. (2004) control for the potential endogeneity of the firm's choice to bargain at local level using a treatment effect model with endogenous dummy variable (the local bargaining dummy). In the case of Italy, the (corrected) coefficient of decentralised bargaining is found to be negative but not statistically significant.

<sup>10</sup> See Istat, *Indagine sulle retribuzioni contrattuali*, various issues. Here we are using the aggregate variable "retribuzioni contrattuali per dipendenti degli operai e impiegati" (contractual wages for blue and white collars).

<sup>11</sup> See Assolombarda 2002, *Retribuzioni di fatto nell'industria manifatturiera dell'area milanese*. The values are expressed in euros and consider the item "retribuzione totale CCNL" (Total nation-wide bargained wage) at December 2002.

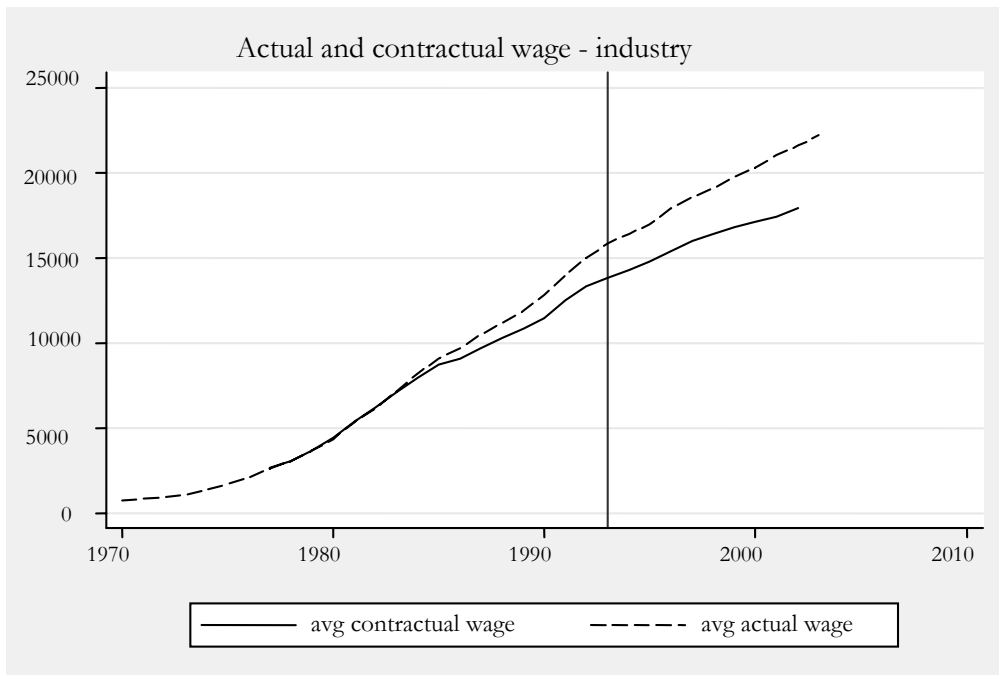
<sup>12</sup> The variable considered is "unità di lavoro dipendente – media annua su dati trimestrali grezzi" (standardised employee labour unit – annual average on quarterly raw data).

<sup>13</sup> The variable considered is "retribuzioni lorde individuali di fatto" (actual individual gross wages), obtained by the ratio of "retribuzioni lorde" (gross wages) and "unità di lavoro dipendente" (standardised employee labour unit).

<sup>14</sup> See for example Istat (2002), chapter 3. It must be recalled that the average actual wage includes the payment to cadres and managers, and therefore it may overestimate the gap with the contractual wage.

For this reason, in addition to the role of decentralised bargaining, in the next section we will investigate the relative contribution of national contracts to inequality reduction.

**Figure 1 – Aggregate wage dynamics**



**Figure 2 – Aggregate inequality measures**





**Figure 3 – Aggregate inequality measures**



### 3. Disaggregate evidence

Thanks to a convention between the PIEP research group and Eurostat, we were given the possibility to access a unique data-set containing individual information about employees, in combination with firm level data. In particular, the data we use are from the European Structure of Earning Survey (ESES), which contains matched employer-employee information and covers establishments with more than 10 employee whose economic activity falls within Section C to Section K of the Nace Rev.1 classification (substantially they include industry and private services)<sup>15</sup>.

The underlying survey was conducted in 1995, two years after the reform of the bargaining system. Since this reform imposed a freeze on local bargaining for 18 months (from July 1993 to December 1994), 1995 witnessed a revival of bargaining activity at local level (Checchi and Flabbi 1999). Thus the data collected should provide an effective view of the effects of bargaining activity, especially when it is particularly in action<sup>16</sup>.

The full ESES sample for Italy includes 96267 individuals and 7778 firms. Employee level data include gender, age, occupation (classified using ISCO classification), education, tenure, working hours (full time/part time), type of contract (permanent, fixed term, apprentice or other contract) and other information that can be used to calculate hourly wage, either including or excluding annual bonuses. Firm level data include geographical location of the reporting unit, sector of activity (Nace Rev.1 classification), size and type of collective agreement applied to the workers in the unit (whether only using a nation-wide contract, supplementing the national contract with a firm-specific contract or applying other/no contract). A code variable allows the matching of the sample of workers with the sample of firms.

<sup>15</sup> These data are not publicly available, and are not in the possession of the authors. We got remote (and restricted) access to the data thanks to a TSER programme on *Pay Inequalities and Economic Performance* (PIEP) financed by the European Commission (Contract nr. HPSE-CT-1999-00040). The authors would like to thank the Italian participants to the project (Carlo Dell'Aringa and Claudio Lucifora) for giving us this opportunity.

<sup>16</sup> However, as reported in note 6, not all sectors signed a new contract in 1995.

This data set has already been analysed within the research group (Dell’Aringa et al. 2004) with respect to the issue of within-firm wage inequality (see the first section of this work for a description of their results). In the present case, we are concerned with overall wage inequality, and we discuss the relative contribution of union activities (both at national and local level) to inequality reduction. For this reason, we do consider a narrow definition of wage inequality, excluding payment for overtime and all bonuses from the definition of actual wages, and we leave managers and professionals working within the enterprise out of our analysis since they are not covered by unions’ agreements. As a consequence, we concentrate on the dimensions of wage inequality that are under the potential direct control of union bargaining activity.

Table 1 and 2 present the sample composition for both the full and the restricted samples. The full sample contains 96267 observations, while excluding managers and professional it reduces to 81219 observations. The great majority of the individuals in the full/restricted sample (61%/69%) have less than upper secondary education and only around 5%/2% have a university degree.

**Table 1 – Descriptive statistics of the workers sample – Individual and occupation characteristics**

	Full sample (including managers and professionals – sample size 96267)			Reduced sample (excluding managers and professionals – sample size 81219)		
	composition	Mean wage (bonus excluded)	Mean wage (bonus included)	composition	Mean wage (bonus excluded)	Mean wage (bonus included)
total sample		8.485	9.644		7.394	8.315
<b>Individual characteristics</b>						
Primary education	0.16	7.093	7.850	0.19	7.025	7.772
Lower secondary education	0.45	7.268	8.083	0.50	7.043	7.806
Upper secondary education	0.33	9.723	11.278	0.29	8.119	9.354
Non-university degree	0.00	12.806	14.337	0.00	8.320	9.536
University degree	0.05	15.112	17.932	0.02	9.651	11.851
Post graduate	0.00	17.760	21.110	0.00	10.198	11.541
Age	38.69			37.97		
Male	0.75	8.947	10.173	0.73	7.639	8.574
Female	0.25	7.102	8.060	0.27	6.744	7.624
<b>Occupation characteristics</b>						
Managers	0.02	26.172	30.568	---	---	---
Professionals	0.04	15.141	17.879	---	---	---
Associate professionals	0.10	11.738	13.688	---	---	---
Clerks	0.22	8.859	10.437	0.27	8.859	10.437
Personal services workers; sale	0.05	6.866	7.646	0.06	6.866	7.646
Craft and related trades workers	0.27	6.749	7.365	0.32	6.749	7.365
Plant-machines operators	0.23	7.209	7.969	0.28	7.209	7.969
Elementary occupations	0.07	6.179	6.808	0.08	6.179	6.808
Permanent contract	0.95	8.617	9.817	0.94	7.491	8.445
Fixed term contract	0.03	6.461	6.832	0.03	6.074	6.400
Apprentice/trainee	0.02	5.728	6.156	0.03	5.560	5.976
Other contract	0.00	6.926	7.621	0.00	6.286	7.042
Full time	0.94	8.666	9.854	0.93	7.543	8.482
Part time	0.06	5.771	6.490	0.07	5.383	6.059
Tenure	133.29			126.76		

Note: mean wages are expressed in euros.

Focussing on the restricted sample, the mean age is 38 years old and men make more than two thirds of the sample up. Over 90% of the sample workers are hired on a permanent basis and hold a full time

job. As for the firms' characteristics (see Table 2), 63% of the sample workers have a job in manufacturing and firm size is less than 100 employees for 55% of them. Considering the type of agreement, the majority of workers (73%) are covered only by a national collective agreement, while for 24% of them a local agreement is added to the national one<sup>17</sup>. A minority of workers (3%) are covered by other types of agreements or are not covered at all.

**Table 2 – Descriptive statistics of the workers sample – Firms characteristics**

	Full sample (including managers and professionals – sample size 96267)		Reduced sample (excluding managers and professionals – sample size 81219)			
	composition	Mean wage (bonus excluded)	Mean wage (bonus included)	composition	Mean wage (bonus excluded)	Mean wage (bonus included)
<b>Firm characteristics</b>						
Mining and quarrying	0.03	8.002	8.824	0.03	7.173	7.860
Manufacturing	0.61	7.717	8.539	0.63	6.900	7.588
Electricity, gas and water supply	0.04	11.111	12.801	0.03	9.958	11.448
Construction	0.04	8.198	8.655	0.04	7.279	7.633
Wholesale and retail sale; repair	0.04	7.451	8.367	0.04	6.748	7.523
Hotels and restaurants	0.03	6.725	7.466	0.03	6.185	6.818
Transport, storage and communication	0.06	10.025	11.381	0.06	9.256	10.462
Fincancial intermediation	0.09	12.922	16.656	0.08	10.377	13.408
Real estate, renting and business act.	0.07	7.851	8.824	0.06	6.531	7.237
size 10-19	0.16	7.343	8.142	0.17	6.697	7.351
size 20-49	0.20	7.725	8.629	0.21	6.942	7.676
size 50-99	0.17	8.318	9.443	0.17	7.178	8.053
size 100-249	0.20	8.694	9.926	0.20	7.486	8.481
size 250-499	0.11	9.070	10.441	0.11	7.839	8.942
size 500-999	0.09	9.759	11.342	0.08	8.387	9.662
size 1000+	0.07	10.335	11.982	0.06	9.056	10.437
National agreement	0.72	8.162	9.146	0.73	7.213	8.001
National and local agreement	0.25	9.478	11.169	0.24	8.018	9.378
Other agreement	0.03	7.976	8.886	0.03	6.847	7.496
North-West	0.16	8.912	10.244	0.15	7.525	8.562
North-East	0.33	8.381	9.470	0.33	7.337	8.210
Centre	0.22	8.550	9.752	0.22	7.433	8.381
South	0.29	8.318	9.429	0.29	7.361	8.254

Note: mean wages expressed in euros.

Table 1 also shows the mean hourly wage for different sub-samples of workers. Mean (net) wage in euros<sup>18</sup> increases with the level of education, even if the difference between the mean wage paid to individuals with primary education and to individuals with lower secondary education is very small. As expected, men earn a higher hourly wage than women and mean wage increases with the level of occupation. Permanent contract workers earn a considerably higher wage than other workers; a significant difference is registered also between full-time and part-time workers. The better paying sector is financial intermediation, followed by electricity, gas and water supply; hotels and restaurants is the sector with the lowest mean hourly wage. As expected, hourly wage is increasing in firm size. With regard to the type of agreement, the highest mean wage is recorded in the presence of two levels of

<sup>17</sup> Checchi and Flabbi (1999) report a much higher fraction (75%) of enterprises signing a local agreement, but their sample includes only medium and large size companies in Lombardy. The ISTAT survey on “Flessibilità nel mercato del lavoro” (flexibility in the labour market) conducted in 1996 report a much lower figure (32%), but still higher than the one obtained in the current sample.

<sup>18</sup> Data originally collected in 1995 Italian liras have been converted in euro using the official exchange rate of 1936.27 liras for one euro.

bargaining, while the lowest wage is paid if the national collective agreement is not applied. Finally, notice that there are no significant regional differences; however, the highest paying region is the North-West.

If we look at the raw data, there is evidence in the sample of reduced inequality associated with union bargaining. Looking at Table 3, we observe that inequality measures are rather similar when considering firms that apply only the national contract or other/no contract, but all inequality measures decline when taking into account the sub-sample of firms undertaking local bargaining.

**Table 3 – Inequality measures for hourly wage – unconditional measures**

	full sample	firms with other/no agreement	firms with only national agreement	firms with national+ local agreement
mean	7.394	6.847	7.213	8.018
median	6.949	6.576	6.735	7.594
standard deviation	2.318	2.213	2.311	2.237
relative mean deviation	0.119	0.120	0.121	0.107
coefficient of variation	0.313	0.323	0.320	0.279
standard deviation of logs	0.308	0.322	0.311	0.276
Gini coefficient	0.168	0.173	0.170	0.150
Mehran measure	0.237	0.247	0.239	0.214
Piesch measure	0.133	0.136	0.136	0.119
Kakwani measure	0.027	0.029	0.028	0.022
Theil entropy measure	0.047	0.050	0.048	0.037
Theil mean log deviation measure	0.047	0.050	0.048	0.038

Table 4 reports the inequality decomposition of one unconditional measure, the generalised entropy index<sup>19</sup>. It is easy to recognise that within-groups inequalities decline when passing from the absence to application of national contracts, and from only national to local bargaining, while local bargaining reduces between-groups inequality only in two cases. The within-group inequality decline is particularly pronounced when considering full-time workers, which are the widest constituency for union support; for temporary workers, inequality is higher if only a nation-wide agreement rather than other/no agreement is applied, while local bargaining is inequality reducing for temporary full-timers and inequality increasing for temporary part-timers<sup>20</sup>. Finally, it is worth noticing that between-groups inequality increases when considering decomposition by educational attainment and by occupation. This can be taken as indication that union activity aims to alter the entire wage distribution: on one side it compresses wage distribution within similar educational attainment and/or qualification (in the line

<sup>19</sup> The generalised entropy measure is given by  $E_{\alpha} = \frac{1}{\alpha(\alpha-1)} \left[ \frac{1}{n} \sum_{i=1}^n \left( \frac{y_i}{\bar{y}} \right)^{\alpha} - 1 \right]$  (see Cowell 1995, theorem 5). In case of

$\alpha = 1$  it corresponds to  $E_1 = \left[ \frac{1}{n} \sum_{i=1}^n \frac{y_i}{\bar{y}} \cdot \log \left( \frac{y_i}{\bar{y}} \right) \right]$ . All inequality measures in this class can be additively decomposed in a

between-group component and in a within-group component. The within-group component is  $\sum_{k=1}^K [ysh_k E_{1,k}]$  where K is

the number of subgroups and  $ysh_k$  is the subgroup income share. The between-group component is derived assuming every person within a given subgroup  $k$  receives  $k$ 's mean income.

<sup>20</sup> It should be recalled that this measures are computed over hourly wages, and therefore should in principle be independent of differences in working hours. However it could be possible that this variable cumulates the measurement errors in the salary and in the working hours.

of a celebrated slogan “equal pay for equal work”), and at the same time it operates to keep wage differentials large enough to maintain the internal hierarchy in the firm, as well as for providing careers incentives.

**Table 4 – Inequality decomposition – hourly wage – unconditional measure of Generalised entropy index (for  $\alpha=1$ )  $\times 1000$**

	full sample	firms with other/no agreement	firms with only national agreement	firms with national+ local agreement
male	8.20	10.40	8.20	5.90
female	6.30	6.60	6.60	5.00
<i>within group inequality</i>	6.81	7.72	7.02	5.23
<i>between group inequality</i>	0.25	0.54	0.31	0.08
permanent full time	5.30	6.10	5.50	4.00
permanent part-time	18.40	19.10	18.10	17.60
temporary full time	5.80	4.50	6.30	3.70
temporary part-time	19.00	11.10	19.40	14.90
<i>within group inequality</i>	6.08	7.15	6.30	4.63
<i>between group inequality</i>	0.97	1.11	1.03	0.68
primary education	6.90	7.90	7.30	5.10
lower secondary	6.80	8.00	7.10	4.90
upper secondary	6.40	8.10	6.70	4.90
tertiary education	4.20	4.40	5.20	2.70
<i>within group inequality</i>	6.66	7.95	7.03	4.82
<i>between group inequality</i>	0.39	0.31	0.30	0.49
Clerks	4.96	6.19	5.44	3.37
Personal services workers; sale	6.96	7.22	7.01	5.65
Craft and related trades workers	6.79	8.31	7.03	5.05
Plant-machines operators	5.48	5.82	5.93	4.21
Elementary occupations	7.56	8.31	7.92	4.79
<i>within group inequality</i>	5.98	7.32	6.39	4.18
<i>between group inequality</i>	1.07	0.95	0.93	1.13

However, we are perfectly aware that unconditional measures may be the mere reflection of composition bias. The lower inequality associated to local bargaining is also linked to higher level of pay, which leads us to suspect that these firms may attract a self-selected sample of workers. Suppose for example that these firms attract only graduate workers: given the presence of a rather homogeneous labour force within these firms, wage differentials are compressed (i.e. within inequality is reduced), while at the same time the wage differential with firms without local bargaining (between-inequality) expands<sup>21</sup>. Thus we would like to assess whether the inequality reduction is a genuine outcome of bargaining activity of unions at local level or merely reflects a composition effect.

One possible strategy to tackle this problem is the following. Suppose we can express the hourly wage  $w_{ij}$  of worker  $i$  working in firm  $j$  as a function of her individual characteristics  $X_i$  (a vector including gender, age, education), of occupational characteristics  $Y_i$  (a vector including tenure, hierarchical position, working time and type of contract), of firm characteristics  $Z_j$  (a vector including

<sup>21</sup> Blau and Kahn (1999) discuss the effect of unionisation and wage premium onto wage inequality.

firm size, firm location and sectoral controls) and of the type of collective bargaining applied in the firm, as represented in equation (1):

$$w_{ij} = \beta_0 + \beta_1 X_i + \beta_2 Y_i + \beta_3 Z_j + \beta_4 \delta_j + \varepsilon_{ij} \quad (1)$$

where  $\delta=1$  if a local agreement is in force in the firm.

Denoting with  $I(w)$  a generic inequality measure computed over  $w_{ij}$ , the unconditional evidence reported in table 3 corresponds to the case where

$$I(w)_{\delta=0} > I(w)_{\delta=1} \quad (2)$$

Because of sample self-selection, we cannot take this result as supportive evidence of the fact that unions' bargaining at local level reduces wage inequality. Ideally, we would like to observe a counterfactual situation where, other things being held constant, an identical set of firms is initially exposed to and then prevented from engaging in local bargaining. If this experiment could be made possible, and we could observe that

$$I(w | \delta = 0) > I(w | \delta = 1) \quad (3)$$

then we would be inclined to conclude that union local bargaining contributes to overall inequality reduction (without being able to assess whether this reduction occurs at the between-group or within-group level). If equation (1) consists of an adequate representation of the reality, the claim reported in equation (3) can be re-expressed as

$$I(\beta_0 + \beta_1 X_i + \beta_2 Y_i + \beta_3 Z_j) > I(\beta_0 + \beta_1 X_i + \beta_2 Y_i + \beta_3 Z_j + \beta_4 \delta_i) \quad (4)$$

under the further assumption that the variance of the error term is identical in the two sub-samples (namely  $\sigma_w^2|_{\delta=0} \approx \sigma_w^2|_{\delta=1}$ ). However inequality (4) is conditioned by two limitations:

- i) since the presence/absence of local bargaining is potentially endogenous, the OLS estimate of  $\beta_4$  is biased, and appropriate econometric techniques are required.
- ii) the presence/absence of local bargaining may affect not only the mean wage (intercept), but also the marginal impact of observable characteristics (slopes).

We deal with the first limitation by studying the determinants of local bargaining, in order to apply a 2SLS estimate of equation (1) that controls for its potential endogeneity. To deal with the second limitation we will consider a certain number of possible interactions of local bargaining and observable worker/firm characteristics.

### 3.1 The determinants of local bargaining

Existing literature on the Italian case<sup>22</sup> suggests that the probability of finding a local agreement is strongly and positively associated with firm size, sector of activity and "style" of industrial relations (whether unions and managers have regular meetings, whether there exist arbitration committee, whether firms apply human resources management practices). Contrary to expectations, local union density is statistically insignificant in the prediction of the same probability. We have estimated the probability of local bargaining in our sample using alternative techniques.

In the first column of Table 5 we estimate a linear probability model for the presence of local bargaining, whereas the second column repeats the exercise for an ML probit model and the third one

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<sup>22</sup> See Checchi and Flabbi (1999) and Checchi and Giannini (2000) and the reference therein.

reports an ML multinomial model (the two other alternatives being observing only a national contract or observing other/no type of contract). Finally, the fourth column gives details of a treatment effects model using a full ML estimator<sup>23</sup>.

**Table 5 – Determinants of local bargaining**

Linear probability and probit models with heteroskedasticity robust standard errors – Treatment effect for comparison

	Ols	<i>p-value</i>	probit	<i>p-value</i>	multi-nomial	<i>p-value</i>	treatment effect	<i>p-value</i>
Size 20-49	0.04	0.00	0.32	0.00	0.59	0.00	0.37	0.00
Size 50-99	0.12	0.00	0.67	0.00	1.20	0.00	0.70	0.00
Size 100-249	0.22	0.00	0.99	0.00	1.75	0.00	1.01	0.00
Size 250-499	0.26	0.00	1.09	0.00	1.94	0.00	1.18	0.00
Size 500-999	0.26	0.00	1.08	0.00	1.92	0.00	1.23	0.00
Size 1000+	0.20	0.00	0.90	0.00	1.61	0.00	1.15	0.00
Mining and quarrying	-0.34	0.00	-1.23	0.00	-2.19	0.00	-1.62	0.00
Manufacturing	-0.27	0.00	-0.84	0.00	-1.42	0.00	-1.02	0.00
Electricity, gas and water supply	-0.54	0.00	-2.17	0.00	-3.90	0.00	-2.18	0.00
Construction	-0.38	0.00	-1.49	0.00	-2.59	0.00	-1.61	0.00
Wholesale and retail sale; repair	-0.24	0.00	-0.69	0.00	-1.12	0.00	-0.88	0.00
Hotels and restaurants	-0.32	0.00	-1.13	0.00	-1.96	0.00	-1.07	0.00
Transport, storage and communic.	-0.36	0.00	-1.15	0.00	-2.00	0.00	-1.04	0.00
Real estate, renting and business	-0.32	0.00	-1.05	0.00	-1.78	0.00	-1.32	0.00
temporary workers share	0.05	0.07	0.23	0.08	0.39	0.09	0.04	0.34
Blue collar share	-0.01	0.72	-0.02	0.76	-0.01	0.94	0.11	0.00
Part-time share	-0.05	0.06	-0.29	0.03	-0.52	0.03	-0.26	0.00
mean tenure	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
women share	-0.01	0.42	-0.06	0.43	-0.07	0.55	0.05	0.05
young share	-0.09	0.00	-0.43	0.00	-0.77	0.00	-0.25	0.00
north-west	0.09	0.00	0.37	0.00	0.65	0.00	0.45	0.00
north-east	0.10	0.00	0.44	0.00	0.79	0.00	0.47	0.00
centre	0.04	0.00	0.19	0.00	0.33	0.00	0.24	0.00
constant	0.29	0.00	-0.97	0.00	-1.65	0.00	-0.99	0.00
n.observations	7709		7709		7709		80717	
R <sup>2</sup>	0.16		0.17		0.13			

Note: the excluded case is a firm with 10-19 employees, working in the financial intermediation sector, located in the south. In the ML multinomial logit model “only nation-wide bargaining” is the comparison group.

All estimates report consistent results: the probability of coming across a local agreement shows an inverted U-shape with the firm size (the turning point being around 500 employees). Decentralised bargaining is also more likely in the financial intermediation sector (the excluded case), and then in decreasing order in the sale sector and in the manufacturing sector. As far as the geographical location is concerned, it is more frequently encountered in the Northeast region of the country, followed by Northwest and Centre. In the absence of direct information about local union density, we experimented with compositional variables that in our opinion should be related to the relative strength of unions at local level. Unions are stronger when the local workforce is more homogeneous and/or is closer to the 3-M paradigm (male-manual-manufacturing)<sup>24</sup>: we have tried to proxy this idea of homogeneity by taking into account the shares of blue-collars (plant-machines operators and

<sup>23</sup> While the first three models are estimated over the sample of firms, the fourth column is estimated over the sample of workers taking into account the potential self-selection of workers. For example, if more experienced workers self-select into firms with higher wages obtained through local bargaining, the fourth column estimates the probability of encountering a worker covered by a local agreement. Since the estimate is obtained in a treatment effect model for the determinants of individual wage (see Table 6 below), it takes into account the covariance in the error terms of the two equations (stata command: treatreg).

<sup>24</sup> Hanké (1993).

elementary occupations), temporary workers, part-timers, young workers (aged under 30) and female workers. Finally, we have also added the mean tenure experience in the workplace. Looking at their statistical significance, we find that bargaining activity is more likely in workplace with older and/or more experienced workforce, which typically is employed under full time permanent contracts. Notice, however, that in all four models the coefficient of temporary workers share is positive, even though its statistical significance is low. Contrary to expectations, the blue-collar and the female shares tend to be non-significant<sup>25</sup>.

### 3.2 Individual wage determinants

Now that we have an idea of the determinants of local bargaining, we move to estimating equation (1). In Table 5 we report alternative models of individual wage determinants. In keeping with theoretical expectations and empirical analysis of the Italian labour market<sup>26</sup>, we find an average gender wage differential of approximately 10 percentage points, a hump-shaped age-earning profile (with an upper turning point at the age of 53), a limited return to higher education (ranging between 11.5 and 18 percentage points for a university bachelor)<sup>27</sup> and an even lower return to job tenure. White collars earn an average premium with respect to the excluded case (elementary occupation) in the order of 20 percent points, whereas elementary occupations workers rank lowest in the earnings ladder. As far as the contract nature is concerned, full time workers earn an hourly wage that on average is 30 per cent higher than part-timers. An additional wage premium is associated with working in a large firm, located in the northern region. Finally, the best-paid jobs are found in financial intermediation (excluded case), and the worst paid in hotel and restaurants and in the manufacturing sectors.

While these patterns are consistent under alternative specifications, matters change when considering the effect of the type of bargaining on individual wages. The first column reports an OLS estimate of the average effect, which is rather small: working in a firm operating under a national contract implies a wage premium of 2.5%, with an additional 0.7% in case of co-presence of a local contract. This latter figure contrasts sharply with sample statistics and suggests potential bias in the OLS estimate. In fact, looking at the median values reported in Table 3 we get a wage differential associated to local bargaining with respect to national contract in the order of 12.8%.

Moving to alternative specifications, we consider two different strategies for coping with the potential endogeneity. On one side, in the light of the result obtained from the analysis of the determinants of local bargaining, we have instrumented the dummy variable referred to the presence of local bargaining with mean tenure and workforce shares (temporary workers, blue-collar, young, part-timers and women). In such a case we find evidence of downward bias of OLS in the estimate of local bargaining premium, which now reaches 43%. However, since the dichotomous LOCAL variable is no longer dichotomous when instrumented, the average effect should be evaluated at sample mean (0.239), thus producing a more reasonable estimate of the average impact of 10.3%. On the other side, if we take the extreme view that workers intentionally choose their jobs according to the absence/presence of local bargaining, then a treatment effect model can be adopted, as is done in the third column of Table 6. In such a case, we obtain the unexpected result of a negative premium associated with local bargaining (in the order of -16%).

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<sup>25</sup> One potential reason could be related to potential multicollinearity with other regressors (since blue-collar are typically employed under full-time permanent contract, or part-timers are disproportionately women). However both regressors remain insignificant even when other regressors are removed.

<sup>26</sup> See Lucifora (2003) and the references therein.

<sup>27</sup> One should not neglect that we are also controlling for several job characteristics (sectors, size, qualification), which could be already capture part of the economic return to education.



**Table 6 – Determinants of (log of) individual wage**  
Alternative estimators with heteroskedasticity robust standard errors

	ols robust	tstat	<i>p-value</i>	iv robust	tstat	<i>p-value</i>	treatment effect	tstat	<i>p-value</i>	ols robust	tstat	<i>p-value</i>	2sls robust	tstat	<i>p-value</i>
Male	0.112	60.98	0.00	0.106	45.01	0.00	0.113	60.37	0.00	0.118	55.44	0.00	0.111	51.56	0.00
Age	0.019	27.22	0.00	0.017	20.93	0.00	0.019	27.31	0.00	0.019	27.34	0.00	0.019	27.11	0.00
age <sup>2</sup>	0.000	-19.97	0.00	0.000	-15.12	0.00	0.000	-20.03	0.00	0.000	-19.84	0.00	0.000	-19.73	0.00
Lower secondary education	0.050	21.80	0.00	0.054	18.93	0.00	0.050	21.94	0.00	0.048	18.18	0.00	0.045	17.25	0.00
Upper secondary education	0.108	36.48	0.00	0.101	27.21	0.00	0.108	36.69	0.00	0.108	32.53	0.00	0.101	30.54	0.00
Non-university degree	0.155	7.95	0.00	0.159	6.69	0.00	0.157	8.14	0.00	0.156	7.01	0.00	0.138	6.34	0.00
University degree	0.148	23.18	0.00	0.115	13.12	0.00	0.150	23.59	0.00	0.163	18.31	0.00	0.180	18.01	0.00
Post graduate	0.268	2.75	0.01	0.159	1.01	0.31	0.260	2.79	0.01	0.454	2.61	0.01	0.228	1.67	0.09
tenure	0.001	28.31	0.00	0.001	21.23	0.00	0.001	29.39	0.00	0.001	28.73	0.00	0.001	28.31	0.00
tenure <sup>2</sup>	0.000	-14.02	0.00	0.000	-11.83	0.00	0.000	-14.26	0.00	0.000	-13.40	0.00	0.000	-12.89	0.00
Clerks	0.204	56.50	0.00	0.201	44.69	0.00	0.205	56.82	0.00	0.204	56.27	0.00	0.204	56.33	0.00
Personal services workers;	0.124	23.51	0.00	0.113	18.70	0.00	0.126	23.76	0.00	0.123	23.29	0.00	0.124	23.54	0.00
Craft or trades workers	0.046	14.33	0.00	0.049	12.25	0.00	0.047	14.73	0.00	0.045	14.24	0.00	0.046	14.36	0.00
Plant-machines operators	0.088	27.23	0.00	0.068	15.68	0.00	0.090	27.58	0.00	0.087	27.09	0.00	0.088	27.42	0.00
Permanent contract	0.102	4.61	0.00	0.009	0.38	0.70	0.099	4.52	0.00	0.105	4.74	0.00	0.113	5.18	0.00
Fixed term contract	0.087	3.82	0.00	-0.013	-0.54	0.59	0.083	3.70	0.00	0.087	3.86	0.00	0.093	4.20	0.00
Apprentice/trainee	0.011	0.48	0.63	-0.096	-3.85	0.00	0.010	0.44	0.66	0.011	0.50	0.62	0.018	0.80	0.42
Full time	0.293	54.27	0.00	0.292	49.87	0.00	0.291	53.24	0.00	0.293	54.23	0.00	0.293	54.21	0.00
Mining and quarrying	-0.227	-43.35	0.00	-0.053	-3.72	0.00	-0.298	-45.67	0.00	-0.229	-43.56	0.00	-0.230	-40.84	0.00
Manufacturing	-0.260	-83.87	0.00	-0.130	-12.28	0.00	-0.314	-71.83	0.00	-0.261	-82.89	0.00	-0.261	-71.09	0.00
Electricity, gas and water	-0.021	-4.38	0.00	0.222	11.66	0.00	-0.122	-16.98	0.00	-0.025	-5.06	0.00	-0.027	-4.73	0.00
Construction	-0.175	-34.62	0.00	0.002	0.17	0.87	-0.250	-38.56	0.00	-0.176	-34.69	0.00	-0.177	-32.32	0.00
Wholesale and retail sale	-0.231	-43.51	0.00	-0.107	-9.46	0.00	-0.284	-44.39	0.00	-0.232	-43.55	0.00	-0.232	-40.92	0.00
Hotels and restaurants	-0.273	-45.19	0.00	-0.131	-10.26	0.00	-0.334	-47.69	0.00	-0.273	-45.07	0.00	-0.274	-42.95	0.00
Transport communication	-0.067	-15.33	0.00	0.067	5.75	0.00	-0.122	-22.82	0.00	-0.068	-15.40	0.00	-0.069	-13.62	0.00
Real estate, renting business	-0.234	-50.93	0.00	-0.069	-5.11	0.00	-0.305	-49.39	0.00	-0.234	-50.45	0.00	-0.237	-46.11	0.00

size 20-49	0.031	12.53	0.00	0.008	2.63	0.01	0.040	15.52	0.00	0.030	12.32	0.00	0.031	12.63	0.00
size 50-99	0.053	20.09	0.00	-0.003	-0.53	0.60	0.076	25.68	0.00	0.051	19.63	0.00	0.053	20.35	0.00
size 100-249	0.087	33.52	0.00	-0.010	-1.28	0.20	0.127	37.24	0.00	0.086	32.82	0.00	0.089	33.26	0.00
size 250-499	0.106	35.46	0.00	-0.015	-1.57	0.12	0.156	38.37	0.00	0.104	34.57	0.00	0.108	33.47	0.00
size 500-999	0.135	39.39	0.00	0.004	0.36	0.72	0.190	41.82	0.00	0.133	38.94	0.00	0.137	37.14	0.00
size 1000+	0.157	41.58	0.00	0.037	3.56	0.00	0.207	44.81	0.00	0.155	41.01	0.00	0.158	41.83	0.00
north-west	0.056	23.64	0.00	0.010	2.29	0.02	0.073	27.81	0.00	0.055	23.53	0.00	0.056	23.51	0.00
north-east	0.055	27.69	0.00	0.008	1.90	0.06	0.073	32.10	0.00	0.055	27.59	0.00	0.056	27.20	0.00
Centre	0.021	9.93	0.00	-0.001	-0.22	0.82	0.029	13.00	0.00	0.021	9.93	0.00	0.022	10.16	0.00
<b>national contract</b>	<b>0.025</b>	<b>5.19</b>	<b>0.00</b>	<b>-0.064</b>	<b>-7.82</b>	<b>0.00</b>	<b>0.025</b>	<b>5.08</b>	<b>0.00</b>	<b>0.025</b>	<b>5.07</b>	<b>0.00</b>	<b>0.026</b>	<b>5.47</b>	<b>0.00</b>
<b>local contract</b>	<b>0.007</b>	<b>3.59</b>	<b>0.00</b>	<b>0.431</b>	<b>13.65</b>	<b>0.00</b>	<b>-0.162</b>	<b>-18.36</b>	<b>0.00</b>	<b>0.051</b>	<b>4.12</b>	<b>0.00</b>	<b>0.007</b>	<b>0.52</b>	<b>0.60</b>
local×age										0.000	-0.61	0.54	0.000	0.20	0.84
local×male										-0.025	-6.73	0.00	0.002	0.59	0.55
local×low.secondary										0.009	1.83	0.07	0.024	4.51	0.00
local×upper secondary										-0.001	-0.14	0.89	0.030	4.98	0.00
local×non/univ.degree										-0.003	-0.06	0.95	0.071	1.51	0.13
local×university degree										-0.032	-2.71	0.01	-0.039	-3.13	0.00
local×post graduate										-0.326	-1.84	0.07	0.109	0.58	0.56
local×tenure										0.000	-4.54	0.00	0.000	-1.86	0.06
local×permanent contract										-0.009	-1.10	0.27	-0.026	-2.98	0.00
Constant	1.571	58.74	0.00	1.685	56.72	0.00	1.624	60.31	0.00	1.566	58.57	0.00	1.564	59.11	0.00
n.observations	80717			80717			80717			80717			80717		
R <sup>2</sup>	0.5255			0.2370						0.5262			0.526		
				instrument for local = shares of temporary workers, of blue collars, of temporary workers, of women and of young workers + mean tenure			treatment for local = firm size, sector and location + shares of temporary workers, of blue collars, of temporary workers, of women and of young workers + mean tenure			in first stage, local is regressed onto firm size, sector and location + shares of temporary workers, of blue collars, of temporary workers, of women and of young workers + tenure					

Comparison case: female, with primary education, holding an elementary occupation, part-timer under “other” contract, employed in a firm with 10-19 employees of the financial intermediation sector, resident in the south, working in a firm that does not apply the national contract.

Such divergence in results led us to question whether the effects of local bargaining can be restricted to an intercept effect. As a consequence, in the fourth column we have re-estimated the OLS version of the model, including interactions between local bargaining and age, gender, various educational attainment, tenure and type of contract. Correspondingly, in the fifth column, the same model is re-estimated using a 2SLS strategy<sup>28</sup>. In this case the intercept effect of local bargaining is even smaller than before, and there is some evidence of changes in slopes for educational attainments (however with alternating signs when passing from secondary to tertiary education), tenure (the negative sign would imply that local bargaining would reduce the return to experience) and for the permanent nature of the work contract (again with negative impact).

We could conclude that the impact of local bargaining is at least imperfectly estimated, ranging from +10% to +0.7%, the treatment effect model being left aside since it is based on excessively heroic assumptions of intentional choice of workplace in accordance with the presence/absence of local bargaining. However, since the estimates obtained under IV technique are at least from a theoretical point of view more correct with respect to the problem at hand<sup>29</sup>, we will stick to these estimates (second and fifth columns in Table 6) to compute the inequality indices required for the comparison indicated in equation (3). This is what is performed in the next section, where conditional inequality measures are calculated.

### 3.3 Conditional inequality measures

The inequality indices of Table 7 are to be compared with the unconditional measures reported in Table 3.

**Table 7 – Inequality measures for predicted hourly wage – conditional measures**

	local bargaining affecting only the intercept – iv estimates reported in second model of Table 6)			local bargaining affecting intercept and slopes – iv estimates reported in fifth model of Table 6		
	firms with other/no agreement	firms with only national agreement	firms with national + local agreement	firms with other/no agreement	firms with only national agreement	firms with national + local agreement
mean	6899	6482	7342	7056	7240	7232
median	6731	6322	6636	6784	6960	6957
standard deviation	1366	1283	2192	1631	1676	1663
relative mean deviation	0.074	0.074	0.119	0.088	0.088	0.087
coefficient of variation	0.198	0.198	0.299	0.231	0.231	0.230
standard deviation of logs	0.194	0.194	0.279	0.224	0.224	0.223
Gini coefficient	0.108	0.108	0.161	0.126	0.126	0.125
Mehran measure	0.155	0.155	0.222	0.179	0.179	0.178
Piesch measure	0.084	0.084	0.130	0.099	0.099	0.099
Kakwani measure	0.011	0.011	0.024	0.015	0.015	0.015
Theil entropy measure	0.019	0.019	0.042	0.026	0.026	0.025
Theil mean log deviation measure	0.019	0.019	0.040	0.025	0.025	0.025

These conditional measures can be interpreted as the residual inequality once compositional differences (in observables and – as long as the IV model is correctly specified – unobservables as well) are taken into account. When looking at the case when only the intercept is modified by local bargaining

<sup>28</sup> We have taken the linear probability predicted by the model considered in the first column of Table 5, selected a threshold value that replicated a binary variable (with marginal distribution identical to the observed one) and estimated the wage equation reported in fifth column of Table 6 replacing the observed local with the predicted binary variable.

<sup>29</sup> Using the remote system, we have been unable to implement a Sargan's test for overidentifying restrictions on the number of instruments.

(columns 1-3 of Table 7), we get the view that union activity is at best ineffective in terms of inequality reduction at the aggregate level. Independently of which inequality index is considered, aggregate inequality is unaffected by the application of national contract, but it rises significantly when local bargaining is considered, given the huge measured impact of local bargaining in the second column of Table 6. Conversely, inequality seems unaffected when the slopes are also allowed to change: in this case the intercept effect is statistically insignificant (as many interaction variables are), thus leading to a slight decline of inequality as result of union activity at local level. The problem with these results is that in principle we would have liked to potentially control for the full set of potential interactions. But this is equivalent to estimate the wage equations for sub-samples, defined according to the type of contract applied. This is performed in Table 8, where OLS estimates are obtained for three sub samples: absence of national contract, presence of national contract, presence of both national and local contracts.

From Table 8 we are able to reconstruct the wage policy of unions, at both national and local level. By comparing the first and second column, we can claim that gender differentials are reduced and returns to education are lowered under nation-wide union bargaining: while the average wage differential associated with tertiary education is 29.7% in the sector without national agreement, it is halved to 14-15% in the covered one. Similar impact can be found with respect to job qualification (with the noticeable exception of a wage premium for “personal service workers” under decentralised bargaining). On the contrary, national and local bargaining activity seems to value the type of contract covering the ordinary worker: a full-time worker hired under a permanent contract obtains a wage premium under local bargaining of almost 15 percentage points higher when compared to an identical worker not covered by nation-wide bargaining activity. Another remarkable result is the reduced impact of firm size onto wage level when local bargaining is considered: wages remain almost identical for the whole range of employees ( a worker in a big firm above 500 employees receives a wage premium of less than 3% when compared to an identical worker in 10-19 employees firm) under local contracts, while they increase considerably with the number of employees under national contracts. A final element accounting for wage compression is given by geographical location: the wage differential between North and South is around 10% for workers hired in firms not covered by national bargaining, but declines to less than one third under local union bargaining.

The consequences of this type of union bargaining activity are reported in Table 9, where inequality indices are computed for the three sub-samples using the projections of the three different models estimated in Table 8. It is easy to recognise that under all inequality measures, national bargaining is (slightly) inequality enhancing: the average (and the median) wage is higher, but this increase is accomplished at the cost of greater dispersion. This confirms what was envisaged in section 2, where we have shown that the between-sector inequality attributable to contractual wages was upward trended from the mid-eighties. On the contrary, if wages were determined in accordance with the pattern of local bargaining, inequality would be significantly reduced (in the order of 2 percentage points in the Gini index). By reducing the hedonic prices associated with gender, age, educational attainments, job qualification and firm size, and by increasing the return associated with permanent full-time positions, Italian unions contribute to less inequality in earnings. The inequality decline registered for unconditional measures taken for each relevant sub-sample (see Table 2) is replicated here through the analysis of the determinants of individual wages at firm level. As a counterfactual experiment, if the Italian system could switch to a system where all firms negotiate at company level, we should observe an increase in the average wage and a reduction of its dispersion: in fact, the entire wage distribution is rightward shifted, while becoming at the same time more concentrated. The plausibility of this conclusion relies on the credibility of an increase of the mean/median wage. We have shown that the probability of signing a local contract depends, among other things, on the size of the firm, and both variables (presence of local agreement and size of the firm) positively affect individual wages. Thus the benefits of decentralised bargaining would accrue only if the economic system were to grow enough to render local bargaining sufficiently likely in all sectors.

**Table 8 – Determinants of (log of) individual wage by sub samples**  
 OLS estimators with heteroskedasticity robust standard errors

	firms with other/no agreement			firms with only national agreement			firms with national+ local agreement		
	ols robust	t-stat	<i>pvalue</i>	ols robust	t-stat	<i>pvalue</i>	ols robust	t-stat	<i>pvalue</i>
male	0.144	13.52	0.00	0.117	53.03	0.00	0.092	27.36	0.00
age	0.016	3.47	0.00	0.020	23.87	0.00	0.015	14.27	0.00
age <sup>2</sup>	0.000	-2.44	0.02	0.000	-17.43	0.00	0.000	-10.61	0.00
Lower secondary education	0.060	4.39	0.00	0.047	17.56	0.00	0.056	12.71	0.00
Upper secondary education	0.148	7.95	0.00	0.105	30.13	0.00	0.108	19.72	0.00
university degree	0.297	5.82	0.00	0.154	17.50	0.00	0.143	16.37	0.00
tenure	0.001	4.88	0.00	0.001	23.05	0.00	0.001	14.72	0.00
tenure <sup>2</sup>	0.000	-1.31	0.19	0.000	-11.21	0.00	0.000	-8.41	0.00
Clerks	0.203	10.11	0.00	0.203	47.29	0.00	0.185	26.72	0.00
Personal services workers; sales	0.207	8.09	0.00	0.101	17.02	0.00	0.183	14.18	0.00
Plant-machines operators	0.030	1.62	0.10	0.047	12.50	0.00	0.036	5.65	0.00
Elementary occupations	0.091	4.52	0.00	0.091	23.79	0.00	0.069	11.46	0.00
Permanent contract	0.040	1.78	0.08	0.109	4.50	0.00	0.119	2.26	0.02
Fixed term contract	(dropped)			0.095	3.81	0.00	0.074	1.38	0.17
Apprentice/trainee	-0.085	-2.29	0.02	0.005	0.19	0.85	0.070	1.31	0.19
Full time	0.236	10.04	0.00	0.294	46.92	0.00	0.305	25.66	0.00
Mining and quarrying	-0.030	-0.73	0.47	-0.258	-43.61	0.00	-0.083	-4.22	0.00
Manufacturing	-0.129	-4.59	0.00	-0.275	-63.41	0.00	-0.230	-47.45	0.00
Electricity, gas and water	0.201	5.50	0.00	-0.055	-9.34	0.00	-0.040	-2.93	0.00
Construction	0.027	0.71	0.48	-0.187	-31.43	0.00	-0.201	-13.05	0.00
Wholesale and retail sale	-0.110	-3.11	0.00	-0.255	-39.22	0.00	-0.202	-18.46	0.00
Hotels and restaurants	-0.109	-2.82	0.01	-0.278	-39.36	0.00	-0.309	-19.89	0.00
Transport communication	-0.059	-1.81	0.07	-0.072	-12.16	0.00	-0.070	-10.73	0.00
Real estate, renting business	-0.192	-6.08	0.00	-0.243	-42.36	0.00	-0.207	-20.15	0.00
size 20-49	0.081	5.43	0.00	0.027	10.33	0.00	-0.006	-0.83	0.41
size 50-99	0.039	2.45	0.02	0.051	17.61	0.00	-0.007	-0.95	0.34
size 100-249	0.081	5.28	0.00	0.088	29.58	0.00	0.015	2.17	0.03
size 250-499	0.101	5.98	0.00	0.123	33.71	0.00	0.010	1.47	0.14
size 500-999	0.177	7.13	0.00	0.162	38.18	0.00	0.028	3.74	0.00
size 1000+	0.141	5.56	0.00	0.199	41.12	0.00	0.016	2.06	0.04
north-west	0.101	5.76	0.00	0.065	23.41	0.00	0.029	6.26	0.00
north-east	0.104	8.81	0.00	0.060	26.05	0.00	0.026	6.37	0.00
centre	0.105	7.08	0.00	0.019	7.72	0.00	0.005	1.27	0.21
constant	1.544	17.78	0.00	1.586	53.52	0.00	1.754	30.62	0.00
n.observations	2646			58720			19348		
R <sup>2</sup>	0.4813			0.5236			0.5196		

**Table 9 – Inequality measures for predicted hourly wage – estimates by sub samples**

	firms with other/no agreement	firms with only national agreement	firms with national + local agreement
Mean	7095	7254	7419
Median	6861	6949	7214
standard deviation	1654	1724	1477
relative mean deviation	0.089	0.090	0.075
coefficient of variation	0.233	0.238	0.199
standard deviation of logs	0.227	0.230	0.196
Gini coefficient	0.127	0.129	0.109
Mehran measure	0.182	0.183	0.156
Piesch measure	0.100	0.102	0.085
Kakwani measure	0.015	0.016	0.011
Theil entropy measure	0.026	0.027	0.019
Theil mean log deviation measure	0.026	0.027	0.019

#### 4. Concluding remarks

In this paper we have studied the contribution of union wage policies to earnings inequality. Using aggregate data, we have found a positive impact on between-sector inequality of national contracts. Then, using a matched employer-employee data set, we have calculated unconditional inequality measures that indicate that less inequality is present in establishments with local contracts. Since this could be the outcome of self-selection of workers and/or firms, we have estimated wage equations under alternative specifications, in order to assess the “true” contribution of local bargaining to individual wages. Using the estimated wage, we find an increase in inequality when a local contract affects the intercept, and no effect when considering both intercepts and slopes. Finally, we have conducted a counter-factual experiment: by estimating a wage function for sub samples of workers under different degrees of coverage (absence of national contract, presence of national contract, presence of national and local contracts), we have computed the aggregate inequality measures that would have applied under these three alternative systems. We have found that local bargaining reduces the hedonic prices associated with gender, age, educational attainments, job qualification and firm size, and increase the return associated with permanent full-time positions; by so doing, Italian local unions contribute to less inequality in earnings to an extent that is close to the reduction recorded in raw data.

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