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Regional Wage Differentials and Collective Bargaining in Italy[♦]

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Abstract: Questo lavoro utilizza i dati provenienti dall'indagine ESES (European Structure of Earnings Survey) per il 1995 con l'obiettivo di studiare l'impatto del sistema di contrattazione sui differenziali salariali territoriali e sulla dispersione delle retribuzioni a livello locale. L'indagine ESES è un ampio data-set contenente informazioni relative a caratteristiche sia dei lavoratori che delle imprese. I risultati ottenuti indicano che nel Mezzogiorno, in alcuni casi, il salario stabilito centralmente dalla contrattazione costringe un certo numero di imprese a riconoscere salari più elevati di quelli che sarebbero pagati in sua assenza. Inoltre, la dispersione salariale dei lavoratori del Sud coperti dal contratto nazionale risulta più compressa di quella dei lavoratori che non sono coperti da alcun contratto collettivo. Anche questa evidenza empirica sembra suggerire che la contrattazione collettiva crei in questa area un "pavimento" nella distribuzione delle retribuzioni.

Abstract: This paper uses ESES (European Structure of Earnings Survey) data for 1995 in order to investigate the impact of the Italian bargaining system on regional wage differentials and on local wage dispersion. The ESES survey is a large matched employer-employee data-set containing a wealth of information regarding characteristics of both workers and firms. The main findings suggest that in the south of Italy, in specific conditions, the minimum wages established by national sectoral collective agreements oblige some firms to pay higher wages than they would have done had there been no national agreement. In addition, wage dispersion in the south is more compressed for workers covered than for workers not covered by a national collective agreement. These results can be interpreted as indirect evidence for the fact that national collective bargaining creates regional 'wage floors'.

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1. Introduction

Regional wage differentials are a critical factor both for the location of firms and for workers' mobility. The existence of these differentials can be explained by economic and institutional factors, of which trade unions and collective bargaining are undoubtedly fundamental.

As regards market factors, regional wage differentials may reflect differences in the average level and in the distribution of variables determining labour productivity, for example human capital characteristics; in addition, demand factors such as differences in technology may explain the existence of regional variations in wages; finally, geographical differentials may exist because lower/higher wages compensate workers for monetary and other regional advantages/disadvantages.

The institutions governing wage determination most certainly have a prominent role in the definition not only of differences between wage levels in the different areas of a country, but also in explaining wage dispersion within the areas.

In Italy, particularly, as of the July 1993 National Agreement on Labour Cost, bargaining has taken place in a two-tier process. At the first stage wages for each sector are fixed at the national level, with the aim of preserving the real value of wages by means of a revision mechanism for wage levels based on a target rate of inflation set by government. This first level of bargaining, being completely centralised, fixes regional-invariant minimum wages for each sector. Where only central bargaining takes place, wage spread is possible when firms decide unilaterally to grant wage increases above the minima determined at the national level, so that the wages actually paid reflect more accurately individual productivity. This has an effect primarily on wage dispersion within firms, but may also contribute to an increase in wage differentials between different firms and between different regions, if wage drift is greater in areas where labour market performance is relatively better.

The second level of bargaining is firm specific. The July 1993 National Agreement permits the granting of wage increases agreed with the company unions and linked with company performance. Regional wage differentials may be increased by this level of bargaining, which should in theory reflect local labour market conditions. If therefore firms in the centre and north of Italy make use of this level of bargaining in a more frequent and intensive way, it is to be expected an increase in wage differentials between firms in the centre and north and those in the south of Italy.

Until now, the study of regional wage differentials and the analysis of the relationship between these and regional unemployment dispersion, apart from a few important exceptions[1], have

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[1] See Casadio et al. in this volume.

considered actual earnings, without distinguishing the part fixed by national bargaining and that fixed at the local level, and so without distinguishing the various institutional mechanisms influencing wage differences.

This paper examines regional wage differentials in the light of this important distinction. Secondly, it analyses wage dispersion within each of the large regional areas of Italy considered (we split Italy in two parts: centre-north and south), with the aim of verifying, albeit indirectly, the existence of a 'floor' below which wages cannot decrease, a floor which could cause a higher level of unemployment especially in the area with lower labour productivity.

The paper is structured as follows: in the second section a review is given of the main contributions tackling the topic of regional wage differentials in Italy; in the third the data used are described, and some descriptive results are presented. The fourth section presents the estimates of different specifications of the wage equation with the aim of examining regional wage differentials and the role played by collective bargaining in their determination; in addition, the results of a series of quantile regressions are presented in order to verify whether the effect of different bargaining structures varies along the wage distribution. The fifth section comprises a descriptive analysis of the wage distribution and an estimate of wage differentials by education, occupation and age, separately by geographical area; the last section briefly summarises and provides some concluding remarks.

2. Review of the literature

Concerning the topic of regional wage differentials, Italy represents a good case study, because of the huge economic differences between different parts of the country (especially between the centre-north and the south) and the increasing polarisation of the labour market conditions in these two areas. Several works have shown how as of the 70s, the wage differential between the regions in the centre-north and those in the south of the country has gradually reduced; this fact, without a corresponding reduction in the difference between productivity levels, has caused a gradual increase in the difference in unit labour costs between the two areas. Moreover, as of the 80s there has been a steady increase in the difference between unemployment rates in the centre-north and the south of the country – a difference which is now more than 10 percentage points – mainly due to a rapid increase in southern unemployment (Lucifora and Origo 1999, Brunello et al. 2000 and Brunello et al. 2001).

As regards the existence and size of regional wage differentials, Gavosto and Rossi (1997), using ISTAT data from the regional accounts, show that wages over the period 1980 – 1994 were lower in the south compared with the centre-north in almost all sectors. However, they note that these

results suffer from composition effects, and that ISTAT data include an estimate of undeclared work, which is more widespread in the south and so tends to lower average earnings in this area. In the same paper, by using data provided by INPS (that include only declared work), they estimate wage differentials controlling for firm size, sector, worker status, age and sex.. In this case the average differential between the north and the south is lower and is indeed negative in the construction sector; furthermore for the 1990 – 1994 period it tends to decrease.

The conclusions drawn in this work are criticised by Ginzburg et al. (1998), who claim that the decrease in differentials recorded by Gavosto and Rossi (1997) is due to the INPS normalisation procedure for wages, given firms' behaviour and widespread recourse to undeclared work especially in the south of Italy[2].

With reference to the link between wages and local unemployment in Italy, some empirical analyses have highlighted its weakness. Bodo and Sestito (1991 and 1994) show that it is mainly unemployment in the centre-north which determines wage dynamics for the whole economy. Faini (1995) reaches similar conclusions using INPS data for the 1988 – 1992 period. Specifically, this study shows that for large firms in the south, local unemployment does not have a significant role in determining wages; for small firms the effect of local unemployment is negative but not statistically significant. The author concludes that with the exception possibly of small firms, local labour markets do not react to situations of disequilibrium. Brunello et al. (2001) point out how in regions which are politically integrated but with very heterogeneous economic conditions, national wage fixing can be dominated by the conditions of the better performing areas. In this case regional wages do not react to the local economic situation; the lack of this important adjustment mechanism leads to an increase in unemployment differentials. The authors carry out an empirical investigation of this hypothesis using aggregate data for 18 Italian regions over the period 1970 – 1994 and find that real wages in the south are not influenced by the local unemployment rate, but rather by the rate in the regions of the centre-north. Therefore, this process of wage determination does not favour the reduction of the unemployment rate in the south. Brunello et al. (2000) estimate the NAIRU for Italy using aggregate data for the 1951 – 1996 period and find that wage determination depends only on the centre-north unemployment rate, while the unemployment rate in the south does not influence wages.

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[2] The main objection is that the data used are based on daily wages as indicated by firms. If however firms in the south, for tax reasons and to satisfy minimum national collective labour contract daily wage requirements, declare a lower number of days worked than those actually worked, daily wages will appear to be higher than they are, and as a result regional wage differentials will be underestimated. Gavosto and Rossi (1999) reply claiming that the methodological objections raised by Ginzburg et al. (1998), although potentially relevant, were already pointed out in their work and furthermore were not sufficient to invalidate their results. They also cite a previous work by Revelli (1995) in which it is shown that even when analysis is limited to workers paid for at least 300 days per year, wage differences between north and south are minimal.

Lupi and Ordine (1998), using disaggregated Bank of Italy data from the 1995 Survey of Household Income and Wealth, show that in the south there is a narrow influence of the local unemployment rate on the level of wages, moreover limited to the lower part of the wage distribution: using quantile regressions, they show that the influence is significant only for the first deciles of the distribution. Lucifora and Origo (1999), by means of a careful empirical analysis carried out on micro-data from INPS over the period 1980 – 1993, did not find a statistically significant relationship between the level of wages and unemployment in different areas, not even where such a relationship is more likely to exist (small firms, low productivity sectors). According to the authors, the explanation relies on the centralised system of collective bargaining which limits the influence of local labour market conditions on wages and thus tends to reduce regional wage dispersion.

Casadio (1999) studies the influence of wage drift, both as the result of bargaining and as determined unilaterally by the firm, on regional differentials[3]; to this end he uses data from the 'Invind' survey, which is carried out annually by the Bank of Italy on a sample of approx. 1,000 manufacturing firms with more than 50 workers. The analysis, carried out over the 1995 – 1998 period, shows that wage increments determined at firm level tend to increase the differential between firms in the north and those in the south. However, the study does not distinguish between wage components paid unilaterally and those resulting from bargaining.

The paper by Dell'Aringa et al (2005) published in the present volume studies the influence of bargaining on wage dispersion within firms for Italy using the ESES 1995 data-set. The focus of the paper is not on regional differentials, although the results indicate that the location variable does not have a statistically significant influence on wage dispersion within firms.

The present paper does not analyse, as in the majority of studies carried out so far on this topic, how wage levels react to local labour market conditions and the relationship existing between regional wage differentials and differences in unemployment rates by geographical area; rather, it examines the effects of different kinds of collective bargaining, national and local, on regional wage differentials. The data used comes from ESES (European Structure of Earnings Survey) 1995; this database contains a wealth of information on features of workers and firms, including wage levels and type of bargaining. It therefore permits an in-depth study of the relationship between wage structures in different areas of Italy and methods of wage fixing.

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[3] The dependent variable in his regressions is the share of wage increase set at local level with respect to total wage paid the previous year. Wage increases unilaterally paid by firms without local bargaining and those *ad personam* are also considered.

3. The data

The ESES data-set used in this work is a wide matched employer-employee database for the year 1995[4]. The survey covers firms with more than 10 workers whose activity is included in sections C to K of the Nace Rev. 1 classification. Our analysis is conducted on the sub-sample of male workers. We consider gross hourly wage including annual bonuses paid occasionally by the firm. The other variables contained in the data-set and used in this study are:

1. Human capital characteristics: age and education;

2. Job's characteristics: occupation (isco classification), type of individual contract (permanent, temporary, apprentice or other), hours worked (full time or part time) and work experience within the firm;

3. Firm's characteristics: sector (Nace Rev. 1 classification), size, location and type of collective bargaining applied.

With reference to the latter variable, the data-set enables a distinction to be made between firms applying only a national collective agreement (henceforth 'NCA'), firms where also firm-level bargaining takes place, and firms not applying an NCA. In fact, the automatic extension of NCA is not required by law, although the majority of workers are covered by it. There is therefore a small number of workers (approx. 4% of our sample) who are not covered by collective bargaining. The wage paid to these workers can be considered as a sort of 'market wage', in that it is fixed without NCA requirements.

The empirical analysis is generally carried out separately for the two areas centre-north and south. Table 1 shows the sample composition for the two areas, considered overall and separately by type of collective bargaining applied. The table reveals that there are no significant differences by area in the distribution of human capital characteristics; there is a slightly higher percentage of workers with primary education in the south and a slightly higher percentage of workers with university education in the centre-north. The centre-north area has a higher share of executives and professionals and a lower share of elementary occupations. Manufacturing employs a much higher percentage of workers in the centre-north (53%) compared with the south (34%), where the share of workers in construction and hotels and restaurants sectors is higher. There are no large differences in the regional distribution by firm size, although in the south there is a higher proportion of very small firms (between 10 and 19 workers). Finally, there are relevant differences regarding distribution by type of bargaining: 96% of workers are covered by NCA in both areas, but of these workers 22% in the centre-north and only 12% in the south are also covered by company-level bargaining.

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[4] Access to the data-set was via a remote system with Eurostat, where the data-set is held.

Considering collective bargaining system, it should be noted that workers covered by local bargaining are on average better educated and that in the south workers without NCA coverage are on average less educated than covered workers. In firms with local bargaining of both areas, the share of workers in higher-level occupations is larger and average job tenure is considerably longer; average tenure is much shorter in the south if there is no NCA.

In the south the absence of coverage regards especially workers in construction and in real estate, renting and business activities, and in the centre-north workers in transport, storage and communication. For both areas, local bargaining coverage regards above all workers in manufacturing, transport storage and communication and financial intermediation. Approx. one worker in three not covered by NCA works in a very small firm (10 – 19 workers).

Local bargaining therefore more often concerns better educated and more skilled workers, with longer job tenure and working in medium-large-sized firms; lack of NCA coverage instead often concerns lower productivity workers (less educated, with less experience and lower positions) and firms (small firms).

Table 1. Sample composition

	Centre-North				South			
	All workers	Only NCA	NCA + local	No NCA	All workers	Only NCA	NCA + local	No NCA
Age	38.32	37.86	39.84	38.50	40.11	39.74	41.86	43.00
Education								
Primary	0.15	0.15	0.15	0.14	0.19	0.19	0.16	0.21
Lower secondary	0.47	0.48	0.43	0.50	0.43	0.43	0.41	0.46
Upper secondary	0.32	0.31	0.34	0.28	0.34	0.34	0.35	0.30
Tertiary	0.06	0.05	0.08	0.08	0.04	0.04	0.08	0.02
Occupation								
Manager	0.03	0.02	0.04	0.03	0.01	0.01	0.03	0.02
Professionals	0.05	0.04	0.05	0.07	0.04	0.04	0.04	0.02
Associate professionals	0.13	0.12	0.15	0.10	0.14	0.14	0.12	0.13
Clerks	0.16	0.17	0.16	0.13	0.15	0.14	0.19	0.10
Personal services workers; sale	0.05	0.06	0.04	0.02	0.09	0.10	0.04	0.14
Craft and related trades workers	0.30	0.33	0.20	0.27	0.26	0.27	0.17	0.38
Plant-machines operators	0.22	0.20	0.30	0.18	0.21	0.20	0.33	0.07
Elementary occupations	0.06	0.06	0.05	0.21	0.10	0.10	0.07	0.14
Individual contract								
Permanent contract	0.95	0.95	0.96	0.96	0.94	0.94	0.95	0.92
Fixed-term contract	0.02	0.02	0.02	0.01	0.03	0.03	0.02	0.06
Apprentice/trainee	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.02
Other contract	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Working time								
Full time	0.97	0.97	0.97	0.96	0.94	0.94	0.98	0.90
Part time	0.03	0.03	0.03	0.04	0.06	0.06	0.02	0.10
Tenure	127.35	120.85	150.07	120.39	130.27	125.45	171.93	101.61
Sector								
Mining and quarring	0.01	0.01	0.00	0.01	0.02	0.02	0.00	0.00
Manufacturing	0.53	0.51	0.66	0.34	0.34	0.33	0.47	0.28
Electricity, gas and water supply	0.03	0.04	0.01	0.00	0.04	0.05	0.00	0.11
Construction	0.05	0.07	0.02	0.04	0.11	0.13	0.00	0.15
Wholesale and retail sale; repair	0.06	0.07	0.04	0.09	0.07	0.08	0.03	0.00
Hotels and restaurants	0.02	0.02	0.01	0.01	0.04	0.05	0.01	0.01
Transport, storage and communication	0.17	0.19	0.09	0.36	0.24	0.24	0.31	0.05
Financial intermediation	0.05	0.03	0.12	0.09	0.05	0.04	0.14	0.01
Real estate, renting and business activ.	0.07	0.07	0.06	0.05	0.09	0.08	0.04	0.37
Size								
10-19	0.21	0.25	0.05	0.27	0.26	0.28	0.08	0.33
20-49	0.21	0.25	0.10	0.18	0.20	0.22	0.11	0.15
50-99	0.14	0.13	0.15	0.10	0.12	0.12	0.12	0.08
100-249	0.15	0.13	0.23	0.13	0.13	0.12	0.18	0.22
250-499	0.11	0.08	0.21	0.12	0.09	0.08	0.21	0.12
500-999	0.06	0.05	0.11	0.13	0.06	0.04	0.16	0.05
>1000	0.12	0.11	0.15	0.05	0.13	0.14	0.14	0.05
Bargaining								
Only NCA	0.74	-	-	-	0.84	-	-	-
NCA+local	0.22	-	-	-	0.12	-	-	-
No NCA	0.04	-	-	-	0.04	-	-	-

As a first exercise, we have tested whether there are statistically significant differences between mean wages paid in the centre-north and the south, both for the whole sample and for different types of agreement.

As shown in Table 2, overall the mean wage paid in the centre-north is higher than that paid in the south by 7.2 percentage points. The difference is especially high if referred to workers with no agreement (19.2%), while it is lower and less statistically significant for the wages of workers covered by firm-level bargaining (2.7%)[5].

Table 2. Percentage differences in mean hourly wages between workers in the centre-north and workers in the south

Workers coverd only by NCA	0.057 ***
Workers covered both by NCA and by local bargaining	0.027 *
Workers not covered	0.192 ***
All workers	0.072 ***

***: p≤0.01; **: 0.01<p≤0.05; *: 0.05<p≤0.1

Sectoral disaggregation generally leads to similar results (see Table 3), and it should be noted that lack of NCA penalises in the south the workers in construction, hotel and restaurants and financial intermediation particularly, since the centre-north/south differential in these sectors is considerably lower if there is NCA compared with when there is not.

Table 3. Percentage differences in mean hourly wages between workers in the centre-

	Workers covered only by NCA	Workers covered both by NCA and by local bargaining	Workers not covered	All workers
Mining and quarring	0.165 ***	-0.467 ***	0.186 **	0.134 ***
Manufacturing	0.075 ***	-0.055 ***	0.181 **	0.099 ***
Electricity, gas and water supply	-0.037		0.261 ***	-0.027
Construction	0.066 **	0.124 ***	0.329 ***	0.092 ***
Wholesale and retail sale; repair	0.233 ***	-0.330 ***	-0.083	0.240 ***
Hotels and restaurants	0.055	0.317 ***	0.377 *	0.093 ***
Transport, storage and communication	0.038 *	-0.112 ***	-0.055	0.006
Financial intermediation	0.086 **	0.072 **	0.281 **	0.069 **
Real estate, renting and business activ.	0.275 ***	-0.140 ***	0.218 *	0.304 ***

north and workers in the south by sector
***: p≤0.01; **: 0.01<p≤0.05; *: 0.05<p≤0.1

[5] It should be noted that the value of the mean differential is influenced by a different distribution of workers by agreement type within the two areas. Indeed, as will be seen later, there are wage differentials which depend on the type of agreement adopted; on the other hand, the distributions of workers by type of agreement are different, as has been seen, between centre-north and south of Italy.

Obviously these results may be partly due both to composition effects and to problems related to the non-random selection of firms by type of agreement in the different areas; however, they provide a preliminary indication in favour of the hypothesis that in the south of Italy the minimum wages fixed by NCA are binding, as witnessed by the fact that the regional wage differential for workers not covered by collective bargaining (which could be interpreted, to some extent, as a 'market differential') is considerably higher than when there is NCA.

4. Bargaining and regional wage differentials

To test whether differences in mean wages are maintained when controlling for composition effects, we estimated the following wage equation:

$$\log w = \alpha + \beta X + \gamma Y + \delta Z + \varepsilon \tag{1}$$

where w is the gross hourly wage including annual bonuses, X, Y and Z are vectors of the characteristics of respectively the worker, the job and the firm, β, γ and δ are the vectors of the respective coefficients, α is the constant and ε represents the error term. The estimates were carried out both on a pooled sample referred to the whole economy, introducing some interactions to test for the presence of statistically significant differences not only in the intercept but also in some of the slopes, and separately for the centre-north and south of Italy, assuming that wage equations are different in the two areas. The pooled estimation without interactions and the separate estimates for macro-regions were repeated using the instrumental variable technique, to take account of the potential non-randomness of the distribution of firms between bargaining systems. The instrument used is average job tenure within a firm, which was seen to be positively correlated with the likelihood of local bargaining[6].

Results are reported in Tables 4 and 5, which give the results of the estimation of different specifications of the wage equation[7]. As regards the coefficients not reported in the table (available on request), results are in line with earlier empirical analyses of the wage equation in Italy[8]. These results are quite robust to the various specifications used.

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[6] This significance, already found by Checchi and Pagani (2005) in a different sub-sample of the same data set, was tested by means of a probit model for local bargaining. The results of the probit analysis are available from the authors upon request.

[7] Only the coefficients for the regional dummy and the dummies relative to the type of bargaining are given. The reference category is a worker in the south only covered by NCA. The complete results of the estimates are available from the authors upon request.

[8] See Lucifora (2003).

In the first specification (column 1), the regional differences are measured only by the intercept term. The premium for workers in the centre-north is 5.7%. This is reduced significantly in the specification which allows the effect of education and sector to vary by geographic area (column 5): the premium for workers in the centre-north decreases to 1.7%[9].

Table 4. Wage equation - pooled sample

	1		2		3		4		5		6		7	
	OLS		OLS		OLS		OLS		OLS		OLS		IV	
Centre-North	0.057	***	0.046	***	0.030	***	0.059	***	0.017	**	0.019	**	0.013	*
No NCA	-0.026	***	-0.026	***	-0.024	***	-0.062	***	-0.024	***	-0.059	***	0.097	***
Local bargaining	0.017	***	0.017	***	0.016	***	0.028	***	0.016	***	0.021	***	0.533	***
													0.108	
No NCA centre-north							0.050	***			0.047	***		
Local bargaining centre-north							-0.015	***			-0.006			
No. Obs.	71677		71677		71677		71677		71677		71677		71677	
R2	0.7018		0.7019		0.7024		0.7019		0.7025		0.7026		0.4821	
INTERACTIONS														
centre-north*education	NO		YES		NO		NO		YES		YES		NO	
centre-north*sector	NO		NO		YES		NO		YES		YES		NO	
centre-north*bargaining	NO		NO		NO		YES		NO		YES		NO	

***: $p \leq 0.01$; **: $0.01 < p \leq 0.05$; *: $0.05 < p \leq 0.1$
Note: reference category is a southern worker covered only by NCA. Other controls are: age, square age, education, occupation, type of individual contract, part-time/full-time, tenure, square tenure, sector and firm size.

The lack of a national agreement reduces average wage by between 2.4 and 6.2% depending on the specification used, while local bargaining increases it, by a maximum of 2.8%. This figure seems to be particularly low, and lower than that found in similar analysis (see for example Dell'Aringa and Lucifora, 1994). In any case, this low value indicates that firm-level bargaining is unable to increase wages much more than firms without local bargaining do with their unilateral policies[10].

The impact of the type of bargaining varies by geographical area. It should be noted especially that the absence of NCA penalises the workers in the south particularly, their wages being approx. 6% lower than those of workers in the same area covered by collective bargaining (see coefficients of equation in column 4). The negative effect of the lack of NCA falls to 1.2% (6.2% - 5%) for workers in the centre-north. This result would seem to confirm the existence of a greater downward wage rigidity in the south of Italy.

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[9] Similar results were obtained by Del Colle (1998) who shows that the location effect is very small and that regional wage variability is mainly sectoral and due to firm size.
[10] Note that the minima fixed by NCAs cover on average less than 80% of wages actually paid.

The impact of local bargaining is without doubt lower in determining regional wage differentials. In this case workers in the south are more advantaged, their wages being on average 2.8% higher (column 4) than that of workers in the same area covered only by a national agreement; the premium from local bargaining falls to 1.3% for workers in the centre-north. It should however be noted that in the specification with the whole set of interactions (column 6), the differences in the return on a local agreement between the centre-north and the south are no longer statistically significant.

The wage equation has been also estimated separately for the centre-north and south samples. The results are reported in Table 5.

Table 5: Wage equation – Centre-North and South

	Centre-North		South	
	OLS	IV	OLS	IV
No NCA	-0.012 **	0.139 ***	-0.057 ***	0.001
Local bargaining	0.018 ***	0.574 ***	0.015 ***	0.406 ***
		0.128		0.049
No. Obs.	48822	48822	22855	22855
R2	0.7042	0.4242	0.6983	0.6010

***: p≤0.01; **: 0.01<p≤0.05; *: 0.05<p≤0.1
Note: reference category is a worker covered by NCA. Other controls are: age, square age, education, occupation, type of individual contract, part-time/full-time, tenure, square tenure, sector and firm size. IV estimates are based on mean tenure as instrument.

These estimations also showed that the lack of NCA penalises to a greater extent the workers in the south (-5.7%) compared with those in the centre-north (-1.2%). The return on local bargaining is lower than 2% in both areas, and the difference in this return between centre-north and south continues to be statistically non-significant[11].

Instrumental variables estimation (IV) modifies the results obtained by means of the OLS estimation. The lack of coverage of collective bargaining seems to determine an increase in average wages, although this effect is near zero and is not statistically significant for the south; the effect of local bargaining is higher compared with that obtained in previous estimates. However, since the local bargaining variable is no longer dichotomous in the IV estimate, to evaluate the average effect the coefficient obtained should be multiplied by the sample mean. In this way, the

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[11] The equality tests on the coefficients of the two areas (available from the authors) reveal that, among others, the coefficients for almost all the sectors considered, and for the firms with over 500 workers, are significantly different, indicating a higher relative premium for financial intermediation and jobs in large firms in the south.

effect of local bargaining is calculated as being 10.8% overall, 12.8% in the centre-north and 4.9% in the south[12].

To check whether the effect of different types of collective bargaining changes along the distribution of wages, and whether this effect is different in the two areas, we estimated quantile regressions for each decile of the distribution, separately for the centre-north and for the south. We use graphs to synthesise the results of these estimations (Lupi and Ordine, 1998).

In Figure 1, the nine deciles for which the quantile regressions were estimated are given on the x-axis, and the dummy coefficients for local bargaining obtained from the corresponding quantile regressions are on the y-axis. In Figure 2 the coefficients given on the y-axis are those relative to the 'lack of NCA' dummy. Note that the reference category is 'only NCA', and so the coefficients given measure the effect with respect to this category.

Figure 1. Quantile regression coefficients – Effect of local bargaining
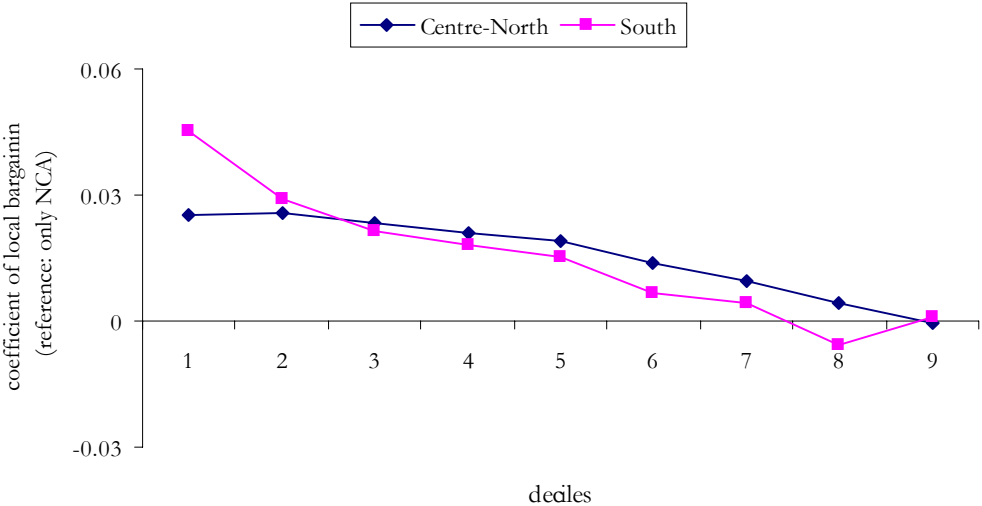
Note: the coefficient values indicate the effect of local bargaining in addition to NCA.

The estimations reported in Figure 1 indicate that the effect of local bargaining is higher for the lower quantiles and tends to decrease for higher wages. It is interesting to note that for the lowest decile, the wage differential between the two collective bargaining regimes is especially high. Workers in the highest deciles are paid more or less the same whether or not they are covered by a local agreement: those not covered receive wage increments decided unilaterally by their employers. For low wage workers unilateral wage drift does not fully compensate for lack of local bargaining, so that they are paid less in firms where only NCA is applied. This is particularly true for workers in firms located in the south, whose differential amounts to 4.5% versus 2.5% for

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[12] It should however be noted that remote access to the ESES data-set did not permit testing for instrument validity, and so the accuracy of the results of the IV estimates is uncertain.

workers in the centre-north. This is further indirect evidence that firms applying only NCA, especially in the south, tend to pay low-level workers only the national minimum, believing they are paying wages which are already 'high' enough. The opposite happens for more skilled workers.

Results are considerably different for the 'lack of NCA' dummy: in both areas the lack of bargaining leads to a wage reduction for every decile of the wage distribution, but the effect in the south is considerably higher, especially for the lower deciles. Indeed, while for the north the wage reduction due to lack of NCA never exceeds 2%, and for many deciles is near zero, for the first and second deciles in the south the reduction is close to 12% and 8% respectively. This effect tends to decline for the higher wage categories.

Figure 2. Quantile regression coefficients - Effect of lack of NCA coverage
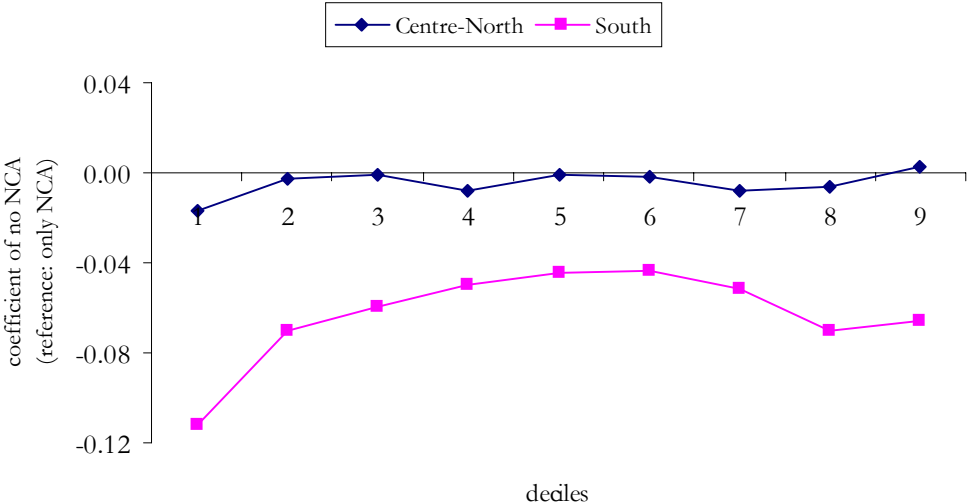
Note: the coefficient values indicate the effect of lack of NCA.

One possible explanation of these results is that while in the south firms applying national agreements pay some categories of workers, probably young and less skilled, wages which are higher than those paid by firms not applying NCA, in the centre-north this is not the case. The same workers are paid the same salaries, whether or not an NCA is in force.

Thus quantile analysis show that the firms in the south which do not apply collective bargaining pay wages which are significantly lower compared with those fixed by the NCAs, especially for lower wages. The 'market' wage (if the wage paid by firms without NCA can be considered as such) is lower than the national minimum, which is thus binding.

## 5. Bargaining and within regions wage dispersion

The foregoing analysis seems to indicate that NCA, in some cases, fixes wage minima which act

as a binding 'floor' for firms in the south. This fact would imply that adjustments to situations of disequilibrium can not take place through changes in prices and thus they come about mainly through changes in quantity, with negative effects on the local unemployment rate.

To further investigate this issue, our analysis moves on to examine the structure of the entire wage distribution. As a descriptive exercise, we have reproduced the wage distribution in the two areas separately by collective bargaining system. To this end, we first calculated the deciles of the economy wide wage distribution; we then calculated the percentage of observations which, for each area and collective bargaining type, fall between each couple of deciles (e.g. 1-2, 2-3, etc.) of the whole distribution[13]. In this way we obtained an estimation of the wage distribution by area and by collective bargaining type. The results of this analysis are given in Figures 3 – 5.

The numbers reported on the x-axis correspond to the deciles' ranges; on the y-axis is given the percentage of workers who, for each area and collective bargaining type, have a wage falling in the corresponding deciles' range[14]. For example, in Figure 3 the value 14.3% in correspondence of number 2 for the south-line indicates that 14.3% of southern workers covered only by NCA have a wage between the first and the second decile of the economy wide wage distribution.

Figure 3. Wage distribution – Workers covered only by NCA

ranges of deciles of the whole wage distribution (Italy and all contractual regimes)
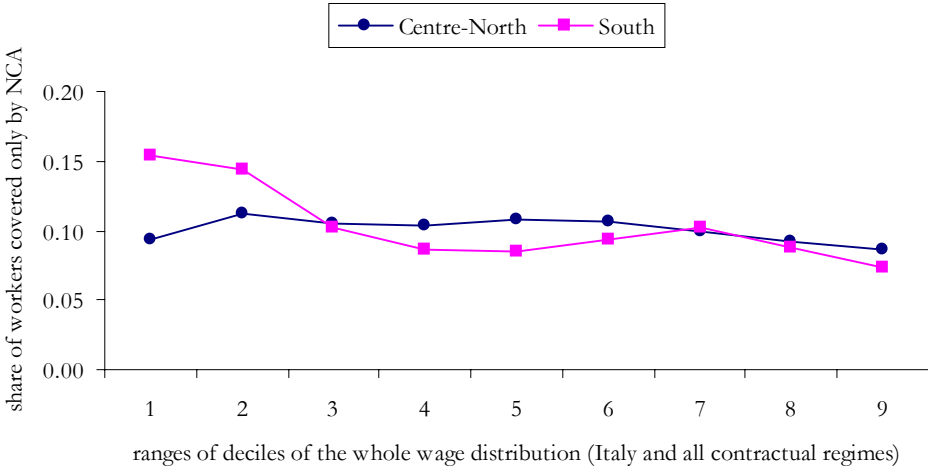
With reference to the sub-sample of workers covered only by NCA (Figure 3), there is a concentration of workers in the south of Italy in the lower wage categories. Approx. 8% of workers in the centre-north covered by NCA receive a wage lower than the value of the first decile of the whole wage distribution, while this percentage is almost double for workers in the

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[13] The non-availability of the ESES data set, plus the impossibility of using some of the STATA statistical software commands, meant we could not estimate wage distributions in any other way.
[14] If workers were distributed, by area and contract type, identically and equally to the overall distribution, the curves would be horizontal segments corresponding to a value of 10%.

south. Approx 40% of observations for the south compared to 30% of those for the centre-north fall within the first three deciles. This stronger concentration of workers in the lower part of the wage distribution seems to confirm for the south a 'floor' effect of wages fixed by NCA: a higher number of firms in the south pay wages which are equal to or slightly above those fixed by national bargaining, while in the centre-north firms more frequently pay unilaterally determined pay increments, thus rendering the wages actually paid more closely linked to the local labour market condition.

Considering the workers covered also by local bargaining (Figure 4), the distribution between the two areas is quite similar. The percentage of workers in the south falling beyond the seventh decile is higher, but this result is probably linked to composition effects, and especially to the fact that firms with local bargaining in the south perform relatively better compared with other firms than in the centre-north.

Figure 4. Wage distribution – Workers also covered by local bargaining

ranges of deciles of the whole wage distribution (Italy and all contractual regimes)
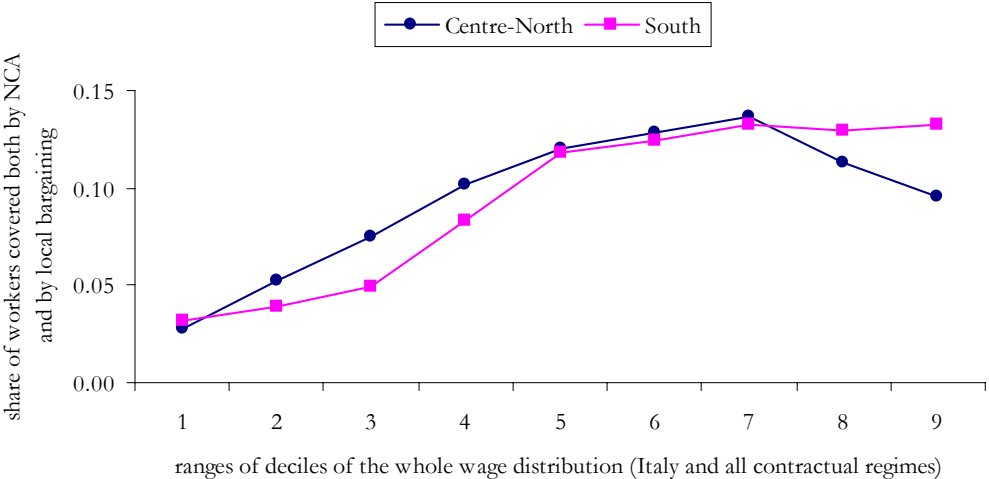
The existence of a 'floor' effect in the south seems to be confirmed by Figure 5, which gives the same distribution with reference to the wages of workers not covered by NCA.

In this case approx. 10% of workers in the centre-north receive wages lower than the first decile of the economy wide distribution, but this percentage rises to over 22% for workers in the south. 28% of observations from the centre-north are within the first three deciles, compared with 49% of those from the south. This thus indicates that when firms are free to fix wages without the requirements of NCA, in the south there is a much higher concentration of workers with low wages than in the centre-north.

Figure 5. Wage distribution – Workers not covered by NCA

ranges of deciles of the whole wage distribution (Italy and all contractual regimes)
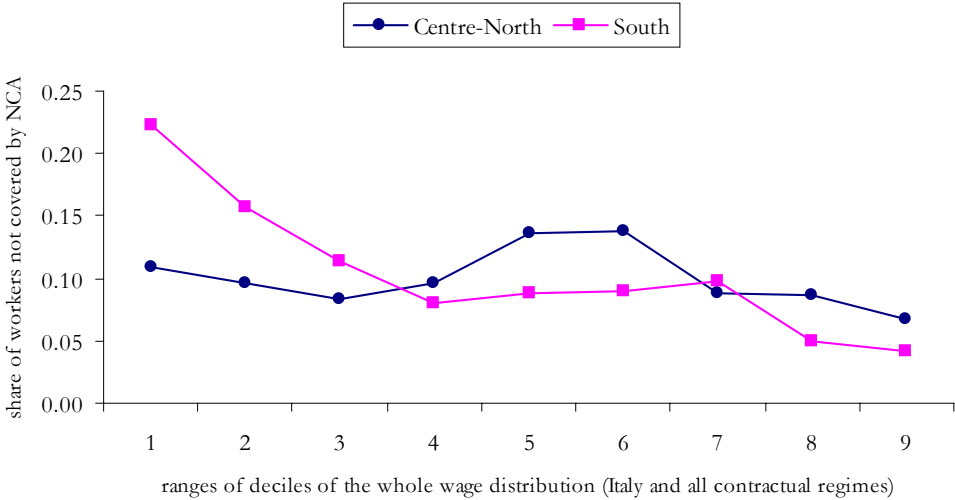
Overall therefore, southern workers covered only by NCA or not covered by any form of collective bargaining are more concentrated in the lower part of the wage distribution than their centre-north counterparts, while this does not occur where there is local bargaining.

Finally, to test how the type of wage bargaining influences wage dispersion within each of the two areas, we used the technique adopted by Krueger and Summers (1988) to calculate sectoral wage differentials, but applying the correction applied by Haisken-DeNew and Schmidt (1997) and calculating different kinds of wage differential (by education, occupation and age).

First of all the procedure requires estimating the wage equation (1) with a restricted least square estimator. More specifically, the restrictions used require that for each categorical variable (e.g. sector, education, etc.), the weighted sum of categories to be zero. The weights are given by the dummy's categories share. In this way the model can be estimated without excluding a dummy for each categorical variable. This model's estimated coefficients represent the deviations from a weighted mean, and not the effects relative to the excluded category.

Haisken-DeNew and Schmidt (1997) show that the dummy variable coefficients obtained from the restricted least square estimation are equal to the sectoral effects (i.e. to the wage differentials between sectors) computed by Krueger and Summers (1988), which were obtained by normalising the coefficients of an unrestricted OLS estimation excluding a dummy for each categorical variable considered[15]. As a measure of total sectoral wage differential, Krueger and Summers (1988) calculate the adjusted standard deviation of the effects of sectors, even thought

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[15] Correction is necessary because the standard deviation of the estimated coefficients $\hat{\beta}$ is distorted upwards compared with the standard deviation of the real coefficients β. This distortion is due to the fact that $\hat{\beta}_i = \beta_i + \hat{\varepsilon}_i$.

this is an underestimated measure[16]. Haisken-DeNew and Schmidt (1997) correct this underestimation and propose as a measure of the overall variability:

$$SD(\beta) = \sqrt{w'\nu(\hat{\beta}^*)\hat{\beta}^* - w'\delta[V(\hat{\beta}^*)]}$$

(2)

where w and $\hat{\beta}^*$ respectively represent the weights used and the estimated coefficients of the restricted regression, ν is an operator which transforms a column vector into a diagonal matrix with diagonal equal to the vector, δ represents a column vector formed by the diagonal elements of the matrix, and V is the variance-covariance matrix of the estimated parameters[17].

Table 6 gives the adjusted standard deviation of the estimated coefficients with reference to education, occupation and age, separately for the centre-north and for the south.

Table 6. Adjusted weighted standard deviation of coefficients

	Std dev of coefficients of equation (1)		
	Education	Occupation	Age
Centre-North			
Workers coverd only by NCA	0.042	0.206	0.068
Workers covered both by NCA and by local bargaining	0.045	0.254	0.061
Workers not covered	0.071	0.248	0.047
South			
Workers coverd only by NCA	0.044	0.172	0.052
Workers covered both by NCA and by local bargaining	0.065	0.197	0.049
Workers not covered	0.078	0.234	0.082

The first interesting result is that in the south for workers not covered by NCA the (conditional) wage differentials are always higher, especially with reference to education and age, compared with when workers are covered by collective bargaining, whether only central or local as well. It seems, therefore, that bargaining in the south has an effect not only on the average, but also on the dispersion of wages, which, with reference to the variables considered, are more compressed if NCA is applied.

Wage differentials by occupation and by age in the firms applying only a national agreement are more compressed in the south than the centre-north. One possible explanation is that these firms

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[16] The formula used for correcting the standard deviation of $\hat{\beta}$ is: $SD(\beta) \approx \sqrt{var(\hat{\beta}) - \sum_{i=1}^{K} \hat{\sigma}_i^2 / K}$; K is equal to the number of sectors and $\hat{\sigma}_i$ represents the standard error of $\hat{\beta}_i$. Since this correction does not take into account the covariance between the ε_i, it underestimates the standard deviation of β.

pay relatively high wages (compared with the market wages) to low-skilled workers (or those with limited experience). The lower 'ability to pay' of many of these firms prevents them from paying higher wages to more skilled workers too. On the contrary, firms in the centre-north can offer (or are forced by the market to concede) to high-skilled workers a unilateral wage drift that southern firms cannot afford.

6. Conclusions

In this work we used data from ESES (European Structure of Earnings Survey) 1995 with the aim of studying regional wage differentials and wage distribution in different parts of Italy: the centre-north and the south. The need for studies on this topic arises from observation of deep economic differences between the two areas, and the growing polarisation of their local labour market conditions. Indeed, as of the 70s, the wage differential between these two areas has gradually decreased, without any reduction in the gap in labour productivity, with a resulting increase in the difference between unit labour costs in the two areas. In addition, as of the early 80s the difference in unemployment rates in the centre-north and the south has increased, mainly due to a rapid increase in the unemployment rate in the south.

The presence of a fully-centralised sectoral wage bargaining raises the question of whether the wage minima fixed by NCAs are binding for firms in the areas of Italy where the labour market is performing poorly, i.e. the south. The ESES data set contains information on the type of bargaining covering workers, and therefore permits investigation of this hypothesis. The sample includes some workers (approx. 4%) who are not covered by national agreements, whose wage can be taken as a proxy for the 'market' wage.

Both the descriptive and the econometric analysis indicate that the regional wage differential between centre-north and south depends on the fact that the worker is covered or not by a collective contract. In particular, the differential is higher where there is no NCA; lack of coverage of collective contracts therefore penalises particularly workers living in the south. However, this result is not confirmed by applying instrumental variable estimation.

In addition, quantile analysis revealed that southern workers not covered by NCA receive lower wages, especially those in the bottom part of the wage distribution.

From the analysis of the wage distribution within the areas, in the south it results a concentration of workers covered only by NCA in the lower wage categories. This result again indicates a 'floor' effect: many firms in the south, required to respect the NCA, pay wages equal to or only slightly higher than the minima fixed by the national contracts, while in the centre-north firms more

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[17] See Haisken-DeNew and Schmidt (1997) p. 518.

frequently concede unilaterally decided wage increases above these minima, in accordance with their better labour market conditions compared with those in the south.

Finally, wage differentials calculated by education, occupation and age with distinct wage equations for the two areas are lower for workers covered by NCA in the south than in the centre-north. This result may be linked with the fact that these firms are required to pay low-skilled or inexperienced workers wages which are higher than the market price, and this leads to a 'compression' of the overall distribution.

To conclude, this work provides some indirect empirical evidence in favour of the hypothesis that national bargaining hinders wages in the south from fully carrying out their allocative role in order to combat unemployment.

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