

The Extent of Rent Sharing along the Wage Distribution

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Abstract

The relationship between rent sharing and wages has generally been evaluated on average wages. This paper uses a unique employer-employee panel database to investigate the extent of rent sharing along the wage distribution in Italy. We apply quantile regression techniques and control for national level bargaining, unobserved heterogeneity and endogeneity. Our findings show that the extent of rent-sharing decreases along the wage distribution, suggesting that unskilled workers benefit most from firms' rents. One possible explanation for this finding refers to the role of the unions, which are more interested in favouring unskilled workers.

JEL Classification: C33, J31, J41, L25.

Keywords: Rent Sharing, Wage Distribution, Quantile Regressions, IV Quantile regressions, Quantile fixed effects regressions.

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1. Introduction

European countries are usually taken as examples for non-competitive labour markets because of the important role played by labour market institutions. Economic literature has largely investigated how wage setting works in non-competitive labour markets, and how rent sharing can emerge in such markets. Non-competitive theories, such as efficiency wage and bargaining models, can predict a positive relationship between wages and profits. In particular, bargaining models underline that wages result from a bargain between employer and employees which generates a long-run positive relation between wages and profits. In this setting, wages are determined by workers' outside options, by quasi-rent (firm profits evaluated at the opportunity cost of labour) and by the relative bargaining power of the parties involved (Hildreth and Oswald, 1997).

At the empirical level many papers have tested the existence and extent of rent sharing (Abowd and Lemieux, 1993, Van Reenen, 1996, Margolis and Salvanes, 2001, Martins, 2009, Card et al., 2013, etc.). However, these analyses have generally been carried out taking into account average wages. In this way there can be no insight into the distributional consequences of rent sharing, i.e. it is not possible to take into account the difference in the degree of rent sharing for workers located at different points of the distribution.

The aim of this paper is to evaluate the degree of rent sharing along the overall wage distribution in order to achieve a better understanding of the explanations behind the relation between profits and wages. There could be various different reasons why rent sharing is not uniform along the workers' wage distribution. On the one hand, it might be argued that if bargaining at the firm level was mainly organized by unions, low and median skilled workers might enjoy a higher degree of rent sharing than high skilled workers. On the other hand, if bargaining occurred mainly at the individual level, rent sharing might favour high skilled workers, who can benefit from higher individual bargaining power and from performance pay schemes (Lemieux et al., 2009). Hence, given the ambiguous theoretical predictions, the analysis of rent sharing along the wage distribution is mostly an empirical issue, and to the best of our knowledge this is the first paper that addresses this issue along the whole wage distribution.

In our analysis we make use of a unique employer-employee panel database from 1996 to 2003 for Italy, constructed by merging the INPS (the Italian Social Security

Institute) employer-employee panel database with the AIDA database (provided by Bureau Van Dick) which contains detailed information on the balance sheets of the Italian capital-owned firms.

On the econometric side, our empirical analysis takes into account all the issues which have been proved to be relevant when addressing the relationship between rents and wages.

We begin by estimating the impact of quasi-rents on wages using cross-sectional quantile regressions (Koenker and Basset, 1978), controlling for observed worker and firm heterogeneity. In the estimation we use as proxy for the opportunity cost of labour the minimum wage corresponding to the national contract applied to each worker and, within the national contract, to the exact occupation level ('livello di inquadramento') the worker belongs to. We argue that this is a more accurate measure to control for the opportunity cost of labour with respect to the average industrial wage, as generally used in the literature. Another advantage in using individual minimum wages is that they allow for control in the estimates for the first national collective bargaining level, since minimum wages are formally bargained at the national level between unions and employer associations. The cross-section estimates show that the impact of rent sharing is decreasing along the wage distribution: rent sharing elasticities range from 6.9% at the 10th wage percentile to 4.7% at the 90th wage percentile.

A second step in the analysis is to control for the unobserved worker heterogeneity, which can affect the relationship between profits and wages (Card et al., 2013, Arai and Heyman, 2001, Margolis and Salvanes, 2001, Martins, 2009). By applying quantile fixed effects estimates that explicitly take into account the individual unobserved heterogeneity (Canay, 2011), the results change significantly. In particular, the impact of rent sharing is significantly reduced along the whole wage distribution, and rent sharing elasticities are still decreasing along the wage distribution.

The last step of the empirical analysis investigates the endogeneity issue, which has been proved to be a serious concern in the analysis of rent sharing since endogeneity could cause serious underestimation (Card et al., 2013, van Reenen, 1996) – underestimation which could even be exacerbated by the introduction of fixed effects (Nickell, 1981). Therefore, we apply IV quantile fixed effect estimation techniques (Galvao, 2011, Galvao and Montes-Rojas, 2010). For the instrument, we exploit the intuition developed in Card et al. (2013) by using a weighted average of the real sales

per employee in other provinces of Italy in the same 3-digit industry. The idea is that real sales per employee in the same industry - which represents national industry demand shocks - affect the profitability of the firms. On the other hand, these sales relate to firms in other provinces of Italy and are therefore assumed to be uncorrelated with local labour market conditions. Consistently with the related literature, by applying an IV methodology estimates increase along the whole wage distribution and by a large extent, thus pointing out that previous fixed effects estimates suffered by a serious degree of underestimation. In particular, the elasticity of wages with respect to rent stands at 7.3% at the 10th percentile, 4.8% at the median and 3.7% at the highest percentile, confirming that the degree of rent sharing is decreasing along the wage distribution.

As possible explanation for this decreasing pattern, one might argue that in Italy bargaining takes place mainly at the national, regional and firm level, where the role of the unions is more effective, while individual level bargaining plays a less important role. In this framework, it is not surprising that, even after controlling for the first national-level bargaining, the unions negotiate higher rent sharing for low and medium skilled workers than for skilled ones. Our findings provide robust evidence in support of the existing papers that instead of using quantile regressions make use of proxies for the workers' skills, such as occupation and education categories - for instance, Bagger et al. (2013) for Denmark, where it is shown that worker's bargaining power decreases slightly with the level of education, and Guertzgen (2009) and Kohn and Lembcke (2007) who find stronger rent sharing impact for blue collar workers.

The structure of the paper is as follows. In Section 2 we review the theoretical and empirical literature on the relationship between profits and wages. In Section 3 we describe the data we use throughout the empirical analyses. Section 4 discusses the empirical specification and presents the main results. Section 5 concludes.

2. Related Literature

Non-competitive theories underline that firms may pay a wage over the level set in the competitive labour market for various different reasons. First, it is possible that firms pay higher wages on the basis of efficiency wage arguments (see Shapiro and Stiglitz, 1984, Krueger and Summers, 1988). Second, according to bargaining theories, profits and wages can move together due to the bargaining over wages between employers

and employees. More specifically, in a bargaining framework, wages at the firm level are determined by workers' outside options, by the quasi-rent (firm profits evaluated at the opportunity cost of labour) and by the relative bargaining power of the parties involved (Hildreth and Oswald, 1997).³

As for the empirical evidence, many studies explore the existence and the extent of rent sharing in different countries, using various methodologies and various kinds of data. Hildreth and Oswald (1997) make use of firm level data for the UK providing evidence in favour of a significant positive relationship between profits and wages, controlling for observed work heterogeneity and firm characteristics and applying GMM techniques (or using lagged values of profits) to control for the endogeneity of profits. Similar findings are derived by Blanchflower, Oswald and Sanfey (1996) for the US, using industry level data matched with individual data.

Other papers use instrumental variables techniques to control for the endogeneity of profits. Abowd and Lemieux (1993), in the case of Canada, use instruments related to international performance, namely the industry import and export prices, finding a very large degree of underestimation in the extent of rent sharing when not controlling for the endogeneity between profits and wages. Van Reenen (1996) analyzes the case of the UK using different measures for profits (net profits per head, quasi-rents and Tobin Q), and past innovations as instruments. His findings suggest a substantial amount of rent sharing in the UK, and serious underestimation when not controlling for endogeneity.

More recently, various papers have made use of matched employer-employee panel data in order to control for unobserved worker heterogeneity. Margolis and Salvanes (2001) investigate the case of France and Norway. They apply IV techniques using as instruments sales and operating subsidies, finding relevant rent sharing only in the case of Norway. In the case of France they show that when taking into account the unobserved individual heterogeneity in the IV estimation, rent sharing estimates turn out to be not significant. Similarly, using employer-employee data Arai (2003) analyzes the case of Sweden. He uses time-average of lagged values of profits as instruments and controls for observable firm characteristics to verify the relevance of different

³ Note that also within a modified version of the competitive model it is possible to have a positive correlation between wages and profits. In particular, in the presence of short-run frictions, such as experienced by firms facing an upward sloping labour supply curve, positive demand shocks could lead to a rise in total firm profits and wages (Hildreth and Oswald, 1997). However, in the long-run, wages adjust to the competitive level. Hence, a test for rent sharing cannot rest on the evidence of a short-run correlation between profits and wage.

theoretical explanations for the relationship between profits and wages (rent sharing, efficiency wages, short-run labour market frictions). He finds robust evidence of rent sharing, in line with bargaining theories, and this effect does not differ across the different worker categories.⁴ In another related paper, Arai and Heyman (2001) make use of a larger employer-employee matched dataset and apply instrumental variable techniques. They use different instruments such as lagged values of profits, demand elasticity (based on predicted response in sales due to higher prices) and measures indicating the degree of competition in the product market. Their findings confirm that rent sharing is underestimated when not controlling for endogeneity, and that even greater estimates are provided when demand elasticity is used as instrument.

Also Martins (2009) makes use of matched employer-employee panel data to derive evidence of rent sharing for Portugal in the period 1993-1995. His findings strongly support the need to take into account the role of both the unobserved individual and firm heterogeneity, as well as endogeneity (as instruments: the interaction between the exchange rate and the share of total exports in sales).

Another interesting related paper is Guertzgen (2009), which focuses on how rent sharing is affected by the different levels of bargaining in Germany, using firm-worker level data and GMM techniques. He shows that rent sharing is higher where there is no collective agreement coverage and in the presence of firm-specific contracts. Moreover, he also shows that blue collar workers in uncovered establishments seem to benefit more from the local bargaining power of works councils, i.e. local unions.

Rusinek and Rycx (2013) also analyze the impact of different levels of bargaining (industry and firm level) on the extent of rent sharing, using an employer-employee database for Belgium, a country where the relative importance of industry and firm level agreements (the degree of centralization) differs significantly across industries. Their results show that, after controlling for the endogeneity of profits and heterogeneity among workers and firms, in industries where agreements are more likely to be renegotiated at firm-level ('decentralized industries'), wages and profits are positively correlated regardless of the type of collective wage agreement. On the contrary, where firm-level wage renegotiation is less likely ('centralized industries'),

⁴ However, note that the results of this analysis could be affected by the very small sample size compared with other studies that use employer-employee data.

wages are only significantly related to profits for workers covered by a firm-level collective agreement.⁵

As for Italy, empirical evidence on rent sharing is somewhat wanting. One of the few exceptions is the recent paper by Card et al. (2013), which analyzes the degree of rent sharing and tests the hold-up hypothesis in the Italian region of Veneto for the period 1995-2001. By using INPS-AIDA matched employer-employee data, they perform an accurate analysis taking into account all the relevant issues needed to identify the extent of rent sharing (the workers' and firms unobserved heterogeneity and the endogeneity of profits). Their findings show that there is evidence of a substantial degree of rent sharing in Veneto, and that profits are shared with workers after capital costs are fully deducted from profits.⁶

3. The Italian institutional setting and Data Description

The institutional issues related to this paper concern the Italian wage setting. Since the beginning of the nineties there has been a two-level wage bargaining system, which is similar to schemes used in other European countries such as Germany. The first level concerns national collective bargaining, which has to preserve the purchasing power of wages at the sector level by incorporating the expected inflation rate in wage increases. This is done concretely by setting minimum wages for all workers covered by the related National collective agreements, which are renewed every 2-4 years. Minimum wages are different in each industry, and within industries different minimum wages are assigned to different workers in different occupation levels ('livelli di inquadramento'): this means that minimum wages are settled, at different levels, for blue collar workers and for managers.

The second level of bargaining is decentralized, and encourages rent sharing through performance-related pay schemes at the region/firm level.⁷ This second level

⁵ See also Martins (2007) for a survey of the main empirical results and methodologies applied in the rent sharing literature.

⁶ Another paper on the Italian case is Pistoiesi and Strozzi (2003). Their main findings are that rent sharing in Italy arises only at the centralized level of wage bargaining, while decentralized wage negotiations do not lead to any degree of rent sharing between unions and employers. However, since they use time series techniques and industrial data, they cannot take into account the within-industry heterogeneity (observed and unobserved worker and firm heterogeneity).

⁷ Apart from the wage setting issue, the second level bargaining may also concern other work dimensions, such as hours worked, working conditions, etc.

is not compulsory for firms and unions, while it is compulsory respecting the lower bound set by the minimum wage of the first national bargaining level.

As for the data, we use a panel version of the administrative database provided by INPS (Italian Social Security Institute) and elaborated by ISFOL.⁸ It is a matched employee-employer dataset, constructed by merging the INPS employee information database for the period 1985-2003 with the INPS employer information database.⁹ The database contains individual information such as age, gender, occupation, workplace, date of beginning and end (if any) of the current contract, the kind of national contract and the related minimum wage, the social security contributions, the worker status (part-time or full-time), the real gross yearly wage and the number of weeks worked. We then have some information concerning the firm such as the plant location (province), the number of employees and the sector (NACE Rev.1.1). We focus on male and female prime-age workers, aged between 25 and 49 (when they first enter the database), working in the industrial and service sectors, both part-time (converted into full-time equivalent) and full-time, employed in standard labour market contracts: blue collar and white collar workers.¹⁰

We merge the INPS dataset with the AIDA database, from 1996 to 2003. AIDA is a database on Italian (capital-owned) firms provided by Bureau Van Dijk which contains information on the balance sheet such as value added, profits, sales, production and costs of production.¹¹

The two databases are merged by using as key variable the tax code or the VAT number (*codice fiscale* or *partita IVA*) of the company.¹² After the merge, the panel

⁸ ISFOL stands for “Institute for the Development of Vocational Training”. The sample scheme has been set up to follow individuals born on the 10th of March, June, September and December and therefore the proportion of this sample on the Italian employees’ population is approximately of 1/90.

⁹ For the information on employers we also make use of the ASIA (“Italian Statistical Archive of Operating Firms”) database, provided by ISTAT. This database has been used since 1999, because the INPS employer database was no longer available as from 1998. The two databases provide the same set of information (firm size and sector).

¹⁰ The sample also includes managers. However, since they account for a relatively small fraction of workers in the sample (only about 1%, because most of the managers are not covered by the INPS archive) we include this category within the white collars.

¹¹ The data have been deflated using the valued added deflator for value added, profits, sales, production and costs of production. The value added deflator derives from our elaboration of ISTAT data on regional economical accounts and is defined at the sectoral and regional level. The base year is 2002.

¹² Note that AIDA contains capital-owned firms with total value of production equal to or higher than 950.000 euro, while INPS data cover workers employed in all kinds of companies whatever the legal status and amount of total value of production. Therefore, it is possible to match only the INPS records of firms that are included in the AIDA database.

version has been constructed considering only one observation per year for each worker. For those workers who display more than one observation per year we selected the longest available contract in terms of weeks worked. We also eliminated extreme observations below (above) the 1st (99th) percentile of the wage and quasi rent distributions.¹³ Further, we dropped those observations for which the growth rate of wages from year to year was higher (lower) than 100%(-50%) and where the growth rate of the quasi rent variable was higher (lower) than 500%(-500%). These thresholds were computed taking into account the growth rate values corresponding approximately to the 1st and 99th percentile of the related growth rates distribution. We also eliminated those observations where the percentage difference in the firm size reported in AIDA and the one reported in INPS exceeds 5% (in this way the correlation between the firm size reported in AIDA and the firm size reported in INPS is equal to 0.96). Finally, we dropped workers for whom data on the minimum wage is not available. In fact, our database lacks data for all the – nearly 300 – national contracts. We have data for the 39 major contracts, which nonetheless cover more than 75% of the whole sample.

We end up with an employer-employee panel database constituted by 25,796 workers for 123,178 observations for the period 1996-2003.

4. Econometric Analysis

4.1 Econometric Strategy

In this section we analyze the impact of rents on wages. Since our focus is on the relationship between rents and wages along the wage distribution, we start by performing standard quantile regressions (Koenker and Bassett, 1978). We use the INPS-AIDA employer-employee database from 1996-2003. The baseline specification is quite standard in the rent sharing literature (see for instance Van Reenen, 1996), and it is as follows:

$$\ln(w_{\theta(i,t)}) = \alpha_{\theta} + \chi_{\theta} * \ln MW_{c(i,t)} + B'_{\theta} * I_Char_{i,t} + \beta_{\theta} * \ln Firmsize_{j(i,t)} + \gamma_{1,\theta} * \ln Quasi Rents_{j(i,t)} + \phi_{s,\theta} + \lambda_{a,\theta} + \delta_{t,\theta} + \varepsilon_{i,t,\theta}$$

¹³ Note that we eliminate all the observations of workers for which there is at least one outlier.

where θ refers to the percentile, i to individuals, $j(i,t)$ to the firm where the worker i is employed at time t , $c(i,t)$ to the national contract (along with its level) the worker is subject to, s to industry. The dependent variable in our regressions is the (log) real gross weekly wage in euro.¹⁴ As main independent variable we use the quasi-rent per worker, $QuasiRents_{j(i,t)}$, as in Van Reenen (1996) and Card et al. (2013).¹⁵ The term $I_Char_{i,t}$ is the set of observed individual characteristics, such as age, age squared, tenure (in three categories, 1-2, 3-10, more than 10 years) and occupation dummy (blue collar and white collar). $MW_{c(i,t)}$ is the national contract minimum wage. $Firmsize_{i,t}$ is the proxy for firm heterogeneity, while φ_s , λ_a , δ_t are industry, area (five macro-areas in Italy: Northwest, Northeast, Centre, South and Islands) and year dummies respectively. All the relevant variables are in logarithms and therefore we estimate elasticities. Table 1 shows the descriptive statistics of the variables of the analysis.

In the first specification, as benchmark estimates, we perform cross-sectional quantile estimates where, as already pointed out, we use as alternative wage the minimum wage which captures the extent of the first (national) level of bargaining. It is worth noting that the minimum wage turns out to be a very accurate measure to control for first level bargaining at the national level. At the same time it is the best available measure of the opportunity cost of labour. We believe this measure represents a valuable improvement with respect to the average industrial wages generally used in the literature, mainly because it is related to the specific contract (and within the contract to the specific level) the worker belongs to.

Since an important concern in our analysis is to tackle the issue of the unobserved individual heterogeneity that can bias the cross sectional estimates, we then carry out quantile fixed effects estimates (Canay, 2011). In fact, in the literature unobserved worker heterogeneity has been proved to be very important in affecting the relationship between rents and wages since high-skilled workers may sort into highly profitable firms (Card et al., 2013, Martins, 2009, Arai and Heyman, 2001, Margolis and Salvanes, 2001).

¹⁴ Wages have been deflated using as deflator the National Consumer Price Index (FOI index, *Indice dei Prezzi al Consumo per le Famiglie di Operai e Impiegati*, ISTAT). The base year is 2002.

¹⁵ Rent per worker evaluated at the opportunity cost of labour, which is defined as the revenue per worker (operative income -which equals net profits- plus the wage bill), minus the alternative wage that we proxy with the minimum wage.

Table 1: Descriptive Statistics of the Variables of the Analysis

Variable	Mean	Std. Dev.	Min	Max
Log Real Weekly Wage	5.98	0.28	4.39	8.86
Log Real Weekly Minimum Wage	5.69	0.12	5.37	6.80
Female	0.31	0.46	0.00	1.00
Age	37.72	9.72	25	56
Age Squared	1,477.83	755.89	625	3,136
Blue Collars	0.63	0.48	0	1
White Collars and Manager	0.37	0.48	0	1
Log Firm Size	4.65	1.51	0	10.69
Log Quasi-Rent per Employee	3.01	0.96	-6.14	5.01
Log Real Sales per Employee other provinces (instrument)	5.23	0.50	2.63	7.16
Tenure 1-2	0.33	0.48	0	1
Tenure 3-10	0.48	0.50	0	1
Tenure >10	0.19	0.37	0	1
North East	0.30	0.46	0	1
North West	0.42	0.49	0	1
Centre	0.16	0.37	0	1
South	0.09	0.28	0	1
Island	0.03	0.17	0	1
Number of Observations	123,178			
Number of Workers	25,796			

Source: Panel ISFOL on INPS-AIDA data. Note: Sectoral dummies are defined according to Nace Rev 1.1, and the related descriptive statistics are omitted from the table for the sake of space. As for the main aggregates, the industry accounts for around 58% of the observations, while the service sector for 42%.

Finally, in order to control also for the issue of the endogeneity between profits and wages (due to simultaneous determination and to possible measurements error) we also apply an IV strategy. The literature has stressed that in case of endogeneity the (attenuation) bias in the cross-sectional estimates can be severe, and may also be aggravated by a fixed effects strategy (Card et al., 2013).

Therefore, we use a very recently developed estimation strategy of IV quantile fixed effects estimates (Galvao, 2011, and Galvao and Montes-Rojas, 2010), which is an extension of the IV quantile procedure of Chernozukov and Hansen (2008) that allows for the inclusion of fixed effects as introduced in Koenker (2004).¹⁶ As instrument we

¹⁶ For a detailed description of the procedures applied see the appendix in Matano and Naticchioni (2012) and Canay (2011), Galvao (2011) and Galvao and Montes-Rojas (2010).

exploit the idea developed in Card et al. (2013) by using a weighted average of the firm sales per employee in other provinces of Italy but in the same three-digit industry of the firm considered. The weights are the inverse of the distance between provinces. The idea is that industry sales, which represent industry demand shocks, affect the profitability of the firms while, at the same time, they are not correlated with local labour market conditions since they concern firms in other provinces of Italy.

4.2 Results

Table 2 shows the cross-sectional quantile estimates of the impact of profits per employee on workers' wages, by using the minimum wage as a measure for the opportunity cost of labour.

The main relevant variable, rent sharing, displays a non-uniform impact along the wage distribution. In particular, elasticity estimates turn out to stand at 6.9% at the 10th percentile, 5.7% at the median and 4.7% at the 90th percentile.¹⁷ Moreover, since these elasticities have been computed by controlling for the importance of the first (national) level of bargaining, they suggest that there is a non-negligible rent sharing that essentially takes place at the local, regional or firm level (consistently with Van Reenen, 1996).¹⁸

¹⁷ In this literature it is quite standard to provide a measure of the "Lester" range. The "Lester" range is defined as the elasticity of wages with respect to quasi-rent multiplied by four times the ratio between the standard deviation of quasi-rent and mean quasi-rent (Lester, 1952). It provides a measure of how much the wage of a worker increases moving from a firm at the bottom of the profit distribution (two standard deviations below the mean) to a firm at the top of the profit distribution (two standard deviations above the mean). In this paper we are unable to provide measures for the "Lester" range, since we are working with quantiles and not with average wages. Nonetheless, we provide a computation of the Lester range, which amounts to 19%, based on the OLS estimates included in table A1 in the appendix.

¹⁸ As for the control variable in the estimation, the results are as follow: the impact of minimum wage is positive and increasing along all the wage distribution and its elasticity is higher than 1, meaning that an increase in the minimum wage implies a more than proportional increase in the corresponding worker's wage; the age coefficients show a concave pattern, which is increasing along the wage distribution; the gender wage gap is higher at the highest percentiles; the return to tenure is positive and decreasing along the wage distribution and the occupation dummy is positive and increasing, highlighting higher wages for higher occupation categories; the firm size has only a slightly decreasing impact along the wage distribution.

Table 2: Cross Sectional Quantile Regressions of Wages on Quasi Rents, with Control on First Level of Bargaining.

	q10	q25	q50	q75	q90
Ln Quasi Rent	0.069***	0.059***	0.057***	0.054***	0.047***
Ln Minimum Wage	1.449***	1.539***	1.659***	1.755***	1.775***
Female	-0.086***	-0.076***	-0.091***	-0.120***	-0.150***
Age	0.009***	0.010***	0.011***	0.012***	0.016***
Age Squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
Tenure 3-10	0.057***	0.041***	0.025***	0.015***	0.009***
Tenure >10	0.089***	0.065***	0.042***	0.025***	0.015***
White Collar and Manager	0.061***	0.052***	0.061***	0.086***	0.131***
ln Firm Size	0.014***	0.015***	0.015***	0.012***	0.009***
Constant	-3.128***	-3.445***	-4.000***	-4.363***	-4.354***
Area, Time and Sector dummies	yes	yes	yes	yes	yes
N. Observations	123,178	123,178	123,178	123,178	123,178
N. Individuals	25,796	25,796	25,796	25,796	25,796
R squared	0.35	0.38	0.41	0.43	0.44

Notes: ***, ** and * denote significance at 1%, 5% and 10% respectively.

The cross sectional standard quantile regressions are likely to be biased since they do not take into account the workers' unobserved heterogeneity. Therefore we run quantile fixed effects estimates (Canay, 2011), enabling the introduction of fixed effects in the estimation, in such a way as to capture time invariant worker characteristics such as ability and education. Table 3 shows the results. The estimates change significantly: the coefficients are much reduced in magnitude (around 60%) and are still slightly decreasing along the wage distribution.

These results are consistent with previous empirical evidence showing that taking into account the unobserved worker heterogeneity entails a sharp reduction in the estimated degree of rent sharing (see for instance Card et al., 2013, Martins 2009).

Table 3: Quantile Fixed Effects Regressions of Wages on Quasi Rents.

	q10	q25	q50	q75	q90
Ln Quasi Rent	0.027***	0.021***	0.020***	0.020***	0.019***
Ln Minimum Wage	0.855***	0.864***	0.880***	0.899***	0.914***
Age	0.040***	0.037***	0.035***	0.033***	0.030***
Age Squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
Tenure 3-10	0.048***	0.028***	0.012***	0.002***	-0.011***
Tenure >10	0.054***	0.027***	0.009***	-0.005***	-0.026***
White Collar and Manager	0.047***	0.049***	0.048***	0.049***	0.056***
ln Firm Size	0.009***	0.009***	0.010***	0.011***	0.011***
Constant	-0.097***	0.004	0.025	0.009	0.060*
Area, Time and Sector dummies	yes	yes	yes	yes	yes
N. Observations	123,178	123,178	123,178	123,178	123,178
N. Individuals	25,796	25,796	25,796	25,796	25,796
R squared	0.42	0.49	0.53	0.52	0.48

Notes: ***, ** and * denote significance at 1%, 5% and 10% respectively.

Finally, we present the IV estimates to tackle the endogeneity between rents and wages; in fact, endogeneity can cause serious underestimation of the degree of rent sharing, which can also be worsened by a fixed effects strategy (Card et al., 2013). The estimation was carried out simultaneously on three percentiles (10th, 50th, 90th) for computational reasons. Moreover, since it is not possible to test the weakness of the instrument in this procedure, we carried out a standard IV fixed effects estimation on average wages (see table A1 in the appendix), checking the first stage F-statistics. The F-value for the instrument in the first stage is significant and higher than the threshold value of 10, confirming that the instrument chosen is not weak.

When endogeneity is taken into account, the results change significantly (Table 4). In fact, the elasticities of rents with respect to wages are now greater, and the highest increases are to be seen in the lower tail of the wage distribution. In particular, rents show a decreasing impact along the wage distribution with elasticities ranging from

7.3% at the 10th percentile to 4.8% at the median and to a 3.7% at the 90th percentile. These estimates are consistent with those of Card et al. (2013), who find an elasticity of (average) wages with respect to rents of 4.5% for Veneto in Italy.

Table 4: IV Quantile Fixed Effects Regressions of Wages on Quasi Rents.			
	q10	q50	q90
In Quasi Rent	0.073***	0.048***	0.037***
In Minimum Wage	0.847***	0.889***	0.963***
Age	0.037***	0.030***	0.027***
Age Squared	-0.000***	-0.000***	-0.000***
Tenure 3-10	0.053***	0.010***	-0.015***
Tenure >10	0.057***	0.008***	-0.029***
White Collar and Manager	0.034***	0.033***	0.040***
In Firm Size	0.011***	0.013***	0.014***
Constant	16.109***	16.375***	16.205***
Area, Time and Sector dummies	yes	yes	yes
N. Observations	123,178	123,178	123,178
N. Individuals	25,796	25,796	25,796

Notes: ***,** and * denote significance at 1%, 5% and 10% respectively. The instruments are the linear projections of other provinces average sales per employee on the endogeneous variables.

This evidence suggests that once having controlled for the national centralized level of bargaining, rent sharing in Italy is such as to favour unskilled workers.¹⁹ This

¹⁹ By dividing firms with respect to the quartiles of the profit distribution and workers with respect to the quartiles of the wage distribution, we find evidence that high paid workers are mostly employed in high profits firms, while low paid workers are mostly employed in low profits firms. It is also interesting to note that the rate of growth of profits is not the same in the four quartiles of the profits distribution. Our descriptive analysis (available upon request) shows that the firms that enjoy higher growth rates in profits are those in the top quartile of profits (on average 8% per year). Combined with previous results, this evidence suggests that low-skilled workers are characterized by a higher degree of rent sharing than high-skilled workers, but at the same time they are employed in firms which experience relatively lower growth rates, thus partially balancing out (in cumulative terms) their greater rent sharing elasticities.

finding is consistent with the idea that in Italy the unions are relevant not only at the national level, but also at the local/regional/firm level. Moreover, this result is also in line with Bagger et al. (2013) who, using a structural matching model, have shown that the workers' bargaining power decreases slightly with the education level. Similar findings are derived by Guertzen (2009) and Kohn and Lembcke (2007), who find that rent sharing is greater for blue collar workers.

5. Conclusions

The innovative contribution of this paper is to analyze the degree of rent sharing along the wage distribution, thereby enriching the existing literature that focuses on average wages, with only some cases of sample split analysis being used for specific groups of workers defined by education or occupation categories. We make use of a unique employer-employee database for Italy, which merges administrative records for workers (INPS) and balance sheet data for firms (AIDA). Our findings show that the rent sharing impact is not uniform along the wage distribution. In particular, taking into account the first national level of bargaining, unobserved heterogeneity and endogeneity, we find a decreasing pattern of rent sharing along the wage distribution, with elasticities of wages with respect to quasi-rents ranging from 7.3% at the 10th percentile to 3.7% at the 90th percentile of the distribution. One of the possible explanations for this finding refers to the role of the unions in protecting the lowest paid worker categories, since in Italy, as in other European countries, the unions play a crucial role in the bargaining process between employers and employees, while individual bargaining is less important.

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Appendix

Table A1: Regressions of Average Wages on Quasi Rents with Control on First Level of Bargaining.

	(1)	(2)	(3)
	Cross Section	Fixed Effects	IV-Fixed Effects
Ln Quasi Rent	0.063***	0.022***	0.056***
Ln Minimum Wage	1.575***	0.885***	0.905***
Female	-0.114***		
Age	0.013***	0.035***	0.034***
Age Squared	-0.000***	-0.000***	-0.000***
Tenure 3-10	0.033***	0.016***	0.016***
Tenure >10	0.050***	0.011***	0.012***
White Collar and Manager	0.098***	0.049***	0.048***
ln Firm Size	0.013***	0.010***	0.013***
Constant	-3.658***	-0.028	-0.198***
Area, Time and Sector dummies	yes	yes	yes
N. Observations	123,178	123,178	123,178
N. Individuals	25,796	25,796	25,796
R squared	0.63	0.19	0.17
F Test Instrument First Stage			2,108.46

Notes: ***,** and * denote significance at 1%, 5% and 10% respectively.