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# MICRO-EVIDENCE ON RENT SHARING FROM DIFFERENT PERSPECTIVES

Sabien Dobbelaere
Jacques Mairesse

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Cambridge, MA 02138
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## ABSTRACT

This article provides evidence of rent sharing from orthogonal directions by exploiting different dimensions in the same data. Taking advantage of a rich matched employer-employee dataset for France over the period 1984-2001, we consistently compare industry differences in rent-sharing parameters derived from three different approaches. The accounting approach and the standard labor economics approach are compatible with distinct labor bargaining settings (right-to-manage, efficient bargaining, labor hoarding) whereas the productivity approach hinges on the assumption of efficient bargaining. Across the different approaches, we evidently find differences in dispersion of the industry-specific rent-sharing parameter estimates which could be attributable to differences in modeling assumptions and/or data requirements but these estimates lie within a comparable range. We interpret the latter finding as lending empirical support to efficient bargaining as the nature of the bargaining process in France over the considered period.



Sabien Dobbelaere
Faculty of Economics and Business Administration
VU University Amsterdam
De Boelelaan 1105
1081 HV AMSTERDAM
THE NETHERLANDS
sdobbelaere@feweb.vu.nl

Jacques Mairesse
CREST-INSEE
15, Boulevard Gabriel PERI
92245 MALAKOFF CEDEX
FRANCE
and NBER
mairesse@ensae.fr

# 1 Introduction

The theoretical underpinnings of individual and firm wage heterogeneity can broadly be classified into three categories: matching/search-based models (Jovanovic, 1979; Postel-Vinay and Robin, 2002; Mortensen, 2003; Shimer, 2005), incentive compensation models (Lazear and Rosen, 1981) and rent-sharing models (McDonald and Solow, 1981; Nickell and Andrews, 1983). Regardless of the theoretical model one favors, the exclusion of unobserved individual or firm wage heterogeneity creates biases in wage equations as well as problems in identifying the underlying sources of wage variation.

On the empirical side, there is a large body of studies examining the effect of industry or firm performance on wages using either industry or firm data (e.g. Katz and Summers, 1989, Blanchflower et al., 1996, Estevao and Tevlin, 2003 for the US; Christofides and Oswald, 1992, Abowd and Lemieux, 1993 for Canada; Blanchflower et al., 1990, Holmlund and Zetterberg, 1991, Nickell et al., 1994, Hildreth and Oswald, 1997 for European countries) and testing the rent-sharing hypothesis. The seminal contribution of Abowd et al. (1999), providing a statistical decomposition of wage rates into worker and firm effects and focusing on the private sector in France, together with the availability of matched employer-employee datasets, fueled a resurge of interest in this subject. Recent studies investigating the impact of profits on wages using matched worker-firm data include Margolis and Salvanes (2001) for France and Norway, Arai (2003) and Nekby (2003) for Sweden, Kramarz (2003) for France and Martins (2009) for Portugal. Albeit using different models of collective bargaining, the results of these studies indicate in general that changes in profitability feed through into long-run changes in wages.[1]

The contribution of this article to the latter strand of the empirical literature is to provide evidence of rent sharing from orthogonal directions by exploiting different dimensions in the same data. In particular, taking advantage of a rich matched employer-employee dataset for France, we consistently compare industry differences in rent-sharing parameters derived from three different approaches. The first approach is the accounting approach which is compatible with distinct labor bargaining settings (right-to-manage, efficient bargaining, labor hoarding) which differ in terms of bargaining scope. In this approach, we directly compute average measures of rent sharing from the firm accounting information. The second approach is the standard

[1] The recent studies that use matched employer-employee data to control for unobserved worker abilities find smaller but generally significant effects of performance on wages compared to previous studies based on firm-level data.

labor economics approach which is also compatible with the two principal labor bargaining models, i.e. the right-to-manage model and the efficient bargaining model, and the labor hoarding model. In this approach, we estimate a wage equation taking into account worker and firm wage heterogeneity. From the estimated wage-profits elasticities, we retrieve average rent-sharing parameters. The third approach is the productivity approach which hinges on the assumption of efficient bargaining. In this approach, we estimate a productivity equation at the firm level. By comparing the estimated factor elasticities for labor and materials and their shares in revenue, we are able to derive estimates of average rent-sharing parameters. The three approaches clearly differ in the sources of variation and identification of industry-specific extent of rent sharing.

This article does not aim at testing the various labor bargaining models. The novelty of our analysis is to compare industry-specific rent-sharing parameters derived from distinct approaches which differ in modeling assumptions and/or data requirements. As expected, we find that there exist differences in dispersion of the industry-specific rent-sharing parameter estimates across the three approaches but the rent-sharing estimates lie within a comparable range across the three approaches. We interpret the latter result as lending empirical support to efficient bargaining as the nature of the bargaining process in France over the considered period.

We proceed as follows. Section 2 presents the three approaches. Section 3 discusses the data, clarifies the sources of variation and identification of rent sharing within each approach and focuses on industry differences in rent-sharing parameter estimates within each approach. Section 4 consistently compares industry differences in rent-sharing parameter estimates across the three approaches. Section 5 concludes.

# 2 Micro-evidence on rent sharing from three different approaches

In this section, we present three approaches from which we derive rent-sharing parameter estimates: the accounting approach, the standard labor economics approach and the productivity approach. The first two approaches are more general in the sense that they are compatible with different labor bargaining settings which differ in terms of bargaining scope. The third approach is the most restrictive one since it imposes *a priori* a particular bargaining framework, i.e. efficient bargaining.

It is not our intention to test empirically which bargaining model is not rejected by the available data. Instead, we aim at consistently comparing industry-specific rent-sharing parameters obtained from orthogonal directions in the same data.

## 2.1 Accounting approach

The workers, represented by the union, and the firm are involved in a bargaining situation. Both parties maximize their respective utility function during the bargaining process. Union preferences are represented by a modified Stone-Geary utility function (see e.g. Mezetti and Dinopoulos, 1991):

$$U(w_{it}, x_{it}) = (w_{it} - \overline{w}_{it})(x_{it} - \overline{x}_{it}) \tag{1}$$

where $i$ is a firm index, $t$ a time index, $w_{it}$ is the bargained wage, $x_{it}$ are bargained working conditions (which will be specified later), and $\overline{w}_{it} \leq w_{it}$ and $\overline{x}_{it} \leq x_{it}$ are respectively the reservation wage and the reservation working conditions available in the event of a bargaining dispute.[2] $U(.)$ implies from the point of view of the union that both the wage $w_{it}$ and the working conditions $x_{it}$ are normal goods.[3]

Consistent with capital quasi-fixity, firm $i$'s utility is assumed to equate its short-run profit at time $t$: $\pi_{it} = R_{it} - w_{it}N_{it} - j_{it}M_{it}$, where $R_{it} = P_{it}Q_{it}$ stands for total revenue with $P_{it}$ the output price, and $Q_{it} = \Theta_{it}F(N_{it}, M_{it}, K_{it})$ where $N$ is labor, $M$ is material input, $K$ is capital and $F(.)$ is assumed to be homogeneous of degree one in its arguments, $\Theta_{it}$ is an index of technical change or "true" total factor productivity and $j_{it}$ is the material input price.

Following the literature, we assume that the conventional asymmetric Nash bargaining solution is the appropriate solution concept. The bounds of the bargaining range are given by the minimum acceptable utility levels for both parties. In the absence of an agreement, the union receives the reservation wage $\overline{w}_{it}$, in which case union utility equals zero. If no revenue accrues to the firm when bargaining breaks down, the firm's utility equals zero in which case the firm

[2] Mezetti and Dinopoulos (1991) consider a more general modified Stone-Geary utility function: $U(w_{it}, N_{it}) = (w_{it} - \overline{w}_{it})^{\lambda}(x_{it} - \overline{x}_{it})^{\theta}$, where $x_{it} = N_{it}$ is the employment level, $\overline{x}_{it} = 0$, $\lambda \geq 0$ and $\theta \geq 0$. The union is wage (employment) oriented iff $\theta > \lambda\, (\theta < \lambda)$. We follow McDonald and Solow (1981) by setting $\lambda = \theta = 1$, meaning that the union is equally concerned with the wage premium $(w_{it} - \overline{w}_{it})$ and the working conditions premium $(x_{it} - \overline{x}_{it})$.

[3] The marginal rate of substitution between $x$ and $w$, $\frac{\frac{\partial U}{\partial x}}{\frac{\partial U}{\partial w}} = \frac{(w-\overline{w})}{(x-\overline{x})}$ is increasing in $w$, keeping $x$ constant, which is a sufficient condition for normality of $x$. A similar argument holds for $w$ (Mezetti and Dinopoulos, 1991).

has to bear only the fixed costs of capital. Hence, the generalized Nash product is written as:

$$G = \{(w_{it} - \overline{w}_{it})(x_{it} - \overline{x}_{it})\}^{\phi_{it}} \{R_{it} - w_{it}N_{it} - j_{it}M_{it}\}^{1-\phi_{it}}$$

where $\phi_{it} \in [0, 1]$ represents the workers' bargaining power.

Maximization of $G$ with respect to the wage rate gives the following first-order condition:

$$w_{it} = \overline{w}_{it} + \gamma_{it} \left[ \frac{R_{it} - w_{it}N_{it} - j_{it}M_{it}}{N_{it}} \right] \tag{2}$$

where $\gamma_{it} = \frac{\phi_{it}}{1-\phi_{it}}$. Eq. (2) states that the equilibrium wage is determined by the reservation wage, the relative bargaining strength of the workers and the firm and the level of profits per employee.

The extent of rent sharing that follows from Eq. (2) is compatible with distinct labor bargaining settings that differ in terms of bargaining scope: the right-to-manage model (Nickell and Andrews, 1983), the efficient bargaining model (McDonald and Solow, 1981) and the labor hoarding model (Haskel and Martin, 1992).

The *right-to-manage (RTM) model* postulates that the union bargains with the firm over wages while the firm chooses its profit-maximizing employment level. In the standard representation, the union prefers higher wages and more employment. Setting $x_{it} = N_{it}$ and $\overline{x}_{it} = 0$ in Eq. (1), we obtain the most common utility function in the literature, i.e. the rent maximization utility function of wages and employment (Rosen, 1969; Calvo, 1978; Johnson, 1990):

$$U(w_{it}, x_{it}) = (w_{it} - \overline{w}_{it})N_{it} \tag{3}$$

The outcome of the bargaining is the asymmetric Generalized Nash solution to: $\max_{w_{it}} \{(w_{it} - \overline{w}_{it})N_{it}\}^{\phi_{it}} \{R_{it} - w_{it}N_{it} - j_{it}M_{it}\}^{1-\phi_{it}}$, from which Eq. (2) follows.

Under the RTM bargaining setting, the union and the firm however agree on a Pareto-inefficient contract. To obtain Pareto efficiency, the *efficient bargaining (EB) model* represents collective bargaining by simultaneous negotiation over wages and employment. Assuming again that the union maximizes its membership aggregate gain from employment, the outcome of the bargaining is the asymmetric Generalized Nash solution to:

$$\max_{w_{it}, N_{it}} \{(w_{it} - \overline{w}_{it})N_{it}\}^{\phi_{it}} \{R_{it} - w_{it}N_{it} - j_{it}M_{it}\}^{1-\phi_{it}} \tag{4}$$

Maximization with respect to the wage rate gives Eq. (2).

Maximization with respect to employment gives the following first-order condition:

$$w_{it} = (R_N)_{it} + \phi_{it}\left(\frac{R_{it} - (R_N)_{it} N_{it} - j_{it} M_{it}}{N_{it}}\right) \tag{5}$$

with $(R_N)_{it}$ the marginal revenue of labor.

If workers value on-the-job leisure, overhead labor will constitute a bargaining issue for the union in addition to labor reward. Setting $x_{it} = \left(\frac{N_O}{N_P}\right)_{it}$ and $\overline{x}_{it} = \overline{\left(\frac{N_O}{N_P}\right)}_{it}$ where $(N_O)_{it}$ is the proportion of the workforce that is paid for but unproductive due to e.g. illicit shirking, set-up time of machinery, coffee breaks, $(N_P)_{it}$ is productive labor, $\left(\frac{N_O}{N_P}\right)_{it}$ is the degree of overmanning or generous crew sizes and $\overline{\left(\frac{N_O}{N_P}\right)}_{it}$ is the reservation overhead labor ratio, the preferences of the union can be represented as follows according to the *labor hoarding (LH) model*: $U(w_{it}, (N_O)_{it}) = (w_{it} - \overline{w}_{it})\left(\left(\frac{N_O}{N_P}\right)_{it} - \overline{\left(\frac{N_O}{N_P}\right)}_{it}\right)$. We assume that both types of labor are paid the same and that productive labor is unilaterally chosen by the firm at the profit-maximizing level, i.e. $(R_{N_P})_{it} = w_{it}$ with $(R_{N_P})_{it}$ the marginal revenue of productive labor. Under the LH bargaining setting, the outcome of the bargaining is the asymmetric Generalized Nash solution to: $\max_{w_{it},(N_O)_{it}} \left\{(w_{it} - \overline{w}_{it})\left(\left(\frac{N_O}{N_P}\right)_{it} - \overline{\left(\frac{N_O}{N_P}\right)}_{it}\right)\right\}^{\phi_{it}} \{R_{it} - w_{it}N_{it} - j_{it}M_{it}\}^{1-\phi_{it}}$. Maximization with respect to the wage rate still gives Eq. (2) with $N_{it} = (N_O)_{it} + (N_P)_{it}$. Maximization with respect to unproductive (overhead) labor gives the following first-order condition: $w_{it} = \gamma_{it}\left(\frac{R_{it} - w_{it}N_{it} - j_{it}M_{it}}{(N_P)_{it}}\right)\left(\left(\frac{N_O}{N_P}\right)_{it} - \overline{\left(\frac{N_O}{N_P}\right)}_{it}\right)$.

By simply rewriting Eq. (2) and defining the wage premium as the difference between the bargained wage and the reservation wage in the event of a bargaining dispute ($(WP)_{it} = w_{it} - \overline{w}_{it}$), we directly compute the extent of rent sharing $\left(\phi_{a_{it}}\right)$ that is compatible with the distinct bargaining settings discussed above from the firm accounting information:

$$\gamma_{a_{it}} = \frac{(w_{it} - \overline{w}_{it})N_{it}}{P_{it}Q_{it} - w_{it}N_{it} - j_{it}M_{it}} \tag{6}$$

$$\phi_{a_{it}} = \frac{\gamma_{a_{it}}}{1 + \gamma_{a_{it}}} = \frac{(w_{it} - \overline{w}_{it})N_{it}}{P_{it}Q_{it} - \overline{w}_{it}N_{it} - j_{it}M_{it}} \tag{7}$$

## 2.2 Standard labor economics approach

Following standard practice in the rent-sharing literature (for references, we refer to Section 1), we interpret $\overline{w}_{it}$ as the expected income in the event of a bargaining dispute which is determined by productivity-related characteristics of the worker and the probability of becoming

unemployed. Having longitudinal data, we assume that $\overline{w}_{it}$ is captured by year effects ($\alpha_t$) and by a proxy of the wage outside the employing firm within the same industry ($w_{It}$). Hence, the empirical specification of Eq. (2) can be written as:

$$\ln w_{j(i)t} = \ln w_{It} + \varepsilon^{w}_{\frac{\pi}{N}} \ln\left(\frac{\pi_{it}}{N_{it}}\right) + \alpha_{j(i)} + \alpha_i + \alpha_t + \epsilon_{jt} \tag{8}$$

where $w_{j(i)t}$ is the wage of individual $j$ working in firm $i$ at date $t$, $\pi_{it}$ and $N_{it}$ are respectively the profits and employment of the employing firm $i$ at time $t$, $\varepsilon^{w}_{\frac{\pi}{N}}$ is the wage-profits elasticity, $\alpha_{j(i)}$ is the individual effect, $\alpha_i$ the firm effect, $\alpha_t$ the year effect and $\epsilon_{jt}$ the statistical residual.

From the discussion in Section 2.1, it is clear that Eq. (2) is independent of the true nature of the employment function. Since Eq. (8) is simply the statistical specification of this equilibrium relation, the rent-sharing parameter estimate that is derived from the estimated wage-profits elasticity is evidently compatible with an RTM, EB or LH bargaining setting.

## 2.3 Productivity approach

In this approach, we impose *a priori* a particular bargaining setting. More specifically, the rent-sharing estimates derived from this approach result from embedding the EB model into a microeconomic version of Hall's (1988) framework (see also Crépon et al., 1999, 2005; Dobbelaere, 2004; Dobbelaere and Mairesse, 2008; Boulhol et al., 2010).

Denoting the logarithm of $Q_{it}$, $N_{it}$, $M_{it}$, $K_{it}$ and $\Theta_{it}$ by $q_{it}$, $n_{it}$, $m_{it}$, $k_{it}$ and $\theta_{it}$ respectively, the logarithmic specification of the production function gives:

$$q_{it} = (\varepsilon^{Q}_{N})_{it} n_{it} + (\varepsilon^{Q}_{M})_{it} m_{it} + (\varepsilon^{Q}_{K})_{it} k_{it} + \theta_{it} \tag{9}$$

where $(\varepsilon^{Q}_{J})_{it}$ $(J = N,\ M,\ K)$ is the elasticity of output with respect to input factor $J$.

Each firm operates under imperfect competition in the product market.

On the labor side, we assume that the union and the firm are involved in an EB procedure. Consistent with the specification of the union utility function and the firm utility function in the accounting approach, it is the union's objective to maximize its membership aggregate gain from employment and it is the firm's objective to maximize its short-run profit. Material input is unilaterally determined by the firm from profit maximization: $(R_M)_{it} = j_{it}$ with $(R_M)_{it}$ the marginal revenue of material input, which directly leads to:

$$(\varepsilon^{Q}_{M})_{it} = \mu_{it}\,(\alpha_M)_{it} \tag{10}$$

$\mu_{it} = \frac{P_{it}}{(C_Q)_{it}}$ refers to the mark-up of output price $P_{it}$ over marginal cost $(C_Q)_{it}$ and $(\alpha_M)_{it} = \frac{j_{it} M_{it}}{P_{it} Q_{it}}$ is the share of material costs in total revenue.

Solving simultaneously the two first-order conditions with respect to wages and employment, Eqs. (2) and (5) respectively, leads to an expression for the contract curve: $(R_N)_{it} = \overline{w}_{it}$. Under risk neutrality, the firm's decision about employment equals the one of a (non-bargaining) neoclassical firm that maximizes its short-run profit at the reservation wage. Denoting the marginal revenue by $(R_Q)_{it}$ and the marginal product of labor by $(Q_N)_{it}$, we express the marginal revenue of labor as $(R_N)_{it} = (R_Q)_{it} (Q_N)_{it} = \frac{P_{it}(Q_N)_{it}}{\mu_{it}}$. If we use this expression together with Eq. (5), the elasticity of output with respect to labor can be written as:

$$(\varepsilon_N^Q)_{it} = \mu_{it} (\alpha_N)_{it} - \mu_{it}\gamma_{it} [1 - (\alpha_N)_{it} - (\alpha_M)_{it}] \tag{11}$$

with $(\alpha_N)_{it} = \frac{w_{it} N_{it}}{P_{it} Q_{it}}$. Note that Eq. (11) discriminates between the RTM bargaining setting and the EB bargaining setting. In the RTM model, employment is highly endogenous with respect to wages. As in the perfectly competitive labor market case, the marginal revenue of labor is equal to the wage whereas in the EB model, employment does not directly depend on the bargained wage. Hence, the null hypothesis of $\gamma_{it} = 0$ in Eq. (11) does not only correspond to the assumption that the labor market is competitive but also to the less restrictive RTM assumption.

Assuming constant returns to scale $\left[(\varepsilon_N^Q)_{it} + (\varepsilon_M^Q)_{it} + (\varepsilon_K^Q)_{it} = 1\right]$, the capital elasticity can be expressed as: $(\varepsilon_K^Q)_{it} = 1 - \mu_{it}(\alpha_M)_{it} - \mu_{it}(\alpha_N)_{it} + \mu_{it}\gamma_{it} [1 - (\alpha_N)_{it} - (\alpha_M)_{it}]$.[4]

Estimating the production function:

$$q_{it} - k_{it} = (\varepsilon_N^Q)_{it} [n_{it} - k_{it}] + (\varepsilon_M^Q)_{it} [m_{it} - k_{it}] + \theta_{it} \tag{12}$$

allows the identification of $(i)$ the extent of rent sharing $\phi_{it}$ and $(ii)$ the price-cost mark-up $\mu_{it}$:

$$\gamma_{it} = \frac{\phi_{it}}{1 - \phi_{it}} = \frac{(\varepsilon_N^Q)_{it} - \left[(\varepsilon_M^Q)_{it} \frac{(\alpha_N)_{it}}{(\alpha_M)_{it}}\right]}{\frac{(\varepsilon_M^Q)_{it}}{(\alpha_M)_{it}} [(\alpha_N)_{it} + (\alpha_M)_{it} - 1]} \tag{13}$$

[4] The returns to scale assumption evidently affects the estimated output elasticities of factor inputs. In general, the production function coefficients are estimated to be lower when allowing for non constant returns to scale. However, since the first-order conditions with respect to the variable input factors –Eq. (11) for labor and Eq. (10) for materials– do not depend on the returns to scale assumption, our rent-sharing parameter estimate is robust to this assumption.

$$\phi_{it} = \frac{\gamma_{it}}{1+\gamma_{it}} \tag{14}$$

$$\mu_{it} = \frac{(\varepsilon_M^Q)_{it}}{(\alpha_M)_{it}} \tag{15}$$

# 3 Data description and a first look at the three approaches

## 3.1 Data description

We use data from the DADS ("Déclarations Annuelles des Données Sociales") on the matched worker-firm side and firm accounting information from EAE ("Enquête Annuelle d'Entreprise", "Service des Etudes et Statistiques Industrielles" (SESSI)) on the firm side. The DADS is a large-scale administrative database collected by INSEE ("Institut National de la Statistique et des Etudes Economiques") and maintained in the Division des Revenus. The data are based on a mandatory employer report of the gross earnings of each employee subject to French payroll taxes. These taxes apply to essentially all employed individuals in the economy. The Division des Revenus provides an extract of the DADS for scientific purposes, covering all individuals employed in French enterprises who were born in October of even-numbered years, excluding civil servants.

Our analysis sample is obtained by merging the firm current account and balance sheet data of the 10 646 firms that we used in our previous research (Dobbelaere and Mairesse, 2008) with the matched employer-employee information. Our initial dataset contained 1 388 089 observations, each corresponding to a unique firm-worker-year combination. Because of the 1982 and 1990 Census, however, we excluded the years 1981, 1983 and 1990 from the DADS database. To avoid large discrepancies in the number of years available in the matched employer-employee dataset and the firm dataset, we select the period 1984-2001. After some cleaning to eliminate outliers and anomalies, our matched worker-firm dataset contains 1 077 402 observations, corresponding to 209 780 individuals and 10 396 firms. For each observation, we have information on the exact starting date and end date of the job spell in the firm and the full-time/part-time status of the worker. Each firm-worker-year observation additionally includes information on the individual's sex, month, year and place of birth, current occupation and total net nominal earnings during the year. Employer characteristics include the location and industry of the employing firm. 9.7% of the employees move at least once between firms (called *movers*).

For regression purposes, we only select full-time stayers who worked 12 months a year. Our final sample contains 719 693 observations, corresponding to 91 353 individuals, 9 121 firms and 38 industries. Looking at the distribution of workers across firms, we observe 2 workers per firm for firms in the first quartile, 3 workers per firm for firms in the second quartile and 7 workers per firm for firms in the third quartile. The number of observations per worker (firm) is 7 (13) for the first quartile of workers (firms), 11 (16) for the second quartile and 14 (16) for the third quartile.

Using the firm dataset, we measure output ($Q_{it}$) by real current production deflated by the two-digit producer price index of the French industrial classification. Labor ($N_{it}$) refers to the average number of employees in each firm for each year and material input ($M_{it}$) refers to intermediate consumption deflated by the two-digit intermediate consumption price index. The capital stock ($K_{it}$) is measured by the gross bookvalue of fixed assets.[5] The shares of labor $(\alpha_N)_{it}$ and material input $(\alpha_M)_{it}$ are constructed by dividing respectively the firm total labor cost and undeflated intermediate consumption by the firm undeflated production and by taking the average of these ratios over adjacent years. Profits per worker $\left(\frac{\pi_{it}}{N_{it}}\right)$ is measured as value added minus labor costs divided by the average number of employees in each firm for each year. Using the matched worker-firm dataset, the wage $\left(w_{j(i)t}\right)$ refers to the average net nominal wage per worker. In addition to defining the wage at the worker level, we retrieve the firm average wage per worker in two ways: $(i)$ computed directly from the firm accounting information as the wage bill divided by the average number of employees in each firm for each year ($w_{it}$) and $(ii)$ using the worker information and computed as the sum of the wages of the workers divided by the number of workers observed in each firm-year $\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$. By construction, the latter is highly correlated with the average net nominal wage per worker $\left(w_{j(i)t}\right)$.

Table 1 reports the mean, standard deviation and quartile values of our main variables. The average growth rate of real firm output for the overall sample is 2.6% per year over the period 1984-2001. Capital has remained stable, while labor and materials have increased at an average

[5] The capital stock measure is the gross book value of tangible assets as reported in the firm balance sheets at the beginning of the year (or the end of the previous year), adjusted for inflation. This is a standard measure in microeconometric studies of the production function based on firm accounting information. It has the advantage of relying on direct information provided by the firm and does not make the strong assumptions underlying the capital stock measures obtained by the perpetual inventory method, mainly a constant rate of depreciation or a fixed service life. In practice, however, panel data estimates of capital elasticities appear to be very robust to the use of the two types of measures. See for example Atkinson and Mairesse (1978) and Mairesse and Pescheux (1980).

annual growth rate of 0.7% and 4% respectively. As expected for firm-level data, the dispersion of all these variables is considerably large. For example, capital growth is smaller than -7.2% for the first quartile of firms and higher than 6.5% for the fourth quartile.

*<Insert Table 1 about here>*

## 3.2 A first exploration of the industry-specific rent-sharing parameters derived from the three approaches

In this section, we explain how the three approaches differ in the sources of variation and identification of the extent of rent sharing. Within each approach, we concentrate on industry differences in the extent of rent sharing. We decompose the total sample into 38 manufacturing industries according to the French industrial classification ("Nomenclature économique de synthèse - Niveau 3" [NES 114]). Table A.1 in Appendix shows the industry repartition of the sample and presents the number of firms, the number of workers, the number of observations in the firm dataset and the number of observations in the matched worker-firm dataset for each industry $I \in \{1, ..., 38\}$.

### 3.2.1 Accounting approach

For each industry $I \in \{1, ..., 38\}$, we compute the extent of rent sharing based on Eq. (7) where we measure the reservation wage $\overline{w}_{it}$ by the $5^{th}$ percentile value of the nominal wage per worker in the industry in which the firm operates. From Eq. (7), it is clear that variations in the wedge between the wage premium of all employees and the firm's short-run profit evaluated at the reservation wage identify the extent of rent sharing. Table 2 presents for each industry $I$ the distribution of the firm-specific extent of rent sharing $\left(\phi_{a_{it}}\right)$, which gives an indication about within-industry differences in $\phi$.

Previous studies (Dobbelaere, 2004; Dobbelaere and Mairesse, 2008; Boulhol et al., 2010) provide evidence of a positive correlation between the firm-specific extent of rent sharing and the firm-specific price-cost mark-up. This is an empirical inference based on data analysis. From theory, we know that the price-cost margin, i.e. the share of the rents kept by the firm, is positively related to the price-cost mark-up. In addition to $\phi_{a_{it}}$, Table 2 therefore presents also the distribution of the firm-specific price-cost mark-up assuming that firms consider input prices as given prior to deciding their level of inputs ($\mu\ only_{a_{it}}$) and the price-cost mark-up taking into account that workers are able to extract part of the product rents $\left(\mu_{a_{it}}\right)$.

From the firm accounting information, we compute $\mu\ only_{a_{it}}$ as $1+\left(\frac{P_{it}Q_{it}-w_{it}N_{it}-j_{it}M_{it}}{P_{it}Q_{it}}\right)$ and $\mu_{a_{it}}$ as $1+\left(\frac{P_{it}Q_{it}-\overline{w}_{it}N_{it}-j_{it}M_{it}}{P_{it}Q_{it}}\right)=\mu\ only_{a_{it}}+\frac{(w_{it}-\overline{w}_{it})N_{it}}{P_{it}Q_{it}}$. As an alternative to Eqs. (6) and (7), we hence can compute $\gamma_{a_{it}}$ as $\frac{\mu_{a_{it}}-\mu\ only_{a_{it}}}{\mu\ only_{a_{it}}-1}$ and $\phi_{a_{it}}$ as $\frac{\mu_{a_{it}}-\mu\ only_{a_{it}}}{\mu_{a_{it}}-1}$.

Table 2 is drawn up in increasing order of the median value of $\gamma_{a_{it}}$. Focusing on the median distribution across industries, the extent of rent sharing $\left(\phi_{a_{it}}\right)$ is lower than 0.12 for the first quartile of industries and exceeds 0.31 for the upper quartile. The corresponding price-cost mark-up $\left(\mu_{a_{it}}\right)$ is computed to be lower than 1.22 for the first quartile of industries and higher than 1.35 for the top quartile.

*<Insert Table 2 about here>*

### 3.2.2 Standard labor economics approach

Estimating Eq. (8) for each industry $I \in \{1, ..., 38\}$ gives us industry-specific wage-profits elasticity estimates. To retrieve industry-specific rent-sharing parameter estimates, the industry-specific elasticity estimates are multiplied by the industry-specific ratio of the firm average wage per worker to the profit per worker. Within this approach, the identification of industry-specific rent sharing is hence driven by differences between the estimated industry-specific elasticity and the industry-specific ratio of total profits to the wage bill.

Table 3 presents the industry-specific wage-profits elasticities and the implied extent of rent sharing. Consistent with the accounting approach, we proxy the reservation wage by the $5^{th}$ percentile value of the nominal wage per worker in the industry in which the firm operates.[6] Observing considerable variation in the profit per worker variable $\left(\frac{\pi_{it}}{N_{it}}\right)$ over time, we use the average of the profit per worker variable from time $t$ until $(t-4)$ as the main independent variable.[7] The left part of Table 3 presents the results of using the natural logarithm of the average net nominal wage per worker $(w_{j(i)t})$ as the dependent variable, the middle part reports the results of using the natural logarithm of the firm average wage per worker $(w_{it})$ and the right part displays the results of using the natural logarithm of the firm average wage per worker computed on the basis of the worker information $\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$. To take into account

[6] As a robustness check, we experimented with the $1^{st}$ percentile value of the nominal wage per worker in the industry in which the firm operates as a proxy for the reservation wage, using either the matched worker-firm dataset or the firm dataset. None of the alternative measures affected our wage-profits elasticity estimates.

[7] Since the firm dataset covers the period 1978-2001, we also use information over the period 1978-1984 to compute the smooth profit per worker variable.

endogeneity problems, we adopt the system GMM estimator and use appropriate lags of internal variables ($q, n, m$ and $k$) in levels (first-differences) as instruments in the first-differenced (levels) equations.[8] The motivation of estimating the wage equation in logs is essentially that bargaining does not apply to negative profits. By taking the natural logarithm of our smooth profit per worker variable, we lose only 0.3% of the observations in the sample.

Within each part, the first column reports the estimated industry-specific wage-profits elasticity $\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$, the second column derives the corresponding industry-specific relative extent of rent sharing $(\widehat{\gamma}_I)$ by multiplying the estimated industry-specific wage-profits elasticity by the median value of the ratio of the firm average wage per worker to the profit per worker at the industry level and the third column displays the corresponding industry-specific extent of rent sharing $\left(\widehat{\phi}_I\right)$.[9] The table is drawn up in increasing order of $\widehat{\gamma}_I$ using $\ln\left(w_{j(i)t}\right)$ as the dependent variable.

Focusing on the left part of the table, the wage-profits elasticity appears to be positive and significant at the 10% level for all but 3 industries. This elasticity is estimated to be lower than 0.07 for the first quartile of industries and higher than 0.15 for the upper quartile. How do these elasticity estimates match up with other studies? Drawing upon various kinds of data, the estimated elasticities between wages and profits per worker range between 0.04 and 0.2. Using data on Anglo-Saxon countries, Carruth and Oswald (1987), Denny and Machin (1991), Christofides and Oswald (1992), Blanchflower et al. (1996) and Hildreth and Oswald (1997) find a central elasticity estimate of 0.04. These low estimates could be the result of not (adequately) controlling for the endogeneity of rents. Confirming this presumption, Abowd and Lemieux (1993) for Canada, Estevao and Tevlin (1995) for the US and Van Reenen (1996) for the UK report an elasticity estimate between 0.15 and 0.30. These studies use respectively industry import and export prices, industry demand shifters retrieved from input-output tables and firm-

[8] The GMM estimation is carried out in Stata 10.1 (Roodman, 2005). We report results for the *one*-step estimator, for which inference based on the asymptotic variance matrix is shown to be more reliable than for the asymptotically more efficient two-step estimator (Arellano and Bond, 1991). When using $\ln\left(w_{j(i)t}\right)$ as the dependent variable, the Sargan test of overidentification is not rejected for 18 industries and the autocorrelation tests are not rejected for 33 industries. When using $\ln\left(w_{it}\right)$ or $\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$ as the dependent variable, the Sargan test of overidentification is not rejected for all industries. The autocorrelation tests are not rejected for 31 (36) industries when using $\ln\left(w_{it}\right)$ $\left(\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)\right)$ as the dependent variable. Results not reported but available upon request.

[9] Consistent with the smooth profit per worker variable, we compute the average of the ratio of the firm average wage per worker to the profit per worker from time $t$ until $(t-4)$.

and industry-specific technological innovations as instruments for (quasi-) rents. Studies for continental and Nordic Europe point to lower estimates. Margolis and Salvanes (2001) and Arai (2003) find an elasticity estimate in the [0.01-0.03]-range for Norway and Sweden respectively. Using a cross-section of French manufacturing workers, Fakhfakh and FitzRoy (2004) point to an elasticity of 0.02 for France. Rycx and Tojerow (2004) and Brock and Dobbelaere (2006) report an elasticity estimate of 0.06 and 0.03 for Belgium respectively. The third column of the left part indicates that the corresponding extent of rent sharing $\left(\widehat{\phi}_{I}\right)$ is lower than 0.10 for the first quartile of industries and exceeds 0.21 for the top quartile.

Focusing on the middle (right) part, $(\varepsilon_{w}^{\pi})_{I}$ is estimated to be positive and significant at the 10% level for 24 (22) out of the 38 industries. The distribution of $\left(\widehat{\varepsilon}_{\frac{\pi}{N}}^{w}\right)_{I}$ and $\left(\widehat{\phi}_{I}\right)$ across industries using $\ln(w_{it})$ or $\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$ as the dependent variable closely corresponds to the corresponding distributions discussed above.

*<Insert Table 3 about here>*

### 3.2.3 Productivity approach

Since our study aims at assessing industry differences in the extent of rent sharing derived from the three approaches, we estimate the *average* rent-sharing parameter for each industry $I \in \{1, ..., 38\}$. Hence, the corresponding statistical specification of Eq. (12) is: $q_{it} - k_{it} = \varepsilon_{N}^{Q}(n_{it} - k_{it}) + \varepsilon_{M}^{Q}(m_{it} - k_{it}) + \zeta_{it}$, with $\zeta_{it}$ the disturbance term. Consistent with the accounting approach, we also present $(i)$ the average industry-specific price-cost mark-up assuming that input prices are known before input choices are made and $(ii)$ the average industry-specific price-cost mark-up taking into account that wages and employment are the subject of a bargaining agreement.

The data features that are key to empirical identification of the extent of rent sharing and the price-cost mark-up are the differences between the estimated output elasticities of labor and materials and their revenues shares. There are many sources of variation in input shares. Some of them are related to variation in hours of work, machinery, capacity utilization (variation in the business cycle). When deriving our parameters of interest, we want to abstract from such sources of variation. Therefore, we assume *average* input shares. Hence, we derive average industry-specific rent-sharing parameters by comparing the estimated average industry-specific production function coefficients, i.e. the estimated average industry-specific output elasticities of

labor and materials, with the average industry-specific shares of labor and materials in revenue: $\widehat{\gamma}_I = \frac{(\widehat{\varepsilon}^Q_N)_I - \left[(\widehat{\varepsilon}^Q_M)_I \frac{(\alpha_N)_I}{(\alpha_M)_I}\right]}{\frac{(\widehat{\varepsilon}^Q_M)_I}{(\alpha_M)_I}\left[(\alpha_N)_I+(\alpha_M)_I-1\right]}$, $\widehat{\phi}_I = \frac{\widehat{\gamma}_I}{1+\widehat{\gamma}_I}$ and $\widehat{\mu}_I = \frac{(\widehat{\varepsilon}^Q_M)_I}{(\alpha_M)_I}$.[10] The standard errors of $\widehat{\gamma}_I$, $\widehat{\phi}_I$ and $\widehat{\mu}_I$ are computed using the Delta Method (Woolridge, 2002).[11]

Table 4 summarizes the system GMM results of the industry analysis using the same instruments as in Section 3.2.2.[12] The table is drawn up in increasing order of $\widehat{\gamma}_I$. The estimated average extent of rent sharing $\left(\widehat{\phi}_I\right)$ belongs to the $[0,1]$-interval for 25 industries, 16 out of these 25 estimates are significant at the 10% level. The average price-cost mark-up $(\widehat{\mu}_I)$ is estimated to be significantly higher than 1 for 31 industries.

Industry differences in the parameter estimates appear to be sizeable. Considering all industries, there is no evidence of rent sharing for the bottom quartile of industries but we estimate it to be higher than 0.33 for the top quartile. Focusing on median values, the average extent of rent sharing and the average price-cost mark-up are estimated at 0.20 and 1.25 respectively. Ignoring the occurrence of rent sharing reduces the estimated median price-cost mark-up to 1.21. How do these industry differences compare with other studies using the same approach and similar estimation techniques for different countries? Using a panel of 7 086 Belgian firms in 18 manufacturing industries over the period 1988-1995, Dobbelaere (2004) finds that the extent of rent sharing is lower than 0.16 for the first quartile of industries and higher than 0.26 for the third quartile. The median value is estimated at 0.21. Using a panel of 11 799 British firms in 20 manufacturing industries, Boulhol et al. (2010) estimate the extent of rent sharing to be lower than 0.19 for the bottom quartile of industries and higher than 0.54 for the top quartile. The median value is estimated at 0.40.

Considering the industries for which the extent of rent sharing lies in the $[0,1]$-interval and the price-cost mark-up exceeds 1 [24 industries], the rent-sharing parameter $\left(\widehat{\phi}_I\right)$ is estimated to be lower than 0.19 for the first quartile of industries and higher than 0.38 for the upper quartile.

[10] When interpreting the (differences in the) extent of rent sharing, we should be mindful of other forces –that are not included in our modeling framework–impacting the estimated elasticity-revenue share ratios. Possibilities range from economic factors like distortions in the intermediate materials market, other types of imperfect competition in the labor market (e.g. monopsony), variable factor utilization and factor adjustment costs to measurement issues.

[11] Dropping subscripts, $\left(\sigma_{\widehat{\gamma}}\right)^2 = \left(\frac{\alpha_M}{\alpha_N+\alpha_M-1}\right)^2 \frac{\left(\widehat{\varepsilon}^Q_M\right)^2\left(\sigma_{\widehat{\varepsilon}^Q_N}\right)^2 - 2\,\widehat{\varepsilon}^Q_N\widehat{\varepsilon}^Q_M\left(\sigma_{\widehat{\varepsilon}^Q_N,\widehat{\varepsilon}^Q_M}\right)+\left(\widehat{\varepsilon}^Q_N\right)^2\left(\sigma_{\widehat{\varepsilon}^Q_M}\right)^2}{\left(\widehat{\varepsilon}^Q_M\right)^4}$, $\left(\sigma_{\widehat{\phi}}\right)^2 = \frac{\left(\sigma_{\widehat{\gamma}}\right)^2}{(1+\widehat{\gamma})^4}$ and $\left(\sigma_{\widehat{\mu}}\right)^2 = \frac{1}{(\alpha_M)^2}\left(\sigma_{\widehat{\varepsilon}^Q_M}\right)^2$.

[12] Results for the *one*-step estimator are reported. The Sargan test of overidentification is not rejected for 35 industries and the autocorrelation tests are not rejected for 25 industries (results available upon request).

The corresponding estimate of the price-cost mark-up ($\widehat{\mu}_I$) is found to be lower than 1.25 for the first quartile of industries and higher than 1.36 for the top quartile.

*<Insert Table 4 about here>*

# 4 A comparison of the distribution of $\phi_I$ across the three different approaches

*A priori*, sizeable rent-sharing differences across the three approaches could be expected due to two main reasons. First, differences in modeling assumptions about the underlying labor bargaining setting and the nature of competition in the product market could drive these differences (see Section 2). The accounting approach and the standard labor economics approach are compatible with distinct labor bargaining settings while the productivity approach assumes that bargaining issues involve wages and employment and explicitly models imperfect competition in the product market. Second, differences in the underlying sources of identification of rent sharing and hence data requirements could explain these differences (see Section 3). The accounting approach is less data-demanding and provides a *direct* way of deriving rent-sharing parameters. The standard labor economics approach takes into account both worker and firm wage heterogeneity. Previous studies (for references we refer to Section 1) have shown that the inclusion of worker wage heterogeneity downwardly affects the response of wages to performance. The productivity approach *indirectly* derives the extent of rent sharing through the elasticities of output with respect to variable input factors (labor and materials). This section highlights potential rent-sharing differences across the three approaches by consistently comparing industry differences in rent-sharing parameters derived from the three approaches.

Table 5 presents the distribution of the extent of rent sharing $\left(\widehat{\phi}_I\right)$ across the three approaches. We focus on the median values of the accounting extent of rent sharing. When using the standard labor economics approach, we compute the relative extent of rent-sharing parameters ($\widehat{\gamma}_I$) by multiplying the estimated wage-profits elasticities by the median value of the smooth ratio of the firm average wage per worker to the profit per worker at the industry level, from which we compute the extent of rent sharing $\left(\widehat{\phi}_I\right)$. The upper part of Table 5 displays the system GMM results, the lower part reports the levels OLS results. For both estimators, we consider (*i*) all industries and (*ii*) a subsample of industries for which the relative extent of rent-sharing parameters are estimated (or computed) to be positive across the different approaches. This

subsample contains 20 industries when focusing on either the GMM results or the OLS results. Both estimators have 15 industries in common.

Focusing on the upper part of Table 5 and considering all industries, we observe the most sizeable dispersion of the estimated extent of rent-sharing parameter $\left(\widehat{\phi}_I\right)$ within the productivity approach with an interquartile range of 0.40. The smallest dispersion is observed within the standard labor economics approach using $\ln(w_{it})$ as the dependent variable in the wage equation with an interquartile range of 0.07. The median value of $\phi_I$ across the three different approaches varies between 0.10 and 0.22.

Restricting the sample to the economically meaningful parameter estimates [20 industries] reveals that the differences in dispersion across the different approaches become smaller. The interquartile range across the three approaches varies between 0.08 (standard labor economics approach using $\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$ as the dependent variable in the wage equation) and 0.18 (productivity approach). The remaining differences in dispersion could be due to differences in modeling assumptions and/or data requirements.

Considering all industries and looking at the median values, we find that the levels OLS estimates are lower compared to the system GMM estimates for the standard labor economics approach (using $\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$ as the dependent variable in the wage equation) and the productivity approach. The dispersion of $\widehat{\phi}_I$ within each approach appears to be smaller when endogeneity problems are not taken into account. The productivity approach displays the largest dispersion (value of 0.31) whereas the smallest interquartile range (value of 0.05) is observed within the standard labor economics approach using $\ln(w_{it})$ as the dependent variable in the wage equation.

To graphically illustrate the rent-sharing differences across the three approaches, Figure 1 presents the box diagrams for the subsample of the economically meaningful rent-sharing estimates. The upper diagram displays the system GMM estimates whereas the lower diagram shows the levels OLS estimates. Keep however in mind that these box diagrams are based on different subsamples, having 15 out of the 20 industries in common.

The discussion above confirms our presumption that there exist rent-sharing differences across the three approaches. However, if we compare the quartile values across the three approaches, we can conclude that the rent-sharing parameter estimates lie within a comparable range. Taking into account endogeneity problems and considering the economically meaningful parameter estimates, the lower quartile values range between 0.07 and 0.17, the median values between

0.12 and 0.26 and the upper quartile values between 0.16 and 0.36. When endogeneity problems are not taking into account, the corresponding ranges are [0.10-0.19] for the first quartile values, [0.13-0.22] for the median values and [0.15-0.26] for the third quartile values. Given that the accounting approach and the standard labor economics approach are compatible with distinct labor bargaining settings while the productivity approach hinges on the assumption of efficient bargaining, we interpret the finding that the rent-sharing parameter estimates lie within a comparable range as supporting evidence of efficient bargaining as the labor bargaining setting in France over the considered period.

*<Insert Table 5 about here>*

# 5 Conclusion

This article provides evidence of rent sharing from orthogonal directions by exploiting different dimensions in the same data. By doing so, we contribute to the empirical rent-sharing literature. Taking advantage of a rich matched employer-employee dataset for France covering the period 1984-2001, we compare industry-specific rent-sharing parameters derived from three different approaches: the accounting approach, the standard labor economics approach and the productivity approach. The first two approaches are compatible with distinct labor bargaining settings (right-to-manage, efficient bargaining, labor hoarding) while the latter hinges on the assumption of efficient bargaining. As expected, our results point to differences in dispersion of the industry-specific rent-sharing parameter estimates across the three approaches which could be attributable to differences in modeling assumptions and/or data requirements. Focusing on the economically meaningful rent-sharing estimates, we find that the estimates lie within a comparable range across the three approaches. We interpret the latter result as lending empirical support to efficient bargaining as the nature of the bargaining process in France over the considered period.

# References

[1] Abowd, J.M., F. Kramarz and D. Margolis, 1999, High wage workers and high wage firms, Econometrica, 67(2), 251-334.

[2] Abowd, J.M. and T. Lemieux, 1993, The effects of product market competition on collective bargaining agreements: The case of foreign competition in Canada, Quarterly Journal of Economics, 108(4), 983-1014.

[3] Arai, M., 2003, Wages, profits, and capital intensity: Evidence from matched worker-firm data, Journal of Labor Economics, 21(3), 593-618.

[4] Arellano, M. and S. Bond, 1991, Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, Review of Economic Studies, 58(2), 277-297.

[5] Atkinson, M. and J. Mairesse, 1978, Length of life of equipment in French manufacturing Industries, Annales de l'INSEE, 30-31, 28-48.

[6] Blanchflower, D.G., A.J. Oswald and M. D. Garrett, 1990, Insider power in wage determination, Economica, 57(226), 143-170.

[7] Blanchflower, D.G., A.J. Oswald and P. Sanfey, 1996, Wages, profits and rent sharing, Quarterly Journal of Economics, 111(444), 227-252.

[8] Boulhol, H. and S. Dobbelaere, 2010, Imports as product and labour market discipline, British Journal of Industrial Relations, forthcoming.

[9] Brock, E. and S. Dobbelaere, 2006, Has international trade affected workers' bargaining power?, Review of World Economics, 142(2), 233-266.

[10] Calvo, G.A., 1978, Urban unemployment and wage determination in LDC's: Trade unions in the Harris-Todaro model, International Economic Review, 19(1), 65-81.

[11] Carruth, A. and A. Oswald, 1987, Wage inflexibility in Britain, Oxford Bulletin of Economics and Statistics, 49(1), 59-78.

[12] Christofides, L.N and A.J. Oswald, 1992, Real wage determination and rent sharing in collective bargaining agreements, Quarterly Journal of Economics, 107(3), 985-1002.

[13] Crépon, B., R. Desplatz and J. Mairesse, 1999, Estimating price-cost margins, scale economies and workers' bargaining power at the firm level, CREST Working Paper G9917, Centre de Recherche en Economie et Statistique.

[14] Crépon, B., R. Desplatz and J. Mairesse, 2005, Price-cost margins and rent sharing: Evidence from a panel of French manufacturing firms, Annales d'Economie et de Statistique, Special issue in memory of Zvi Griliches, 79/80, 585-611.

[15] Denny K. and S. Machin, 1991, The role of profitability and industrial wages in firm level wage determination, Fiscal Studies, 12(2), 34-45.

[16] Dobbelaere, S., 2004, Estimation of price-cost margins and union bargaining power for Belgian manufacturing, International Journal of Industrial Organization, 22(10), 1381-1398.

[17] Dobbelaere, S. and J. Mairesse, 2008, Panel data estimates of the production function and product and labor market imperfections, NBER Working Paper 13975, National Bureau of Economic Research.

[18] Estevao, M. and S. Tevlin, 1995, The role of profits in wage determination: Evidence from US manufacturing, Board of Governors of the Federal Reserve System Finance and Economics Discussion Series Paper 95-48.

[19] Estevao, M. and S. Tevlin, 2003, Do firms share their success with workers? The response of wages to product market conditions, Economica, 70(280), 597-617.

[20] Fakhfakh F. and F. Fitzroy, 2004, Basic wages and firm characteristics: Rent sharing in French manufacturing, Labour, 18(4), 615-631.

[21] Hall, R.E., 1988, The relationship between price and marginal cost in US industry, Journal of Political Economy, 96(5), 921-947.

[22] Haskel, J. and C. Martin, 1992, Margins, concentration, unions and the business cycle: Theory and evidence for Britain, International Journal of Industrial Organization, 10(4), 611-632.

[23] Hildreth, A.K.G. and A.J. Oswald, 1997, Rent sharing and wages: Evidence from company and establishment panels, Journal of Labor Economics, 15(2), 318-337.

[24] Holmlund, B. and J. Zetterberg, 1991, Insider effects in wage determination: Evidence from five countries, European Economic Review, 35(5), 1009-1035.

[25] Johnson, G.E., 1990, Work rules, featherbedding, and Pareto-optimal union-management bargaining, Journal of Labor Economics, 8(1), S237-S259.

[26] Jovanovic, B., 1979, Job matching and the theory of turnover, Journal of Political Economy, 87(5), 972-990.

[27] Katz, L.F. and L.H. Summers, 1989, Industry rents: Evidence and implications, Brookings Papers on Economic Activity: Microeconomics, 209-275.

[28] Kramarz, F., 2003, Wages and international trade, CEPR Discussion Paper 3936, Centre for Economic Policy Research.

[29] Lazear, E.P. and S. Rosen, 1981, Rank-order tournaments as optimal labor contracts, Journal of Political Economy, 89(5), 841-864.

[30] Mairesse, J. and J.M. Pescheux, 1980, Fonction de Production et Mesure du Capital: La Robustesse des Estimations, Annales de l'INSEE, 38-39, 63-75.

[31] Margolis, D.N. and K. Salvanes, 2001, Do firms really share rents with their employees?, IZA Discussion Paper 330, Institute for the Study of Labor.

[32] Martins, P.S., 2009, Rent sharing before and after the wage bill, Applied Economics, 42(17), 2133-2151.

[33] McDonald, I.M. and R.M. Solow, 1981, Wage bargaining and employment, American Economic Review, 71(5), 896-908.

[34] Mezetti C. and E. Dinopoulos, 1991, Domestic unionization and import competition, Journal of International Economics, 31(1-2), 79-100.

[35] Mortensen, D., 2003, Wage dispersion: Why are similar workers paid differently?, Cambridge, MA: MIT Press.

[36] Nekby, L., 2003, Gender differences in rent sharing and its implications for the gender wage gap, evidence from Sweden, Economics Letters, 81(3), 403-410.

[37] Nickell, S.J. and M. Andrews, 1983, Unions, real wages and employment in Britain 1951-79, Oxford Economic Papers, 35(supplement), 183-205.

[38] Nickell, S.J., J. Vainiomaki and S. Wadhwani, 1994, Wages and product market power, Economica, 61(244), 457-473.

[39] Postel-Vinay, F. and J.M. Robin, 2002, Equilibrium wage dispersion with worker and employer heterogeneity, Econometrica, 70(6), 2295-2350.

[40] Roodman, D., 2005, xtabond2: Stata Module to Extend xtabond Dynamic Panel Data Estimator. Center for Global Development, Washington.

[41] Rosen, S., 1969, Trade union power, threat effects and the extent of organisation, Review of Economic Studies, 36(3), 185-196.

[42] Rycx, F. and I. Tojerow, 2004, Rent sharing and the gender wage gap in Belgium, International Journal of Manpower, 25(3/4), 279-299.

[43] Shimer, R., 2005, The assignment of workers to jobs in an economy with coordination frictions, Journal of Political Economy, 113(5), 996-1025.

[44] Van Reenen, J., 1996, The creation and capture of rents: Wages and innovation in a panel of U.K. companies, Quarterly Journal of Economics, 111(1), 195-226.

[45] Woolridge, J., 2002, Econometric Analysis of Cross sections and Panel Data, Cambridge, MA: MIT Press.

**Table 1**
Summary statistics

| Variables | 1984-2001 | | | | | |
|---|---|---|---|---|---|---|
| | Mean | Sd. | $Q_1$ | $Q_2$ | $Q_3$ | N |
| Real firm output growth rate $\Delta q_{it}$ | 0.026 | 0.152 | -0.055 | 0.024 | 0.108 | 125528 |
| Labor growth rate $\Delta n_{it}$ | 0.007 | 0.123 | -0.042 | 0.000 | 0.055 | 125528 |
| Capital growth rate $\Delta k_{it}$ | 0.001 | 0.152 | -0.072 | -0.017 | 0.065 | 125528 |
| Materials growth rate $\Delta m_{it}$ | 0.041 | 0.193 | -0.060 | 0.038 | 0.141 | 125528 |
| Labor share in nominal output $(\alpha_N)_{it}$ | 0.310 | 0.135 | 0.214 | 0.295 | 0.389 | 132552 |
| Materials share in nominal output $(\alpha_M)_{it}$ | 0.517 | 0.155 | 0.420 | 0.524 | 0.624 | 132552 |
| $\Delta q_{it} - \Delta k_{it}$ | 0.026 | 0.189 | -0.077 | 0.027 | 0.129 | 125528 |
| $\Delta n_{it} - \Delta k_{it}$ | 0.006 | 0.165 | -0.075 | 0.012 | 0.087 | 125528 |
| $\Delta m_{it} - \Delta k_{it}$ | 0.040 | 0.221 | -0.081 | 0.039 | 0.159 | 125528 |
| Profit per worker $\frac{\pi_{it}}{N_{it}}$ | 21592 | 30658 | 6761 | 13529 | 25839 | 132552 |
| Firm average wage per worker $w_{it}$ | 28346 | 8453 | 22480 | 27220 | 32817 | 132552 |
| Number of workers per firm $\sum_{j \in i} j$ | 10 | 55 | 2 | 3 | 7 | 9121 |
| Average wage per worker $w_{j(i)t}$ | 17199 | 9237 | 11650 | 14794 | 19553 | 719693 |

**Table 2**
Accounting approach: Industry analysis:
Distribution of the firm-specific extent of rent sharing $\phi_{a_{it}}$ and price-cost mark-up $\mu_{a_{it}}$ $(only)$
within each industry $I \in \{1, \ldots, 38\}$

| | $\gamma_{a_{it}}$ | | | $\phi_{a_{it}}$ | | | $\mu\ only_{a_{it}}$ | | | $\mu_{a_{it}}$ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Industry $I$ | $Q_1$ | $Q_2$ | $Q_3$ | $Q_1$ | $Q_2$ | $Q_3$ | $Q_1$ | $Q_2$ | $Q_3$ | $Q_1$ | $Q_2$ | $Q_3$ |
| 23 | -1.045 | -0.269 | 0.438 | -0.326 | 0.310 | 1.057 | 1.040 | 1.175 | 1.297 | 0.949 | 1.080 | 1.264 |
| 4 | 0.056 | 0.094 | 0.180 | 0.059 | 0.091 | 0.154 | 1.101 | 1.158 | 1.235 | 1.179 | 1.216 | 1.271 |
| 3 | 0.055 | 0.114 | 0.266 | 0.057 | 0.114 | 0.214 | 1.133 | 1.215 | 1.296 | 1.220 | 1.296 | 1.399 |
| 2 | 0.051 | 0.132 | 0.227 | 0.048 | 0.117 | 0.185 | 1.077 | 1.131 | 1.188 | 1.163 | 1.202 | 1.250 |
| 1 | 0.076 | 0.150 | 0.283 | 0.073 | 0.132 | 0.223 | 1.069 | 1.121 | 1.198 | 1.172 | 1.219 | 1.307 |
| 14 | 0.092 | 0.165 | 0.292 | 0.086 | 0.143 | 0.244 | 1.076 | 1.136 | 1.223 | 1.241 | 1.302 | 1.344 |
| 24 | 0.099 | 0.172 | 0.297 | 0.090 | 0.147 | 0.229 | 1.160 | 1.224 | 1.299 | 1.312 | 1.371 | 1.431 |
| 30 | 0.103 | 0.178 | 0.281 | 0.101 | 0.153 | 0.222 | 1.142 | 1.196 | 1.256 | 1.277 | 1.339 | 1.378 |
| 26 | 0.111 | 0.183 | 0.309 | 0.104 | 0.157 | 0.238 | 1.123 | 1.206 | 1.290 | 1.283 | 1.348 | 1.412 |
| 15 | 0.071 | 0.188 | 0.310 | 0.066 | 0.158 | 0.237 | 1.110 | 1.177 | 1.252 | 1.258 | 1.329 | 1.397 |
| 34 | 0.126 | 0.191 | 0.336 | 0.113 | 0.162 | 0.255 | 1.109 | 1.169 | 1.233 | 1.234 | 1.272 | 1.336 |
| 7 | 0.103 | 0.208 | 0.362 | 0.094 | 0.173 | 0.275 | 1.092 | 1.152 | 1.236 | 1.283 | 1.339 | 1.383 |
| 6 | 0.100 | 0.223 | 0.405 | 0.098 | 0.185 | 0.305 | 1.075 | 1.134 | 1.207 | 1.265 | 1.330 | 1.390 |
| 29 | 0.115 | 0.226 | 0.361 | 0.105 | 0.185 | 0.266 | 1.132 | 1.180 | 1.233 | 1.259 | 1.304 | 1.365 |
| 10 | 0.111 | 0.226 | 0.441 | 0.100 | 0.184 | 0.306 | 1.112 | 1.176 | 1.252 | 1.288 | 1.330 | 1.391 |
| 35 | 0.123 | 0.239 | 0.410 | 0.110 | 0.196 | 0.297 | 1.100 | 1.152 | 1.206 | 1.226 | 1.270 | 1.328 |
| 25 | 0.144 | 0.241 | 0.439 | 0.126 | 0.206 | 0.306 | 1.094 | 1.170 | 1.269 | 1.277 | 1.353 | 1.400 |
| 27 | 0.114 | 0.269 | 0.445 | 0.103 | 0.212 | 0.308 | 1.070 | 1.126 | 1.196 | 1.207 | 1.260 | 1.320 |
| 9 | 0.133 | 0.269 | 0.382 | 0.126 | 0.220 | 0.286 | 1.127 | 1.200 | 1.277 | 1.282 | 1.323 | 1.369 |
| 37 | 0.142 | 0.269 | 0.444 | 0.129 | 0.219 | 0.311 | 1.134 | 1.195 | 1.270 | 1.269 | 1.332 | 1.397 |
| 32 | 0.115 | 0.269 | 0.471 | 0.104 | 0.218 | 0.321 | 1.115 | 1.175 | 1.264 | 1.190 | 1.244 | 1.313 |
| 5 | 0.130 | 0.272 | 0.495 | 0.116 | 0.215 | 0.333 | 1.098 | 1.156 | 1.231 | 1.219 | 1.279 | 1.360 |
| 8 | 0.152 | 0.278 | 0.443 | 0.132 | 0.218 | 0.308 | 1.084 | 1.157 | 1.242 | 1.318 | 1.373 | 1.434 |
| 13 | 0.126 | 0.279 | 0.513 | 0.119 | 0.224 | 0.360 | 1.098 | 1.161 | 1.257 | 1.218 | 1.290 | 1.382 |
| 31 | 0.159 | 0.290 | 0.516 | 0.150 | 0.241 | 0.356 | 1.110 | 1.166 | 1.243 | 1.163 | 1.216 | 1.305 |
| 11 | 0.138 | 0.313 | 0.612 | 0.139 | 0.251 | 0.388 | 1.086 | 1.130 | 1.194 | 1.189 | 1.260 | 1.311 |
| 12 | 0.136 | 0.331 | 0.576 | 0.126 | 0.251 | 0.370 | 1.096 | 1.147 | 1.213 | 1.208 | 1.292 | 1.355 |
| 28 | 0.144 | 0.343 | 0.627 | 0.142 | 0.264 | 0.394 | 1.077 | 1.128 | 1.188 | 1.207 | 1.273 | 1.349 |
| 33 | 0.175 | 0.356 | 0.627 | 0.163 | 0.268 | 0.399 | 1.100 | 1.151 | 1.215 | 1.186 | 1.249 | 1.315 |
| 36 | 0.187 | 0.368 | 0.605 | 0.165 | 0.272 | 0.383 | 1.106 | 1.154 | 1.212 | 1.265 | 1.325 | 1.391 |
| 16 | 0.131 | 0.392 | 0.629 | 0.118 | 0.286 | 0.387 | 1.052 | 1.112 | 1.189 | 1.232 | 1.296 | 1.368 |
| 21 | 0.175 | 0 398 | 0.762 | 0.160 | 0.309 | 0.485 | 1.067 | 1.112 | 1.175 | 1.155 | 1.207 | 1.269 |
| 19 | 0.157 | 0.416 | 0.773 | 0.162 | 0.299 | 0.452 | 1.082 | 1.140 | 1.229 | 1.183 | 1.244 | 1.327 |
| 38 | 0.202 | 0.417 | 0.992 | 0.214 | 0.348 | 0.569 | 1.066 | 1.130 | 1.207 | 1.140 | 1.219 | 1.297 |
| 20 | 0.192 | 0.462 | 0.890 | 0.174 | 0.325 | 0.488 | 1.062 | 1.107 | 1.173 | 1.167 | 1.226 | 1.311 |
| 17 | 0.150 | 0.475 | 0.842 | 0.142 | 0.342 | 0.462 | 1.057 | 1.092 | 1.135 | 1.140 | 1.184 | 1.258 |
| 22 | 0.194 | 0.494 | 1.051 | 0.181 | 0.350 | 0.562 | 1.070 | 1.120 | 1.180 | 1.160 | 1.250 | 1.319 |
| 18 | 0.321 | 0.686 | 1.188 | 0.245 | 0.408 | 0.548 | 1.056 | 1.092 | 1.137 | 1.169 | 1.215 | 1.285 |
| **Mean** | **0.102** | **0.271** | **0.514** | **0.111** | **0.225** | **0.355** | **1.094** | **1.153** | **1.226** | **1.214** | **1.275** | **1.344** |
| $\mathbf{Q_1}$ | **0.103** | **0.189** | **0.342** | **0.099** | **0.165** | **0.257** | **1.071** | **1.130** | **1.196** | **1.174** | **1.231** | **1.311** |
| $\mathbf{Q_2}$ | **0.128** | **0.269** | **0.444** | **0.117** | **0.218** | **0.310** | **1.095** | **1.153** | **1.230** | **1.219** | **1.276** | **1.347** |
| $\mathbf{Q_3}$ | **0.151** | **0.352** | **0.623** | **0.142** | **0.271** | **0.393** | **1.110** | **1.175** | **1.255** | **1.265** | **1.328** | **1.388** |

**Table 3**
Standard labor economics approach: Industry analysis:
Estimated industry-specific wage-profits elasticity $\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$ and extent of rent sharing $\widehat{\phi}_I$

| | **GMM SYS** $(t-2)(t-3)$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | DEP. VAR.: $\ln\left(w_{j(i)t}\right)$ | | | DEP. VAR.: $\ln\left(w_{it}\right)$ | | | DEP. VAR.: $\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$ | | |
| Industry $I$ | $\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$ | $\widehat{\gamma}_I$ | $\widehat{\phi}_I$ | $\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$ | $\widehat{\gamma}_I$ | $\widehat{\phi}_I$ | $\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$ | $\widehat{\gamma}_I$ | $\widehat{\phi}_I$ |
| 14 | 0.013 (0.007) | 0.026 | 0.025 | 0.102 (0.025) | 0.204 | 0.170 | 0.079 (0.048) | 0.159 | 0.137 |
| 17 | 0.014 (0.026) | 0.035 | 0.034 | -0.029 (0.022) | -0.076 | -0.082 | -0.001 (0.042) | -0.002 | -0.002 |
| 22 | 0.021 (0.014) | 0.054 | 0.051 | 0.003 (0.022) | 0.007 | 0.007 | -0.106 (0.047) | -0.266 | -0.362 |
| 2 | 0.062 (0.023) | 0.059 | 0.056 | 0.086 (0.025) | 0.083 | 0.077 | 0.128 (0.052) | 0.124 | 0.110 |
| 34 | 0.061 (0.015) | 0.078 | 0.072 | 0.063 (0.026) | 0.081 | 0.074 | 0.065 (0.038) | 0.084 | 0.077 |
| 21 | 0.036 (0.022) | 0.091 | 0.084 | 0.000 (0.028) | 0.001 | 0.001 | 0.027 (0.039) | 0.069 | 0.065 |
| 1 | 0.065 (0.021) | 0.095 | 0.086 | 0.087 (0.020) | 0.127 | 0.112 | 0.086 (0.038) | 0.125 | 0.111 |
| 9 | 0.082 (0.022) | 0.097 | 0.088 | 0.084 (0.046) | 0.099 | 0.090 | 0.087 (0.047) | 0.103 | 0.094 |
| 13 | 0.055 (0.033) | 0.102 | 0.093 | 0.022 (0.031) | 0.040 | 0.039 | 0.097 (0.060) | 0.179 | 0.152 |
| 10 | 0.075 (0.021) | 0.110 | 0.099 | 0.097 (0.050) | 0.141 | 0.124 | 0.087 (0.061) | 0.127 | 0.113 |
| 24 | 0.094 (0.038) | 0.112 | 0.100 | 0.106 (0.035) | 0.160 | 0.138 | 0.088 (0.059) | 0.105 | 0.095 |
| 3 | 0.144 (0.018) | 0.116 | 0.104 | 0.040 (0.045) | 0.032 | 0.031 | 0.189 (0.065) | 0.152 | 0.132 |
| 16 | 0.046 (0.010) | 0.118 | 0.105 | 0.034 (0.028) | 0.088 | 0.081 | 0.080 (0.057) | 0.205 | 0.170 |
| 12 | 0.063 (0.022) | 0.137 | 0.121 | 0.056 (0.024) | 0.121 | 0.108 | -0.014 (0.058) | -0.031 | -0.032 |
| 29 | 0.090 (0.038) | 0.142 | 0.124 | 0.144 (0.029) | 0.228 | 0.186 | 0.087 (0.053) | 0.138 | 0.122 |
| 15 | 0.097 (0.015) | 0.146 | 0.127 | 0.048 (0.030) | 0.072 | 0.068 | 0.059 (0.045) | 0.089 | 0.082 |
| 4 | 0.211 (0.044) | 0.150 | 0.130 | 0.011 (0.027) | 0.008 | 0.008 | -0.024 (0.048) | -0.017 | -0.017 |
| 19 | 0.071 (0.016) | 0.159 | 0.137 | 0.035 (0.027) | 0.077 | 0.072 | 0.065 (0.034) | 0.145 | 0.127 |
| 30 | 0.154 (0.021) | 0.179 | 0.152 | 0.126 (0.023) | 0.147 | 0.128 | 0.157 (0.041) | 0.183 | 0.155 |
| 28 | 0.078 (0.019) | 0.186 | 0.157 | 0.093 (0.021) | 0.222 | 0.181 | 0.023 (0.044) | 0.055 | 0.052 |
| 20 | 0.074 (0.024) | 0.200 | 0.166 | 0.044 (0.020) | 0.117 | 0.105 | -0.007 (0.045) | -0.020 | -0.020 |
| 23 | 0.147 (0.009) | 0.214 | 0.177 | 0.015 (0.019) | 0.022 | 0.022 | 0.053 (0.030) | 0.078 | 0.072 |
| 11 | 0.092 (0.025) | 0.220 | 0.180 | 0.062 (0.023) | 0.149 | 0.130 | 0.087 (0.042) | 0.209 | 0.173 |
| 8 | 0.115 (0.023) | 0.244 | 0.196 | 0.035 (0.026) | 0.074 | 0.069 | 0.048 (0.051) | 0.102 | 0.092 |
| 27 | 0.117 (0.025) | 0.253 | 0.202 | 0.081 (0.023) | 0.176 | 0.149 | 0.034 (0.046) | 0.073 | 0.068 |
| 6 | 0.095 (0.018) | 0.254 | 0.202 | 0.134 (0.023) | 0.357 | 0.263 | 0.107 (0.025) | 0.284 | 0.221 |
| 37 | 0.144 (0.023) | 0.259 | 0.206 | 0.073 (0.025) | 0.131 | 0.116 | 0.081 (0.047) | 0.145 | 0.127 |
| 33 | 0.135 (0.025) | 0.259 | 0.206 | 0.033 (0.022) | 0.064 | 0.060 | 0.077 (0.042) | 0.147 | 0.128 |
| 32 | 0.188 (0.027) | 0.274 | 0.215 | 0.089 (0.039) | 0.130 | 0.115 | 0.129 (0.055) | 0.187 | 0.158 |
| 35 | 0.111 (0.024) | 0.282 | 0.220 | 0.065 (0.032) | 0.166 | 0.142 | 0.026 (0.048) | 0.067 | 0.063 |
| 28 | 0.184 (0.018) | 0.293 | 0.226 | 0.092 (0.023) | 0.147 | 0.128 | 0.047 (0.039) | 0.075 | 0.070 |
| 38 | 0.139 (0.012) | 0.293 | 0.227 | 0.052 (0.020) | 0.110 | 0.099 | 0.085 (0.034) | 0.179 | 0.152 |
| 36 | 0.115 (0.031) | 0.294 | 0.227 | -0.037 (0.023) | -0.095 | -0.105 | 0.079 (0.040) | 0.202 | 0.168 |
| 31 | 0.184 (0.009) | 0.299 | 0.230 | 0.126 (0.025) | 0.204 | 0.170 | 0.141 (0.040) | 0.230 | 0.187 |
| 26 | 0.221 (0.018) | 0.314 | 0.239 | 0.073 (0.017) | 0.104 | 0.094 | 0.138 (0.029) | 0.197 | 0.164 |
| 5 | 0.209 (0.016) | 0.357 | 0.263 | 0.135 (0.018) | 0.231 | 0.188 | 0.099 (0.030) | 0.169 | 0.145 |
| 7 | 0.193 (0.0222) | 0.374 | 0.272 | 0.102 (0.026) | 0.198 | 0.165 | 0.109 (0.052) | 0.211 | 0.174 |
| 18 | 0.173 (0.013) | 0.641 | 0.391 | -0.022 (0.018) | -0.082 | -0.090 | -0.035 (0.043) | -0.128 | -0.147 |
| **Mean** | **0.110 (0.021)** | **0.198** | **0.158** | **0.102 (0.026)** | **0.107** | **0.090** | **0.067 (0.045)** | **0.109** | **0.089** |
| $\mathbf{Q}_1$ | **0.066 (0.016)** | **0.110** | **0.099** | **0.103 (0.025)** | **0.066** | **0.062** | **0.037 (0.039)** | **0.073** | **0.068** |
| $\mathbf{Q}_2$ | **0.096 (0.021)** | **0.182** | **0.154** | **0.102 (0.022)** | **0.113** | **0.102** | **0.080 (0.045)** | **0.126** | **0.112** |
| $\mathbf{Q}_3$ | **0.147 (0.025)** | **0.270** | **0.213** | **0.103 (0.028)** | **0.158** | **0.136** | **0.085 (0.051)** | **0.179** | **0.152** |

Time dummies are included but not reported. First-step robust standard errors in parentheses.

Instruments used: the lagged levels of $q$, $n$, $m$ and $k$ dated $(t-2)$ and $(t-3)$ in the first-differenced equations and the lagged first-differences of $q$, $n$, $m$ and $k$ dated $(t-1)$ in the levels equations.

**Table 4**
Productivity approach: Industry analysis:
Estimated industry-specific extent of rent sharing $\widehat{\phi}_I$ and mark-up $\widehat{\mu}_I$ (*only*)

| | **GMM SYS** $(t-2)(t-3)$ | | | |
|---|---|---|---|---|
| Industry $I$ | $\widehat{\gamma}_I$ | $\widehat{\phi}_I$ | $\widehat{\mu}_I$ *only* | $\widehat{\mu}_I$ |
| 1 | -1.041 (0.354) | 25.55 (213.5) | 0.971 (0.067) | 0.874 (0.076) |
| 3 | -0.688 (0.210) | -2.210 (2.162) | 1.260 (0.062) | 1.079 (0.071) |
| 32 | -0.411 (0.310) | -0.697 (0.894) | 1.129 (0.041) | 1.018 (0.078) |
| 10 | -0.277 (0.302) | -0.384 (0.578) | 1.245 (0.039) | 1.166 (0.086) |
| 19 | -0.269 (0.477) | -0.368 (0.892) | 1.238 (0.036) | 1.173 (0.104) |
| 4 | -0.254 (0.227) | -0.340 (0.407) | 1.274 (0.046) | 1.203 (0.072) |
| 17 | -0.254 (0.537) | -0.340 (0.964) | 1.094 (0.031) | 1.057 (0.066) |
| 9 | -0.234 (0.256) | -0.306 (0.436) | 1.329 (0.049) | 1.253 (0.073) |
| 25 | -0.221 (0.355) | -0.283 (0.585) | 1.076 (0.063) | 1.012 (0.110) |
| 14 | -0.212 (0.348) | -0.268 (0.560) | 1.144 (0.032) | 1.086 (0.079) |
| 20 | -0.062 (0.410) | -0.066 (0.466) | 1.230 (0.035) | 1.215 (0.095) |
| 21 | -0.060 (0.452) | -0.064 (0.512) | 1.199 (0.048) | 1.187 (0.095) |
| 29 | -0.034 (0.160) | -0.035 (0.172) | 1.239 (0.029) | 1.229 (0.056) |
| 34 | 0.007 (0.207) | 0.007 (0.204) | 1.261 (0.051) | 1.257 (0.082) |
| 2 | 0.011 (0.242) | 0.010 (0.273) | 1.125 (0.049) | 1.122 (0.059) |
| 38 | 0.030 (0.269) | 0.029 (0.254) | 1.088 (0.033) | 1.090 (0.067) |
| 15 | 0.096 (0.245) | 0.088 (0.204) | 1.242 (0.037) | 1.263 (0.067) |
| 30 | 0.179 (0.102) | 0.151 (0.073) | 1.260 (0.033) | 1.364 (0.067) |
| 23 | 0.212 (0.373) | 0.175 (0.254) | 1.204 (0.050) | 1.244 (0.106) |
| 13 | 0.240 (0.216) | 0.193 (0.140) | 1.263 (0.063) | 1.328 (0.106) |
| 33 | 0.247 (0.243) | 0.198 (0157) | 1.147 (0.024) | 1.202 (0.054) |
| 28 | 0.248 (0.307) | 0.199 (0.197) | 1.226 (0.035) | 1.261 (0.081) |
| 31 | 0.279 (0.218) | 0.218 (0.133) | 1.131 (0.036) | 1.222 (0.083) |
| 24 | 0.328 (0.158) | 0.247 (0.089) | 1.159 (0.033) | 1.263 (0.065) |
| 11 | 0.397 (0.287) | 0.284 (0.147) | 1.264 (0.037) | 1.334 (0.075) |
| 7 | 0.416 (0.291) | 0.294 (0.145) | 1.181 (0.058) | 1.258 (0.099) |
| 26 | 0.456 (0.145) | 0.313 (0.068) | 1.232 (0.050) | 1.420 (0.075) |
| 36 | 0.464 (0.152) | 0.317 (0.071) | 1.134 (0.018) | 1.252 (0.043) |
| 35 | 0.487 (0.159) | 0.327 (0.072) | 1.227 (0.031) | 1.365 (0.052) |
| 5 | 0.504 (0.097) | 0.335 (0.043) | 1.126 (0.033) | 1.269 (0.048) |
| 37 | 0.621 (0.140) | 0.383 (0.053) | 1.250 (0.029) | 1.525 (0.076) |
| 12 | 0.637 (0.175) | 0.389 (0.065) | 1.275 (0.035) | 1.486 (0.068) |
| 16 | 0.680 (0.216) | 0.405 (0.076) | 1.210 (0.042) | 1.362 (0.065) |
| 27 | 0.696 (0.272) | 0.410 (0.094) | 1.166 (0.027) | 1.329 (0.080) |
| 18 | 0.763 (0.291) | 0.433 (0.094) | 1.106 (0.020) | 1.220 (0.048) |
| 8 | 0.766 (0.132) | 0.434 (0.042) | 1.241 (0.020) | 1.461 (0.050) |
| 5 | 0.880 (0.170) | 0.468 (0.048) | 1.183 (0.039) | 1.318 (0.049) |
| 22 | 1.025 (0.291) | 0.506 (0.071) | 1.089 (0.032) | 1.271 (0.068) |
| **Mean** | **0.175 (0.258)** | **0.711 (5.926)** | **1.190 (0.039)** | **1.238 (0.074)** |
| $\mathbf{Q}_1$ | **-0.174 (0.172)** | **-0.066 (0.074)** | **1.132 (0.032)** | **1.176 (0.065)** |
| $\mathbf{Q}_2$ | **0.226 (0.244)** | **0.196 (0.164)** | **1.207 (0.036)** | **1.252 (0.073)** |
| $\mathbf{Q}_3$ | **0.481 (0.306)** | **0.333 (0.459)** | **1.244 (0.049)** | **1.326 (0.082)** |

Time dummies are included but not reported. First-step robust standard errors in parentheses.

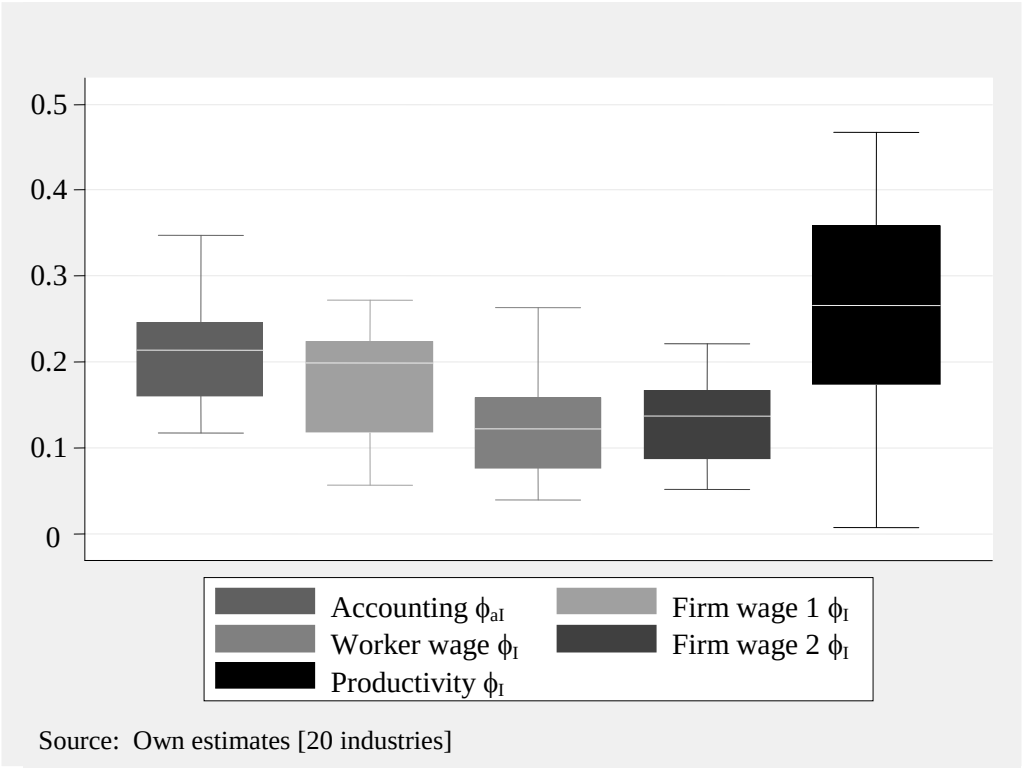
Instruments used: the lagged levels of $q$, $n$, $m$ and $k$ dated $(t-2)$ and $(t-3)$ in the first-differenced equations and the lagged first-differences of $q$, $n$, $m$ and $k$ dated $(t-1)$ in the levels equations.

**Table 5**
Comparison of the distribution of the extent of rent sharing $\phi_I$ across the three approaches

| | **GMM SYS** $(t-2)(t-3)$ | | | | |
|---|---|---|---|---|---|
| # Ind. | Estimate | Mean | $Q_1$ | $Q_2$ | $Q_3$ |
| 38 | Accounting $\widehat{\phi_{a_I}}$ | 0.225 | 0.162 | 0.218 | 0.272 |
| 38 | Worker wage $\widehat{\phi_I}$ | 0.158 | 0.099 | 0.154 | 0.215 |
| 38 | Firm wage 1 $\widehat{\phi_I}$ | 0.090 | 0.060 | 0.102 | 0.138 |
| 38 | Firm wage 2 $\widehat{\phi_I}$ | 0.089 | 0.068 | 0.112 | 0.152 |
| 38 | Productivity $\widehat{\phi_I}$ | 0.710 | -0.066 | 0.196 | 0.335 |
| | | | | | |
| 20 | Accounting $\widehat{\phi_{a_I}}$ | 0.209 | 0.160 | 0.213 | 0.246 |
| 20 | Worker wage $\widehat{\phi_I}$ | 0.175 | 0.116 | 0.199 | 0.223 |
| 20 | Firm wage 1 $\widehat{\phi_I}$ | 0.221 | 0.076 | 0.122 | 0.157 |
| 20 | Firm wage 2 $\widehat{\phi_I}$ | 0.129 | 0.087 | 0.136 | 0.167 |
| 20 | Productivity $\widehat{\phi_I}$ | 0.249 | 0.172 | 0.265 | 0.359 |
| | **OLS LEV** | | | | |
| 38 | Accounting $\widehat{\phi_{a_I}}$ | 0.225 | 0.162 | 0.218 | 0.272 |
| 38 | Worker wage $\widehat{\phi_I}$ | 0.127 | 0.089 | 0.121 | 0.162 |
| 38 | Firm wage 1 $\widehat{\phi_I}$ | 0.140 | 0.113 | 0.137 | 0.166 |
| 38 | Firm wage 2 $\widehat{\phi_I}$ | 0.106 | 0.072 | 0.112 | 0.143 |
| 38 | Productivity $\widehat{\phi_I}$ | 0.064 | -0.115 | 0.091 | 0.200 |
| | | | | | |
| 20 | Accounting $\widehat{\phi_{a_I}}$ | 0.237 | 0.190 | 0.219 | 0.260 |
| 20 | Worker wage $\widehat{\phi_I}$ | 0.151 | 0.118 | 0.142 | 0.189 |
| 20 | Firm wage 1 $\widehat{\phi_I}$ | 0.161 | 0.129 | 0.156 | 0.178 |
| 20 | Firm wage 2 $\widehat{\phi_I}$ | 0.129 | 0.102 | 0.126 | 0.154 |
| 20 | Productivity $\widehat{\phi_I}$ | 0.180 | 0.108 | 0.151 | 0.257 |

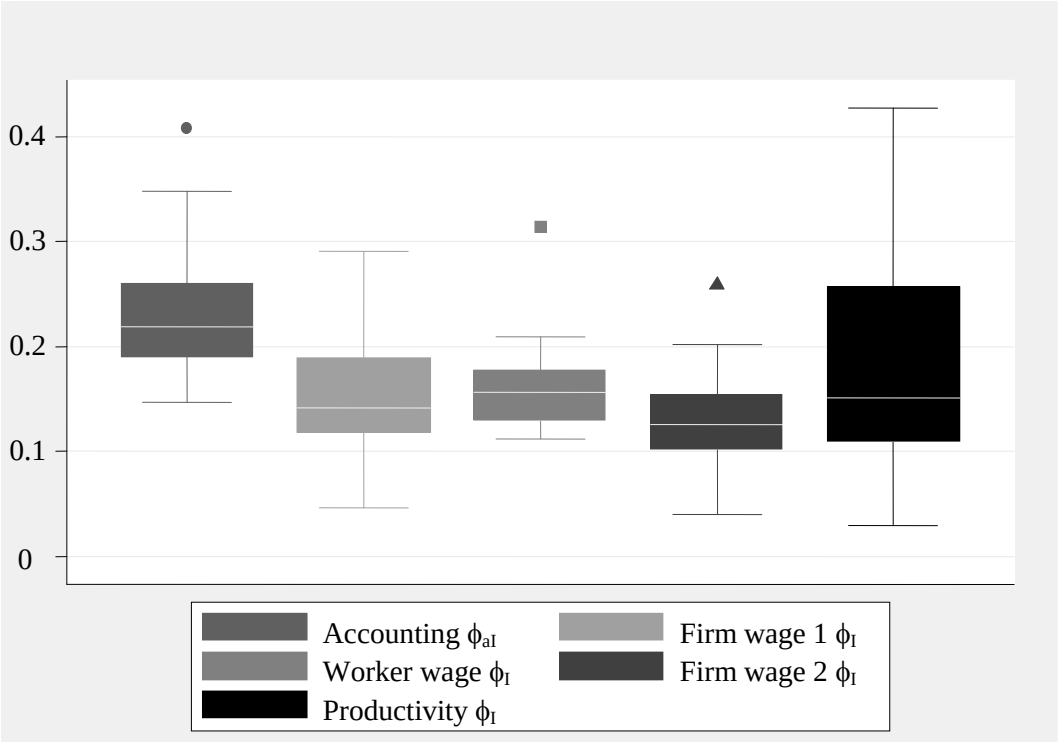
"Worker" refers to estimating the wage equation of the standard labor economics approach using $\ln(w_{j(i)t})$ as the dependent variable, "Firm wage 1" refers to the case where $\ln(w_{it})$ is the dependent variable and "Firm wage 2" refers to the case where $\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in i} j}\right)$ is the dependent variable.

**Figure 1a**: System GMM estimates of rent sharing across the three approaches




Source: Own estimates [20 industries]

**Figure 1b**: Levels OLS estimates of rent sharing across the three approaches




Source: Own estimates [20 industries]

## Appendix: Statistical Annex

**Table A.1**
Industry repartition

| Industry $I$ | Code | Name | # Firms | # Workers | # Obs. Firm dataset | # Obs. Matched worker-firm dataset |
|---|---|---|---|---|---|---|
| 1 | B01 | Meat preparations | 276 | 2006 | 3913 | 13514 |
| 2 | B02 | Milk products | 109 | 1716 | 1603 | 13269 |
| 3 | B03 | Beverages | 96 | 1297 | 1390 | 10118 |
| 4 | B04 | Food production for animals | 105 | 721 | 1516 | 5479 |
| 5 | B05-B06 | Other food products | 427 | 3492 | 6153 | 26601 |
| 6 | C11 | Clothing and skin goods | 388 | 2407 | 5333 | 17234 |
| 7 | C12 | Leather goods and footwear | 186 | 1328 | 2680 | 10471 |
| 8 | C20 | Publishing, (re)printing | 618 | 3427 | 8834 | 25286 |
| 9 | C31 | Pharmaceutical products | 125 | 2738 | 1779 | 20113 |
| 10 | C32 | Soap, perfume and maintenance products | 102 | 1699 | 1518 | 13583 |
| 11 | C41 | Furniture | 286 | 2001 | 4189 | 16353 |
| 12 | C42, C44-C46 | Accommodation equipment | 163 | 1892 | 2370 | 15976 |
| 13 | C43 | Sport articles, games and other products | 138 | 913 | 1942 | 6938 |
| 14 | D01 | Motor vehicles | 117 | 9342 | 1725 | 77448 |
| 15 | D02 | Transport equipment | 122 | 2788 | 1848 | 21494 |
| 16 | E11-E14 | Ship building, aircraft and railway construction | 100 | 3793 | 1492 | 26316 |
| 17 | E21 | Metal products for construction | 136 | 669 | 1956 | 4679 |
| 18 | E22 | Ferruginous and steam boilers | 247 | 1610 | 3609 | 11364 |
| 19 | E23 | Mechanical equipment | 159 | 2027 | 2412 | 16898 |
| 20 | E24 | Machinery for general usage | 234 | 1942 | 3367 | 15490 |
| 21 | E25-E26 | Agriculture machinery | 133 | 752 | 1910 | 5696 |
| 22 | E27-E28 | Other machinery for specific usage | 237 | 1598 | 3425 | 12955 |
| 23 | E31-E35 | Electric and electronic machinery | 160 | 2381 | 2289 | 15450 |
| 24 | F11-F12 | Mineral products | 159 | 641 | 2332 | 4763 |
| 25 | F13 | Glass products | 93 | 1916 | 1382 | 17855 |
| 26 | F14 | Earthenware products and construction material | 334 | 2824 | 4878 | 21471 |
| 27 | F21 | Textile art | 235 | 1940 | 3322 | 13583 |
| 28 | F22-F23 | Textile products and clothing | 277 | 2227 | 3943 | 16788 |
| 29 | F31 | Wooden products | 360 | 1317 | 5267 | 10579 |
| 30 | F32-F33 | Paper and printing products | 288 | 2692 | 4247 | 22810 |
| 31 | F41-F42 | Mineral and organic chemical products | 180 | 5338 | 2718 | 52625 |
| 32 | F43-F45 | Parachemical and rubber products | 149 | 1780 | 2216 | 13824 |
| 33 | F46 | Transformation of plastic products | 521 | 3233 | 7710 | 25874 |
| 34 | F51-F52 | Steel products, non-ferrous metals | 116 | 2746 | 1704 | 22452 |
| 35 | F53 | Ironware | 126 | 1120 | 1887 | 9277 |
| 36 | F54 | ustrial service to metal products | 812 | 2925 | 11880 | 22946 |
| 37 | F55-F56 | Metal products, recuperation | 518 | 3277 | 7563 | 25843 |
| 38 | F61-F62 | Electrical goods and components | 289 | 4838 | 4250 | 36278 |