Micro-evidence on rent sharing from different perspectives*

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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 across-industry heterogeneity 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 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.

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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,

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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 compare consistently across-industry heterogeneity 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 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 rent-sharing parameter estimates across the three approaches but the rent-sharing estimates lie within a comparable range across the three approaches. We could 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 illustrates the across-industry heterogeneity in rent-sharing parameter estimates within each approach. Section 4 consistently compares across-industry heterogeneity in rent-sharing parameter estimates across the three approaches. Section 5 concludes.

[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.

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 the 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, the firm's utility is assumed to equate its short-run profit: $\pi(w_{it}, N_{it}, M_{it}) = R(N_{it}, M_{it}) - w_{it}N_{it} - j_{it}M_{it}$. $R_{it} = P_{it}Q_{it}$ 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. Θ_{it} is an index of technical change or "true" total factor productivity.

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

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

[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).

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 Andrews, 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 $\overline{N}_{it} = 0$ 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):

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

Under the RTM bargaining setting, the outcome of the bargaining is the asymmetric Generalized Nash solution to: $\max\limits_{w_{it}} \{(w_{it} - \overline{w}_{it})N_{it}\}^{\phi_{it}} \{R_{it} - w_{it}N_{it} - j_{it}M_{it}\}^{1-\phi_{it}}$, 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: $w_{it} = \frac{\phi_{it}}{1-\phi_{it}} \left(\frac{R_{it} - w_{it}N_{it} - j_{it}M_{it}}{(N_P)_{it}} \right) \left(\left(\frac{N_O}{N_P}\right)_{it} - \overline{\left(\frac{N_O}{N_P}\right)}_{it} \right)$.

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 $\left(\phi_{a_{it}}\right)$ from the firm accounting information which is compatible with the distinct bargaining settings discussed above:

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

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

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 (α_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:

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

where $w_{j(i)t}$ is the wage of individual j working in firm i at date t, π_{it} and N_{it} are respectively the profits and employment of the employing firm i at time t, $\varepsilon_{\frac{w}{\frac{\pi}{N}}}$ is the wage-profits elasticity, $\alpha_{j(i)}$ is the individual effect, α_i the firm effect, α_t the year effect and ϵ_{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 a RTM, a EB or a 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, 2002; Dobbelaere, 2004; Dobbelaere and Mairesse, 2008; Boulhol et al., 2010).

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

$$q_{it} = (\varepsilon_N^Q)_{it} n_{it} + (\varepsilon_M^Q)_{it} m_{it} + (\varepsilon_K^Q)_{it} k_{it} + \theta_{it} \tag{9}$$

where $(\varepsilon_J^Q)_{it}$ $(J = N,\, M,\, K)$ 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 a 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:

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

$\mu_{it} = \frac{P_{it}}{(C_Q)_{it}}$ 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:

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

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: $(\varepsilon_K^Q)_{it} = 1 - \mu_{it}(\alpha_M)_{it} - \mu_{it}(\alpha_N)_{it} - \mu_{it}\gamma_{it}\,[(\alpha_N)_{it} + (\alpha_M)_{it} - 1]$.[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 ϕ_{it} and (ii) the price-cost mark-up μ_{it}:

[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.

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

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

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

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 $(w_{j(i)t})$ 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 $(w_{j(i)t})$.

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 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 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 across-industry heterogeneity 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.

3.2.1 Accounting approach

For each industry I, 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

[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 "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).

reservation wage identify the extent of rent sharing. Table 2 presents for each industry the distribution of the firm-level extent of rent sharing $\left(\phi_{a_{it}}\right)$, which gives an indication about the within-industry heterogeneity of ϕ.

Previous studies (Dobbelaere, 2004; Dobbelaere and Mairesse, 2008; Boulhol et al., 2010) provide evidence of a positive correlation between the firm-level extent of rent sharing and the firm-level 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 $\phi_{a_{i,t}}$, Table 2 therefore presents also the distribution of the firm-level price-cost mark-up assuming that firms consider input prices as given prior to deciding their level of inputs ($\mu \; only_{a_{i,t}}$) and the price-cost mark-up taking into account that workers are able to extract part of the product rents $\left(\mu_{a_{i,t}}\right)$. 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 $\gamma_{a_{i,t}}$. Focusing on the median distribution across industries, the extent of rent sharing $\left(\phi_{a_{i,t}}\right)$ 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 $\left(\mu_{a_{i,t}}\right)$ 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 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

[6] As a robustness check, we experimented with the 1^{th} 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 had an impact on our wage-profits elasticity estimates.

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

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 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-level wage-profits elasticity $\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$, the second column derives the corresponding industry-level relative extent of rent sharing $(\widehat{\gamma}_I)$ by multiplying the estimated industry-level 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-level 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 0.06 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, Estavao 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- 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. Brock and Dobbelaere (2006) and Rycx and Tojerow (2004) report an elasticity estimate of 0.03 and 0.06 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, $(\varepsilon^{\pi}_{w})_I$ is estimated to be positive and significant at the 10% level for 24 (22) out of the 38 industries. The distribution of $\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$ and $\left(\widehat{\phi}_I\right)$ across

[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 $(t-4)$.

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 across-industry heterogeneity in the extent of rent sharing derived from the three approaches, we estimate the *average* rent-sharing parameter for each industry I. 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 ζ_{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 the shares of labor and materials in revenue. Variation in input shares is idiosyncratic and possibly related to variation in hours of work, machinery, capacity utilization (variation in the business cycle). When estimating the extent of rent sharing (and the price-cost mark-up) at the industry level, we want to abstract from this possible source of contamination. Consistent with the constancy of $\widehat{\phi}_I$ and $\hat{\mu}_I$, we assume constant 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: $\widehat{\gamma}_I = \frac{(\widehat{\varepsilon}_N^Q)_I - \left[(\widehat{\varepsilon}_M^Q)_I \frac{(\alpha_N)_I}{(\alpha_M)_I}\right]}{\frac{(\widehat{\varepsilon}_M^Q)_I}{(\alpha_M)_I}\left[(\alpha_N)_I + (\alpha_M)_I - 1\right]}$, $\widehat{\phi}_I = \frac{\widehat{\gamma}_I}{1+\widehat{\gamma}_I}$ and $\hat{\mu}_I = \frac{(\widehat{\varepsilon}_M^Q)_I}{(\alpha_M)_I}$.[10] The standard errors of $\widehat{\gamma}_I$, $\widehat{\phi}_I$ and $\hat{\mu}_I$ are computed using the Delta Method (Woolridge, 2002).

Table 4 summarizes the system GMM results of the industry analysis using the same instruments as in Section 3.2.2.[11] 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 $(\hat{\mu}_I)$ 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)

[10] When interpreting the (heterogeneity 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] 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).

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 0.20 for the bottom quartile of industries and higher than 0.54 for the top quartile. The median value is estimated at 0.36.

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. 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 ϕ_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 across-industry heterogeneity 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. For 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 in 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 ϕ_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 0.18 (productivity approach) and 0.080 (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). 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 remaining differences in dispersion could be due to differences in modeling assumptions and/or data requirements. The dispersion in $\widehat{\phi}_I$ 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 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 could interpret the finding that the rent-sharing parameter estimates are 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, we find that there exist 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 could interpret the latter result as lending empirical support to efficient bargaining as the nature of the bargaining process in France over the considered period.

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Table 1
Summary statistics

Variables	1984-2001					
	Mean	Sd.	Q_1	Q_2	Q_3	N
Real firm output growth rate Δq_{it}	0.026	0.152	-0.055	0.024	0.108	125528
Labor growth rate Δn_{it}	0.007	0.123	-0.042	0.000	0.055	125528
Capital growth rate Δk_{it}	0.001	0.152	-0.072	-0.017	0.065	125528
Materials growth rate Δm_{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-level extent of rent sharing $\phi_{a_{i,t}}$ and price-cost mark-up $\mu_{a_{i,t}}$ (*only*) within each industry

	$\gamma_{a_{i,t}}$			$\phi_{a_{i,t}}$			$\mu\ only_{a_{i,t}}$			$\mu_{a_{i,t}}$		
Industry	Q_1	Q_2	Q_3	Q_1	Q_2	Q_3	Q_1	Q_2	Q_3	Q_1	Q_2	Q_3
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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-level 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	$\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$	$\widehat{\gamma}_I$	$\widehat{\phi}_I$	$\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$	$\widehat{\gamma}_I$	$\widehat{\phi}_I$	$\left(\widehat{\varepsilon}^{w}_{\frac{\pi}{N}}\right)_I$	$\widehat{\gamma}_I$	$\widehat{\phi}_I$
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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
Ind 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**
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**
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**
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-level extent of rent sharing $\hat{\phi}_I$ and mark-up $\hat{\mu}_I$ (*only*)

	GMM SYS $(t-2)(t-3)$			
Industry	$\widehat{\gamma}_I$	$\hat{\phi}_I$	$\hat{\mu}_I$ *only*	$\hat{\mu}_I$
Ind 1	-1.041 (0.354)	25.55 (213.5)	0.971 (0.067)	0.874 (0.076)
Ind 3	-0.688 (0.210)	-2.210 (2.162)	1.260 (0.062)	1.079 (0.071)
Ind 32	-0.411 (0.310)	-0.697 (0.894)	1.129 (0.041)	1.018 (0.078)
Ind 10	-0.277 (0.302)	-0.384 (0.578)	1.245 (0.039)	1.166 (0.086)
Ind 19	-0.269 (0.477)	-0.368 (0.892)	1.238 (0.036)	1.173 (0.104)
Ind 4	-0.254 (0.227)	-0.340 (0.407)	1.274 (0.046)	1.203 (0.072)
Ind 17	-0.254 (0.537)	-0.340 (0.964)	1.094 (0.031)	1.057 (0.066)
Ind 9	-0.234 (0.256)	-0.306 (0.436)	1.329 (0.049)	1.253 (0.073)
Ind 25	-0.221 (0.355)	-0.283 (0.585)	1.076 (0.063)	1.012 (0.110)
Ind 14	-0.212 (0.348)	-0.268 (0.560)	1.144 (0.032)	1.086 (0.079)
Ind 20	-0.062 (0.410)	-0.066 (0.466)	1.230 (0.035)	1.215 (0.095)
Ind 21	-0.060 (0.452)	-0.064 (0.512)	1.199 (0.048)	1.187 (0.095)
Ind 29	-0.034 (0.160)	-0.035 (0.172)	1.239 (0.029)	1.229 (0.056)
Ind 34	0.007 (0.207)	0.007 (0.204)	1.261 (0.051)	1.257 (0.082)
Ind 2	0.011 (0.242)	0.010 (0.273)	1.125 (0.049)	1.122 (0.059)
Ind 38	0.030 (0.269)	0.029 (0.254)	1.088 (0.033)	1.090 (0.067)
Ind 15	0.096 (0.245)	0.088 (0.204)	1.242 (0.037)	1.263 (0.067)
Ind 30	0.179 (0.102)	0.151 (0.073)	1.260 (0.033)	1.364 (0.067)
Ind 23	0.212 (0.373)	0.175 (0.254)	1.204 (0.050)	1.244 (0.106)
Ind 13	0.240 (0.216)	0.193 (0.140)	1.263 (0.063)	1.328 (0.106)
Ind 33	0.247 (0.243)	0.198 (0157)	1.147 (0.024)	1.202 (0.054)
Ind 28	0.248 (0.307)	0.199 (0.197)	1.226 (0.035)	1.261 (0.081)
Ind 31	0.279 (0.218)	0.218 (0.133)	1.131 (0.036)	1.222 (0.083)
Ind 24	0.328 (0.158)	0.247 (0.089)	1.159 (0.033)	1.263 (0.065)
Ind 11	0.397 (0.287)	0.284 (0.147)	1.264 (0.037)	1.334 (0.075)
Ind 7	0.416 (0.291)	0.294 (0.145)	1.181 (0.058)	1.258 (0.099)
Ind 26	0.456 (0.145)	0.313 (0.068)	1.232 (0.050)	1.420 (0.075)
Ind 36	0.464 (0.152)	0.317 (0.071)	1.134 (0.018)	1.252 (0.043)
Ind 35	0.487 (0.159)	0.327 (0.072)	1.227 (0.031)	1.365 (0.052)
Ind 5	0.504 (0.097)	0.335 (0.043)	1.126 (0.033)	1.269 (0.048)
Ind 37	0.621 (0.140)	0.383 (0.053)	1.250 (0.029)	1.525 (0.076)
Ind 12	0.637 (0.175)	0.389 (0.065)	1.275 (0.035)	1.486 (0.068)
Ind 16	0.680 (0.216)	0.405 (0.076)	1.210 (0.042)	1.362 (0.065)
Ind 27	0.696 (0.272)	0.410 (0.094)	1.166 (0.027)	1.329 (0.080)
Ind 18	0.763 (0.291)	0.433 (0.094)	1.106 (0.020)	1.220 (0.048)
Ind 8	0.766 (0.132)	0.434 (0.042)	1.241 (0.020)	1.461 (0.050)
Ind 5	0.880 (0.170)	0.468 (0.048)	1.183 (0.039)	1.318 (0.049)
Ind 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)**
Q_1	**-0.174 (0.172)**	**-0.066 (0.074)**	**1.132 (0.032)**	**1.176 (0.065)**
Q_2	**0.226 (0.244)**	**0.196 (0.164)**	**1.207 (0.036)**	**1.252 (0.073)**
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.

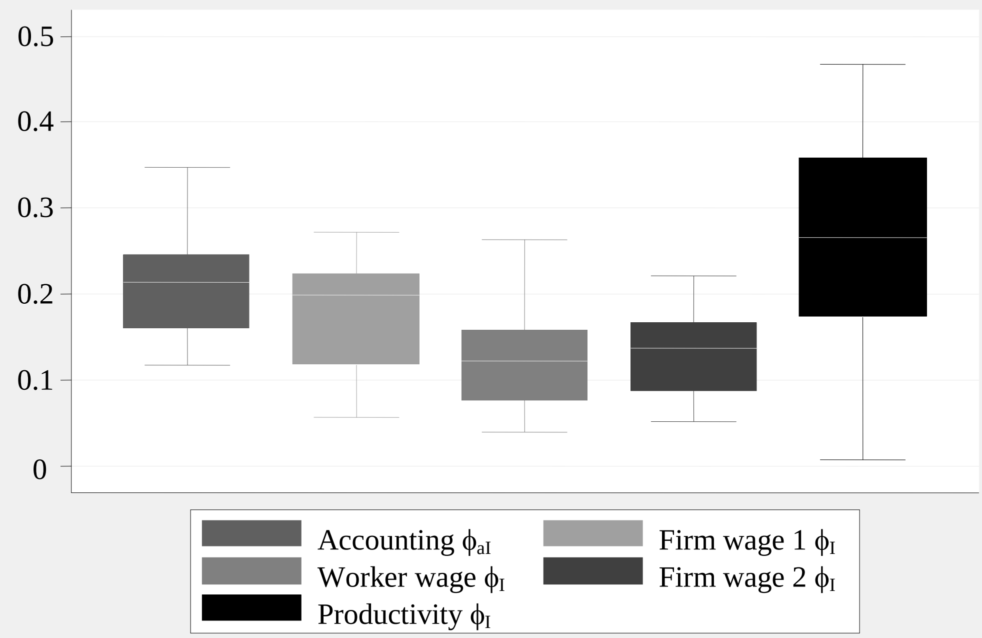
Instruments used: the lagged levels of q, n, m and k dated $(t-2)$ and $(t-3)$ in the first-differenced equations and the lagged first-differences of q, n, m and k dated $(t-1)$ in the levels equations.

Table 5
Comparison of the distribution of the extent of rent sharing ϕ_I across the three approaches

	GMM SYS $(t-2)(t-3)$				
# Ind.	Estimate	Mean	Q_1	Q_2	Q_3
38	Accounting ϕ_{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 ϕ_{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 ϕ_{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 ϕ_{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

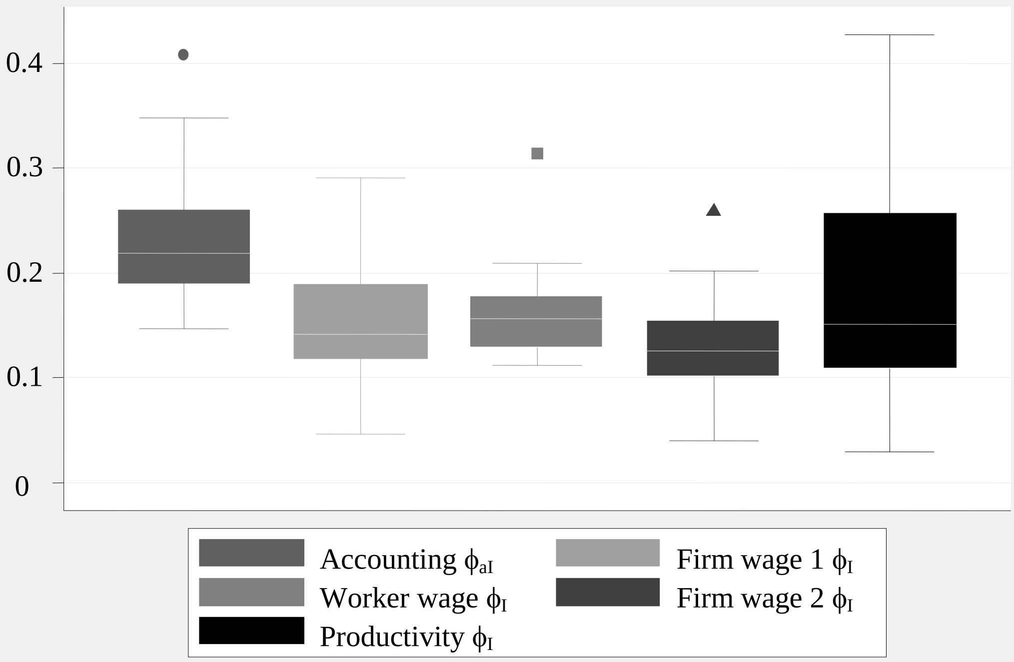
"Worker" refers to estimating the wage equation of the standard labor economics approach using $\ln(w_{j(i)t})$ as the dependent variable, "Firm wage 1" refers to the case where $\ln(w_{it})$ is the dependent variable and "Firm wage 2" refers to the case where $\ln\left(\frac{\sum_{j\in i} w_{j(i)t}}{\sum_{j\in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