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Is There Rent Sharing in Developing Countries?

Matched Panel Evidence from Brazil

by

Pedro S. Martins and Luiz. A. Esteves

Is There Rent Sharing in Developing Countries? Matched-Panel Evidence from Brazil*

Pedro S. Martins†

Queen Mary, University of London & CEG-IST, Lisbon & IZA, Bonn

Luiz A. Esteves‡

Universidade Federal do Paraná & Universitá di Siena

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Abstract

We provide evidence about the determinants of the wage structures of developing countries by examining the case of Brazil. We ask if Brazil's dramatic income and wage differentials can be explained by the division of rents between firms and employees, unlike in competitive markets. Using detailed matched employer-employee panel data, covering a large share of manufacturing from 1997 to 2002, we consider the endogeneity of profits by adopting different measures of profits, different instruments and controls for spell fixed effects. Our results, robust to different tests, indicate no evidence of rent sharing, in contrast with findings for most developed countries.

Keywords: Wage Bargaining; Instrumental Variables; Matched Employer-Employee Data; Developing Countries.

JEL Codes: J31, J41.

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†Corresponding author. Email: p.martins@qmul.ac.uk. Address: School of Business and Management, Queen Mary, University of London, Mile End Road, London E1 4NS, United Kingdom. Phone: +44/0 2078827472. Fax: +44/0 2078823615. Web: http://webspace.qmul.ac.uk/pmartins.

‡Email: esteves@ufpr.br.

1 Introduction

Although 80% of the world's population lives in developing countries, there is considerably less empirical evidence about the labour markets of these countries than about the labour markets of developed countries. Moreover, such lack of evidence may be something particularly important to address, as the high levels of inequality present in developing countries indicate that a considerable share of their populations endure particularly low levels of welfare.

Brazil is an important case in point, as it is a large developing country that exhibits one of the highest levels of income inequality in the world. According to the WorldBank (2005), Brazil's Gini index in 2001 was 59.3, the eighth highest in a list of 123 countries, and the second highest outside of Africa, even if it has been decreasing moderately since 1993 (Ferreira et al. 2006). Moreover, while Brazil's inequality may be influenced by the informality of its labour market (28% of the workforce, when excluding the self-employed, according to World Bank and IPEA, 2002), and also by its disparate levels of human capital, inequality is also extremely high inside the formal sector (Arbache & Negri 2004).

In this paper, we focus on wage inequality in the formal labour market and seek to assess what may be the role of rent sharing. Our motivation for this specific analysis is driven by the evidence that the division of rents between employers and their employees is an important component of the explanation of wage differentials, certainly in developed countries (Abowd & Lemieux 1993, Blanchflower et al. 1996, Van Reenen 1996, Bronars & Famulari 2001, Arai 2003, Martins forthcoming) and maybe also in developing countries (Teal 1996, Revenga 1997, Bigsten et al. 2003). Moreover, rent sharing is also typically related to other sources of inequality, including gender and racial discrimination (Black & Strahan 2001), which may also be relevant in the case of developing countries.

However, employers in developing countries may be relatively immune to wage bargaining pressures exerted by their employees. Amongst other factors, unions are typically not particularly strong outside the developed world; minimum wages tend to be low or not enforced at all; and unemployment benefits do not exist in many countries. Moreover, as suggested before, the size of the informal labour market may imply that firms face flatter labour supply curves, thus weakening the bargaining power of workers in the formal sector. On the other hand, Brazil's relatively stringent employment law may increase the workers' bargaining power, although

possibly at the cost of increased informality.[1] However, the employment law's (unintended) incentives for worker turnover, related to the fact that social insurance individual accounts are remunerated at below-market rates may also make it more difficult for workers to bargain over rents.

Another motivation point in our study is that we are able to draw on particularly detailed data, better than that available for many developed countries, which allow us to tackle some econometric problems that arise when estimating rent sharing. The data result from three different individual- and/or firm-level panels covering the period 1997-2002. In particular, one of the data sets includes several variables for all individual workers of all manufacturing sector firms with more than 30 employees (plus a sample of smaller firms), resulting in an extremely large coverage.

Finally, Brazil's economic and political history over the period we study offers a number of complementary identification strategies. In particular, we use instruments based on several macroeconomic shocks, related to sudden and sharp movements in exchange and interest rates, which are likely to affect different firms differently (namely depending on their export propensities). Moreover, we also proxy rents using 'gross profits' (i.e. profits before subtracting the wage bill), in order to avoid the bias that arises from the fact that firms that share more rents will also have lower net profits, the standard measure of rents used in the literature (Martins forthcoming). Finally, we also account for (time-invariant) worker and firm heterogeneity using spell fixed effects.

Our evidence, robust to different checks, indicates that, once endogeneity and/or heterogeneity are addressed, rent sharing is not an important explanation for wage differentials in Brazil. This is a result that we find surprising given the previously-mentioned findings in the literature, although not so much when taking into account some of the specific characteristics of the Brazilian labour market mentioned before.

The structure of the remaining of the paper is as follows: Section 2 presents the data and some descriptive statistics, Section 3 presents the results under different econometric assumptions and our robustness tests, and Section 4 concludes.

[1] Botero et al. (2004) classify Brazil as the 32nd most rigid employment legislation and the 23rd highest firing costs in their ranking of 85 countries. See also Menezes-Filho et al. (2008) for an analysis of wage differences across firms and workers in the state of São Paulo.

2 Data

The data set used in this paper is derived from two main data sources, RAIS and PIA, which we use to cover the period 1997 to 2002. RAIS, 'Relação Anual de Informações Sociais' (Annual Social Information Report) is an annual census of all firms and their employees in Brazil conducted by the Ministry of Employment. It includes detailed information about each employee (wages, hours worked, education, age, tenure, gender, etc) and each firm (industry, region, size, establishment type, etc), including a unique (time-invariant) identifier for each employee, each firm and each establishment. These identifiers allow one to follow workers and firms over time.

The second data source is PIA, 'Pesquisa Industrial Anual' (Yearly Industrial Research), which covers all manufacturing sector firms with at least 30 employees and a random sample of 10% of firms with between 5 and 30 employees. From PIA we use firms' profits and also additional data about revenues and costs. Finally, the third data used is CCE, 'Censo de Capitais Estrangeiros' (Foreign Capital Census) is conducted by the Brazilian Central Bank and is composed of all establishments situated in Brazil with 10% or more foreign capital participation. Establishments' information (accountability, foreign participation of capital, composition of capital, exports, imports, location, activity sector, number of employees, and establishment type) are available for 1995 and 2000. We assumed that foreign ownership, the single variable we used from CCBB, remain unchanged from 1995 to 1999 (1995 data) and from 2000 to 2002 (2000 data).[2]

Tables 1 and 2 report more information about the data size. There are on average more than 5 million workers per year and almost 25,000 firms per year. At the firm level, there are more than 40,000 different firms, of which more than 12,000 are present in all six years covered. Tables 1 and 2 also present information about the subset of exporting firms, defined here as firms that export a non-zero share of their output in at least one year over the period 1997-2002. More than half of all employees in the data are in firms that export, although the number of these firms is much smaller - as one may expect, exporting firms are bigger than non-exporting firms.

We also report some descriptive statistics of the main variables in Table 3. All financial variables are converted to 2002 prices. One important point relates to the steep decline of

[2]See a working paper version of this paper, Martins & Esteves (2006), for a detailed description of these data sets and additional results.

the real hourly wage, of more than 20% a fact documented in many other analyses of the manufacturing sector in Brazil. At the same time, workers schooling increased by about one year while (Mincer) experience and tenure both fall. These events are most likely related to the process of economic reforms introduced in the late 1980s in Brazil, when tariffs were reduced substantially. The adjustment to these reforms involved substantial reallocation and marked declines in the employment levels in the manufacturing sector. This decline is mirrored in the declining number of workers present in our data up to 1999 (or up to 1998 in the case of exporting firms), after which the employment level increases, although real wages keep falling. Tenure is also relatively low, which may be related to high levels of turnover that characterise the Brazilian labour market. Tenure also increases up to 1999 (when employment is falling) and falls after that (when employment is increasing).

Similarly to the case of wages, wage bills also exhibit a downward trend, except for 2002. These wage bills are derived directly from information provided by each firm, and include, on top of net wages, also taxes, overtime pay, 13th and 14th month pay, etc. All these additional components correspond to about 100% of net wages, a result that emphasises the heavy burden faced by firms that hire from the formal labour market and that may help explaining the large size of the informal labour market.

The net profits variable is also testimony to the difficult years of the Brazilian economy: average profits are negative in 1999 and 2002, when interest rates were increased in order to sustain the currency, while gross profits (i.e. net profits plus the wage bill) are always positive.

The descriptive statistics also indicate the importance of the external market for our sample of Brazilian firms, as, on average, more than 10% of sales are exported. Only about one fifth of these exports go to Mercosul, while less than 2% is exported to Mercosul is 2002, after the Argentinean peso was devalued by more than 50%. One can also see that, when focusing only on workers whose firms export, many differences arise. For instance, this subset of workers are paid higher wages, they are more educated and have higher tenure. Moreover, the profit levels of exporting firms are also higher than the entire set of manufacturing firms in our sample (except for 2002).

3 Results

As indicated in the introduction, our analysis is based on a standard wage equation, augmented by a measure of profitability. (More details on the derivation of this equation from a model of firm and worker bargaining are available in the theoretical appendix.) Following from equation 11, we can consider the following wage equation:

$$w_{it} = X'_{it}\beta_1 + F'_{it}\beta_2 + \beta_3 \frac{\pi_{Lit}}{n_{it}} + u_{it}, \tag{1}$$

where w_{it} is the log of the hourly wage of worker i in period t, X_{it} is a vector of worker i variables in period t, F_{it} is a vector of firm variables (the firm that employs worker i in period t), π_{Lit} is the net profit of the firm that employs that worker, and n_{it} is the number of employees of the same firm. The parameter β_3 indicates the bargaining power of workers.[3]

3.1 Gross and Net Profits

Our initial results, presented in Table 5, are obtained using pooled OLS. In this and the following tables, we present the coefficients on a selected group of regressors and their t-statistic values (corrected for worker clustering). On top of the regressors presented (schooling, gender, experience, tenure, foreign firm and log firm size), we also consider in all specifications a quartic in experience; a quadratic in tenure; year, occupation, region and industry dummies; and interactions between all human capital variables and the gender dummy. All of these variables, in all models, present similar results to those that have been obtained for other countries.

Column 3 of Table 5 presents the results for net profits, indicating a significant β_3 of 0.04. When considering instead gross profits, we find again a significant β_3 but this time about ten times bigger, at 0.35. As expected, the use of a measure of profits that predates the payment of the wage bill (gross profits) indicates that the more common net profits measure generates a downward bias on the estimates of rent sharing.

A useful measure of the implications of these parameters in terms of generating wage differences is the Lester Range (Lester 1952). This range corresponds to four times the product of the rent sharing parameter and the standard deviation of profits (per worker). This formula can be interpreted as indicating the wage increase, in percentage terms, of a worker that would

[3]The parameter β_3 corresponds to $[\phi/(1-\phi)]$ in equation 11.

move from a firm with low profits (more precisely, a firm whose profitability is two standard deviations below the mean profitability of the firms in the sample) to a firm with high profits (a firm placed two standard deviations above mean profitability). The Lester ranges for these two estimates in Table 5 are 5% and 50%, respectively.

Taking these numbers at face value, the gross profits estimate (our preferred estimate for reasons explained before) suggests that rent sharing is indeed an important factor in the Brazilian labour market. These values are also comparable (if not higher than) those figures obtained for different developed countries: Blanchflower et al. (1996) finds a Lester range of 24% for the US; Hildreth & Oswald (1997) find a figure of 16% for the UK; Arai (2003) documents ranges between 12% and 24% for Sweden; and Martins (forthcoming) presents a range of 56% for Portugal.

3.2 Instrumental Variables

An additional concern present in the estimation of rent sharing relates to the endogeneity of profits. For instance, if one considers an efficiency wage model, profits (even gross profits) and wages will be simultaneously determined. Variation of profits across firms may also capture worker unobserved characteristics that also affect those workers wages.

Our first approach at dealing with endogeneity involves the use of instruments. The first set of instruments we use is made of different components of revenues and costs, namely those related to financial investments, participations in other firms, and non-operational activities. Our identification assumption is thus that these components of profits do not affect wages directly, although they are correlated with profits. We believe that this is likely to be true because bargaining over wages is typically related to profits in the firm's mainstream activities, e.g. car sales in the case of a car manufacturer. If that firm happens to benefit from a bump in profits driven by activities unrelated to the production of cars, e.g. selling off a subsidiary, that will not have a direct impact upon wages although it will have a direct effect upon profits.

An additional important aspect concerns the macroeconomic instability of Brazil over the period covered. The first important episode of such instability occurred in January 1999 when the central bank was forced to move from a fixed to a floating exchange rate. At the same time, inflation targeting was adopted and interest rates were increased substantially as a way to counteract inflationary expectations that may have been induced by the depreciation of

the Real. There is a second episode of interest rate hikes in 2002, following the exchange rate pressure induced by the Brazilian presidential elections. These two events imply that firms will see their profitability negatively affected, in particular if they have engaged in large financial investments, implying that they will face higher interest rate payments. We thus expect that financial losses will be an important determinant of profits while, as argued before, without having a direct impact on wages.

Table 6 presents our results, using the 2SLS method, considering either net or gross profits and either only the financial instruments or all instruments (financial and exchange rate instruments). Following Bound et al. (1995) and Shea (1997), we start by investigating the strength of the instruments in the first-stage equation, as measured by the values of the partial R^2 and the joint F-test of the instruments. In Table 7, we find reassuring results, as all coefficients of the instruments are highly significant and generate at least reasonable partial R^2's. Consistent with our view of the role of macroeconomic instability upon profits, the role of financial losses in explaining net or gross profits is not only of the expected sign but also particularly large.

In terms of the main equation, we find that, unlike before, the coefficients are now negative, ranging between -0.05 and -0.04, again precisely estimated. These negative findings indicate that rent sharing is not an important feature of the Brazilian labour market, unlike was suggested by the approach which ignored endogeneity. The Lester ranges are also particularly small, ranging between -8% and -6%.

Having established one of the main results of the paper, we now test the robustness of our findings to different instruments and to controls for other sources of bias. We start by considering exchange rate fluctuations as another dimension of the period of macroeconomic instability faced by Brazil. As indicated before, the country sustained considerable pressure upon its currency over those years; on top of that, the currencies of some of its neighbours - in particular Argentina, an important trade partner under Mercosul - also faced adjustments. These currency shocks can also be used as instruments, as a cheaper Real in terms of dollars or euros translates into cheaper exports and thus higher profits for exporting firms.

Figure 1 describes the evolution of the three different exchange rates over the period. As indicated before, the main depreciations took place in January 1999 and then in the second half of 2002. Before that, in December 2001, Argentina also replaced its currency board with

a floating system, leading to a massive depreciation of their currency with respect to the Real and other currencies. Figure 2 describes the evolution of the interest rate: one can observe the large instability in 1997 and 1999 and the subsequent increasing trend since the mid/late 2001, as the 2002 elections campaign progressed.

In order to exploit these events in terms of our estimation of the rent sharing parameter, we merge into our data information from the PIA data set about the shares of sales which are exported either to Mercosul or to the rest of the world. We then also multiply these shares by the exchange rates of the real with respect to the Argentinean Peso or a weighted average of the dollar and the euro (the weights being the exports from Brazil to either the US or the European Union, in each period.)

Columns 4 and 5 of Table 6 present the results for the sub-sample of exporting firms and their workers. We find that the new estimates of the β_3 parameter are still negative and of a magnitude similar to the case of the previous set of instruments. These estimates are -0.07 and -0.05, for net and gross profits, respectively, each coefficient again statistically significant. Lester ranges are -11% and -7%, respectively. Regarding the first-stage results, we again find that our instruments are statistically significant and of the predicted positive sign (Table 7). This positive sign means that, the higher the share of sales that is exported, the greater the impact of a depreciation of the Real in terms of the firms profitability. It is also interesting to notice that the role of exports to the 'rest of the world' (i.e. other countries than those in Mercosul) is much bigger than that of the exports to Mercosul.

We conclude from our instrumental variable analysis that the evidence of rent sharing documented in simple models that do not account for the endogeneity of profits can be misleading. The higher wages of employees of more profitable firms are artificially driven by the simultaneous determination of profits and wages. When using shocks to profits that are arguably unrelated to the forces that directly determine wages, then no evidence can be found that wages increase with profits.

3.3 Spell Fixed Effects

One additional source of bias concerns the heterogeneity across firms and workers. Up until now, this heterogeneity was assumed to be uncorrelated with profits. Moreover, different observations of the same individual or the same firm over time were not treated differently

from the observations of different individuals or different firms.

In this sub-section we address this issue by incorporating into our instrumental variables approach controls for worker and firm heterogeneity. Given that we are not interested in estimating the heterogeneity itself (Abowd et al. 1999) but only in controlling for its possible biases, we adopt a spell fixed effects method. This corresponds to conducting a within-spell estimation, each spell being defined as a firm-worker match, as indicated by the following equation:

$$lnw_{it} = X'_{it}\beta_1 + F'_{it}\beta_2 + \beta_3 \frac{\pi_{Lit}}{n_{it}} + v_{it} + u_{it}, \tag{2}$$

where v_{ij} denotes the worker-firm spell fixed effect. Then, by mean-differencing equation 2 with respect to the spell means, one obtains:

$$w_{it} - \overline{w}_s = (X_{it} - \overline{X_s})'\beta'_1 + (F_{it} - \overline{F_s})'\beta_2 + \beta_3(\frac{\pi_{Lit}}{n_i t} - \frac{\overline{\pi_{Ls}}}{n_s}) + (u_{it} - \overline{u_s}), \tag{3}$$

in which each barred variable represents the mean of that variable for each spell over time. Since both worker and firm heterogeneity are controlled for in this equation, the rent sharing parameter β_3 can be estimated consistently, which was not necessarily the case in the previous sections.

Table 8 presents the results for models that include spell fixed effects, first disregarding the endogeneity of profits and then instrumenting profits as before. We find in both specifications, and similarly to the previous results, very small bargaining parameters and correspondingly small Lester ranges, between -3.8% and -0.4%.[4] These results strengthen our earlier findings that Brazilian workers do not receive any share of the rents earned by their employers.

3.4 Robustness Analysis

One possible explanation for the lack of evidence of rent sharing documented so far in the paper is that many firms are facing losses. To the extent that rent sharing applies only when firms have profits, then one should not expect a positive correlation between profits and wages in our data. Moreover, as in other countries, the Brazilian labour law makes it very difficult that firms cut their workers' nominal pay. While this constraint was obviously

[4]We have also run these models for net profits and the results were again qualitatively and quantitatively very similar. These results are available upon request.

of little practical importance during the period of high inflation, prices have largely been under control since the Real plan was introduced in 1994. In this context, because of either an intrinsic asymmetry in the process of rent sharing or because of the downward nominal wage rigidity constraint in the law, rent sharing could remain a feature of the labour market, but one which would only emerge during periods of economic expansion or, more specifically, when firms increased their profits.

In order to test this alternative interpretation of our results, we repeat our previous analysis for the subset of workers employed by firms with at least 30 employees and covered during the years of 1999, 2000 and 2001. This was a period of uninterrupted economic growth in which the economy was not affected by major shocks, growing at reasonable rates (the growth rates of GDP per capita were 0.8%, 4.3% and 1.3%, respectively). If the hypothesis in the previous paragraph is correct, this would necessarily be a period in which rent sharing would be found. By focusing on larger firms, we also hope to bias our results towards higher levels of rent sharing, as smaller firms may be affected by greater instability.

Table 9 presents information about the sample size of the new data set. It can be seen that more than 80% of workers are employed by firms with 30 or more employees (either when compared to all firms or only firms that export). In total, there are about 4.5 million workers per year, of which about 2.5 million are employed by exporting firms.

Our regression results (based on the models considering gross profits, spell fixed effects and instruments - financial variables only or financial and export/exchange rate variables) - see Table 10 - indicate that there is indeed only some very mild evidence that, in periods of economic growth, firms are likely to share some of their profits with their employees. The largest Lester range found (for the specification based on exporters and the complete set of instrumental variables) is positive, but not bigger than 4%.

In order to be even more stringent in our analysis, we also consider a sub-sample of the firms present in the 1999-2001 period and whose profits increased over each year (i.e. in 2000 with respect to 1999 and in 2001 with respect to 2000). Consistent with our predictions, we find larger Lester ranges than in our previous estimates (Martins & Esteves 2006). However, our rent sharing parameter is never large enough so that the corresponding Lester range exceeds 14%. This Lester range is also particularly small when comparing it to figures from other countries: in similar analysis (i.e. considering only firms whose profits increase) and

covering the labour markets of Sweden and Portugal, Arai & Heyman (2001) and Martins (forthcoming), respectively, find much larger Lester ranges, ranging between 50% and 60%.

Another possible concern is that our main data set, RAIS, does not include all wage variables that refer to the sharing of profits between employers and employees, as the questionnaire taken by firms may be ambiguous in this specific aspect.[5] In order to address this view, we repeated our analysis using the PIA data set, which is only available at the firm-level but which explicitly requests firms to include information about all profit-sharing schemes in their wage data. In results not shown but available upon request, we again do not find any evidence of rent sharing.

Finally, we also tried to study possible differences in the magnitude of rent sharing that may exist across different types of workers. According to our simple theoretical model, one can expect that subgroups of workers with different bargaining power will benefit differently from their firm's profitability. We considered subgroups defined in terms of the workers' gender, tenure, occupation (blue- or white-collar), and education. Also in these analyses, we find no evidence of rent sharing, regardless of the specific subgroup examined (results not shown but available upon request).[6]

4 Final Remarks

This is one of the first papers that examines rent sharing in a developing country (see also Teal (1996), and Bigsten et al. (2003), who focus on African countries) and is the first that does so exploiting particularly rich matched panel data, of the type typically only available in some developed economies. Moreover, the quality of our data, together with the variability of the macroeconomic environment, also allows us to pay particular attention to a number of econometric problems that may have affected previous research.

We study the case of Brazil, a large country characterised by huge income disparities, and examine a period in which the economy was hit by different macroeconomic shocks (1997-

[5] Incidentally, we also noticed that most papers in the rent sharing literature do not explicit mention whether their wage data does include such profit-sharing information. Differences across countries in this respect may impair international comparisons of the magnitude of rent sharing.

[6] We also trimmed our data in different ways, in case the results were driven by outliers, namely in the profits variable. We also obtained the same results as in the main sections. Moreover, we have also conducted a specific analysis of rent sharing across three of the main foreign car manufacturing firms located in São Paulo's industrial area (the so-called 'ABC' region). Our motivation for that analysis is, in part, derived from the fact that the unions of the car manufacturing industry in that region are known by their strong bargaining power, possibly the strongest in Brazil. However, even for this very specific industry/region, and across different specifications, we found Lester ranges which never exceed 9%.

2002). Exploiting these shocks as exogenous shifters in profitability, and also tackling other econometric problems, we find what we believe is particularly robust evidence that rent sharing is not a feature of the Brazilian labour market. Across almost all specifications, we find precisely estimated parameters indicating virtually zero rent sharing. Even when selecting a relatively small subset of our data that would, in our view, bias the results towards high levels of rent sharing, we still find very small results, about one third of the corresponding findings for developed countries.

Regarding possible explanations for our evidence of no rent sharing, we believe that an important role is played by the relative weakness of different labour market institutions in Brazil. For instance, unions are relatively segmented and weak (Arbache 2002). Employment law may also indirectly foster excessive worker turnover and thus hurt rent sharing, as relatively long periods of tenure may be necessary for workers to gain significant bargaining power in their firms. For instance, only after investing in firm-specific skills may workers benefit from some of the rents generated by those investments. Finally, the large informal labour market will also not help the bargaining power of workers with respect to their employers, as the former become more easily replaceable with respect to case of countries with smaller levels of informality.

Besides contributing to a better understanding of the labour markets of Brazil and perhaps also other developing countries, our results may also help the analysis of the reasons for and the policies against the extremely high levels of income inequality documented for Brazil. For instance, to the extent that firms do not share rents, gender and racial discrimination may be seen as less important determinants of inequality. On the other hand, our evidence shifts emphasis towards differences in observable and/or unobservable individual human capital levels and in convexities in the returns to those assets as possible sources of income dispersion.

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A Theory

This theoretical analysis follows closely Blanchflower et al (1996). It is assumed that wages are determined following a bargain process that corresponds to the following expression:

$$\max \phi log[((u(w) - u(\overline{w}))n] + (1 - \phi)log\pi \tag{4}$$

ϕ represents the workers bargaining power; $u(w)$ represents the workers utility from their wages; $\overline{w}$ represents the outside earnings workers will get if not employed in their current firm; n indicates the employment level and π denotes profits.

If bargaining breaks down, the employer will receive zero profits and workers will receive $\overline{w}$ wages. Profits are defined as $f(n) - wn$, in which f is a concave function in n.

The first order conditions are:

$$w : \frac{\phi u'(w)}{[((u(w) - u(\overline{w}))n]} - \frac{1 - \phi}{\pi} = 0 \tag{5}$$

$$n : \frac{\phi}{n} + \frac{(1 - \phi)[f'(n) - w]}{\pi} = 0 \tag{6}$$

Equation 5 can be rewritten as:

$$\frac{u(w) - u(\overline{w})}{u'(w)} = \frac{\phi}{1 - \phi}\frac{\pi}{n} \tag{7}$$

Given that:

$$u(\overline{w}) \cong u(w) + (\overline{w} - w)u'(w) \tag{8}$$

From 7 and 8 we find:

$$w \cong \overline{w} + \frac{\phi}{1 - \phi}\frac{\pi}{n} \tag{9}$$

Equation 9 establishes that the equilibrium wage is determined by the outside option of the worker, the relative bargaining power of each party $[\phi/(1 - \phi)]$ and the profit per worker (π/n).

The workers outside option can also be characterised as:

$$\overline{w} = c(w^0, b, U), \tag{10}$$

in which w^0 is the outside wage in other firms, b is the income level of unemployed workers and U is the unemployment rate of workers from that firm. Equation 9 can thus be written as:

$$w = c(w^0, b, U) + \frac{\phi}{1-\phi}\frac{\pi}{n} \tag{11}$$

This equation establishes a wage equation in which profits per worker are an explanatory variable. Positive values for $[\phi/(1-\phi)]$ are then understood as providing support for the rent sharing hypothesis. The bigger is $[\phi/(1-\phi)]$, the bigger is share of profits captured by workers via bargaining.

B Figures

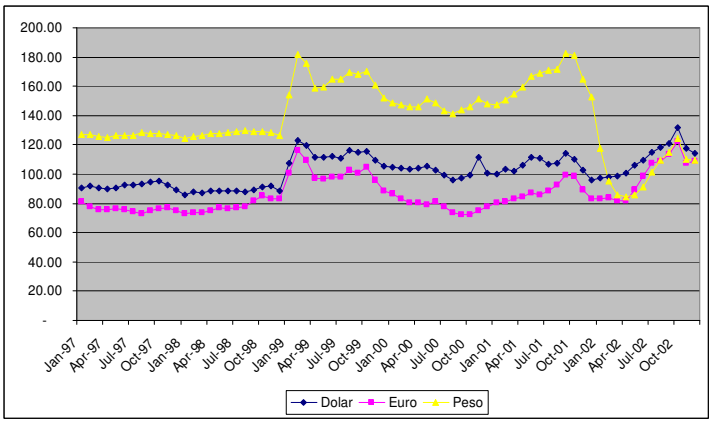

Figure 1: US Dollar, Euro and Argentinean Peso Exchange Rate Indices

Source: Brazilian Central Bank (www.bcb.gov.br)

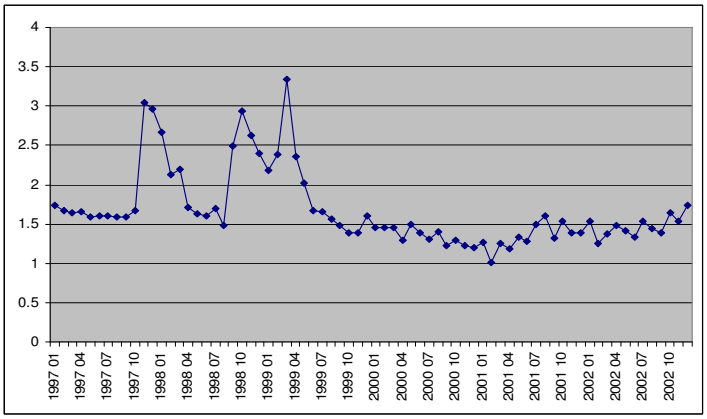

Figure 2: Monthly Interest Rate (%; SELIC)

Source: Brazilian Central Bank (www.bcb.gov.br)

C Tables

Table 1: Number of Workers and Firms (All Firms or Only Exporting Firms)

	All firms		Exporting firms	
	Workers	Firms	Workers	Firms
1997	5,507,887	21,642	2,926,827	5,033
1998	5,048,225	22,904	2,692,923	5,273
1999	4,971,535	23,678	2,705,760	5,623
2000	5,266,867	23,967	2,802,242	5,688
2001	5,474,064	25,819	2,987,354	6,086
2002	5,726,771	27,225	3,117,915	6,322

Table 2: Distribution of firm appearances in data

	All firms	Exporting firms
1 year	9,096	2,795
2 years	6,737	1,702
3 years	5,447	1,327
4 years	4,053	1,007
5 years	3,35	949
6 years	12,227	2,512

Table 3: Descriptive Statistics: Mean and (Standard Deviation)

Variables	1997	1998	1999	2000	2001	2002
Log hourly wage	1.45	1.47	1.36	1.24	1.22	1.14
	(0.94)	(0.94)	(0.91)	(0.89)	(0.89)	(0.83)
Hourly wage R$	4.26	4.35	3.90	3.46	3.38	3.13
Schooling	7.00	7.29	7.57	7.74	7.90	8.04
	(3.68)	(3.68)	(3.67)	(3.63)	(3.62)	(3.60)
Gender (1 if male, 0 if female)	0.75	0.75	0.74	0.74	0.73	0.74
	(0.43)	(0.43)	(0.43)	(0.43)	(0.44)	(0.43)
Experience (years)	18.17	18.13	17.85	17.44	17.35	17.30
	(10.95)	(10.86)	(10.79)	(10.80)	(10.86)	(10.93)
Tenure (months)	50.05	51.76	51.63	48.43	47.38	46.88
	(63.56)	(63.89)	(63.80)	(62.28)	(62.19)	(62.07)
Ratio Mercosul exports/sales	0.022	0.024	0.027	0.025	0.023	0.018
	(0.55)	(0.62)	(0.69)	(0.65)	(0.64)	(0.56)
Ratio rest of the world exports/sales	0.100	0.096	0.106	0.107	0.116	0.136
	(0.215)	(0.210)	(0.224)	(0.223)	(0.231)	(0.250)
Ratio equity/number of workers	7,178	7,894	7,937	7,116	6,135	6,596
	(16,916)	(17,706)	(21,021)	(54,322)	(14,796)	(24,881)
Net profits per worker	3,366	1,812	-67	5,351	6,807	-3,212
	(81,919)	(86,458)	(75,978)	(24,185)	(122,718)	(337,383)
Wage bill (pw)	29,433	29,407	25,277	23,245	21,864	23,379
	(34,348)	(29,373)	(25,911)	(85,141)	(22,266)	(136,165)
Gross profits (pw)	32,798	31,219	25,21	28,595	28,671	20,166
	(92,120)	(94,453)	(80,979)	(169,194)	(127,017)	(287,223)
Financial revenues (pw)	170,78	270,63	215,87	134,02	215,46	212,56
	(1,760)	(3,127)	(2,659)	(1,319)	(3,730)	(3,301)
Profits in other firms (pw)	5,572	6,86	9,195	4,966	5,426	6,911
	(16,203)	(20,057)	(33,336)	(21,395)	(31,723)	(48,851)
Non-operation profits (pw)	2,928	2,967	3,612	3,181	3,169	4,362
	(19,190)	(16,773)	(24,198)	(19,037)	(19,888)	(30,716)
Financial losses (pw)	2,062	2,363	2,64	2,217	2,153	1,92
	(9,551)	(23,490)	(27,708)	(13,063)	(22,514)	(20,828)
Losses in other firms (pw)	1,066	1,257	1,281	1,097	1,318	1,27
	(3,658)	(3,714)	(7,294)	(3,976)	(6,212)	(7,678)
Non-operation losses (pw)	10,635	11,944	15,375	11,311	12,115	14,876
	(22,859)	(32,704)	(47,207)	(56,853)	(63,334)	(147,098)
Log firm size	6.26	6.16	6.13	6.12	6.10	6.13
	(1.69)	(1.74)	(1.74)	(1.73)	(1.77)	(1.81)

Table 4: Descriptive Statistics (exporting firms only): Mean and (Standard Deviation)

Variables	1997	1998	1999	2000	2001	2002
Log hourly wage	1.62	1.66	1.54	1.42	1.39	1.31
	(0.98)	(0.98)	(0.95)	(0.93)	(0.94)	(0.88)
Hourly wage R$	5.05	5.25	4.66	4.13	4.01	3.70
Schooling	7.24	7.60	7.89	8.07	8.20	8.35
	(3.83)	(3.84)	(3.84)	(3.78)	(3.80)	(3.79)
Gender (1 if male, 0 if female)	0.77	0.77	0.77	0.76	0.76	0.76
	(0.42)	(0.41)	(0.42)	(0.42)	(0.42)	(0.42)
Experience (years)	18.25	18.14	17.78	17.34	17.25	17.19
	(10.80)	(10.67)	(10.57)	(10.59)	(10.68)	(10.76)
Tenure (months)	60.77	62.25	61.87	58.15	56.31	55.91
	(71.47)	(71.89)	(71.74)	(70.07)	(70.23)	(70.39)
Ratio Mercosul exports/sales	0.04	0.05	0.05	0.05	0.04	0.03
	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)
Ratio rest of the world exports/sales	0.19	0.18	0.20	0.20	0.21	0.25
	(0.26)	(0.26)	(0.27)	(0.27)	(0.28)	(0.29)
Ratio equity/number of workers	9,921	11,194	11,517	10,469	8,758	9,602
	(20,493)	(21,689)	(25,641)	(73,632)	(17,089)	(30,091)
Net profits per worker	5,785	3,385	2,031	9,181	12,687	(5,020)
	(100,524)	(99,786)	(76,860)	(328,807)	(149,554)	(442,201)
Wage bill (pw)	35,596	36,287	31,199	29,918	27,388	29,978
	(38,052)	(34,928)	(28,382)	(115,577)	(24,430)	(181,222)
Gross profits (pw)	41,381	39,672	33,230	39,099	40,076	24,958
	(111,935)	(110,583)	(40,238)	(28,008)	(40,929)	(371,872)
Financial revenues (pw)	7,505	9,687	3,660	7,590	8,564	10,293
	(18,757)	(22,699)	(40,238	(28,008)	(40,929)	(32,469)
Profits in other firms (pw)	4,321	4,443	4,662	5,059	5,186	7,983
	(17,786)	(18,954)	(18,811)	(23,008)	(40,029)	(32,469)
Non-operation profits (pw)	2,629	2,520	3,393	2,798	3,077	2,565
	(10,930)	(8,841)	(26,438)	(14,757)	(29,794)	(25,138)
Financial losses (pw)	13,530	15,439	21,458	16,039	17,089	22,110
	(25,541)	(27,205)	(46,635)	(72,826)	(67,595)	(181,532)
Losses in other firms (pw)	1,614	1,662	2,179	1,385	1,716	2,476
	(10,800)	(9,225)	(14,314)	(12,241)	(10,372)	(20,021)
Non-operation losses (pw)	3,286	2,428	3,636	2,671	3,292	2,593
	(13,786)	(13,626)	(29,873)	(15,341)	(23,713)	(22,385)
Log firm size	7.06	7.01	6.98	6.98	6.99	7.05
	(1.53)	(1.57)	(1.57)	(1.57)	(1.58)	(1.63)

Table 5: OLS Regressions, Dependent variable: log hourly wage

	(2)	(3)	(4)
Schooling	0.07	0.07	0.07
	(1,003)***	(1,003)***	(991)***
Gender	0.12	0.12	0.13
	(92.79)***	(92.53)***	(94.71)***
Experience	0.04	0.04	0.04
	(238.22)***	(238.46)***	(239.13)***
Tenure	0.04	0.04	0.03
	(397.99)***	(398.02)***	(394.34)***
Foreign firm	0.14	0.14	0.12
	(485.52)***	(487.52)***	(415.94)***
Log firm size	0.06	0.06	0.06
	(888.54)***	(884.32)***	(792.34)***
Net profit (pw)		**0.04**	
		(62.12)**	
Gross profit (pw)			**0.35**
			(653.14)**
R^2	0.64	0.64	0.65
Adj. R^2	0.64	0.64	0.65
F	326,444	324,554	331,673
Lester Range		0.05	0.50

Notes: (1) Significant at 1% (***), 5 % (**), and 10% (*); (2) All regressions include 6 year dummies, 105 industry dummies, 9 job dummies, 27 region dummies and human capital x gender interactions, Robust standard errors, allowing for worker clustering;

Table 6: 2SLS regressions, Dependent variable: log hourly wage

	(2) Financial IV	(3) Financial IV	(4) All IV	(5) All IV
Schooling	0.07 (891.50)***	0.07 (892.22)***	0.07 (631.86)***	0.07 (632.43)***
Gender	0.15 (105.01)***	0.15 (104.46)***	0.19 (84.75)***	0.19 (84.40)***
Experience	0.04 (224.52)***	0.04 (224.72)***	0.05 (154.83)***	0.05 (155.09)***
Tenure	0.04 (366.74)***	0.04 (367.15)***	0.04 (257.07)***	0.04 (257.47)***
Foreign firm	0.16 (454.98)***	0.16 (464.16)***	0.14 (324.73)***	0.14 (334.14)***
Log firm size	0.07 (806.10)***	0.07 (803.03)***	0.04 (276.93)***	0.04 (272.43)***
Net profit (pw)	**-0.05 (-115.85)*****		**-0.07 (-79.64)*****	
Gross profit (pw)		**-0.04 (-80.14)*****		**-0.05 (-41.46)*****
R^2	0.61	0.61	0.64	0.64
Adj. R^2	0.61	0.61	0.64	0.64
F	238,681	238,067	126,646	126,336
Lester Range	-0.08	-0.06	-0.11	-0.07

Notes: (1) Significant at 1% (***), 5 % (**), and 10% (*); (2) All regressions include 6 year dummies, 105 industry dummies, 9 job dummies, 27 region dummies and human capital x gender interactions, Robust standard errors, allowing for worker clustering;

Table 7: 2SLS Auxiliary regressions

Instruments	Net Profits pw Financial IV	Gross Profits pw Financial IV	Net Profits pw All IV	Gross Profits pw All IV
Financial revenues	0.682	1.196	0.703	1.035
	(651)***	(1065)***	(400)***	(557)***
	[0.007]	[0.003]	[0.008]	[0.0028]
Revenues from	0.437	0.529	0.423	0.453
other firms	(397)***	(448)***	(262)***	(226)***
	[0.0006]	[0.001]	[0.0006]	[0.0031]
Non-operational	0.305	0.373	0.321	0.328
revenues	(435)***	(497)***	(287)***	(278)***
	[0.0068]	[0.001]	[0.011]	[0.005]
Financial Losses	-0.828	-0.679	-0.715	-0.422
	(-4,096)***	(-3,137)***	(-1,636)***	(-914)***
	[0.3798]	[0.2575]	[0.1916]	[0.0696]
Losses from other	-0.699	-0.682	-0.804	-0.789
firms	(-951)***	(-866)***	(-656)***	(-609)***
	[0.0216]	[0.0208]	[0.0281]	[0.0268]
Non Operational	-0.462	-0.438	-0.486	-0.481
losses	(-893)***	(-790)***	(-652)***	(-612)***
	[0.0171]	[0.0146]	[0.02814]	[0.02344]
Ratio exports to Mercosul/			0.188	0.086
total sales times Exchange			(24)***	(10)***
rate peso/real			[0.000004]	[0.000002]
Ratio exports to rest of the world/			0.44	0.263
total sales times Exchange			(109)***	(62)***
rate weighted dollar-euro/real			[0.00113]	[0.00209]
R^2	0.4531	0.3528	0.3181	0.2195
Adj. R^2	0.4531	0.3528	0.3181	0.2194
F	154,832	101,001	39790	23735

Notes: (1) Significant at 1% (***), 5 % (**), and 10% (*); (2) All regressions include all variables used in the second stage equation, Robust standard errors, allowing for worker clustering; (3) Shea R^2 partial in brackets;

Table 8: Spell Fixed Effects and Spell Fixed Effects 2SLS Regressions

	(2) No IV	(3) Financial IV	(3) All IV
Schooling	0.050	0.056	0.030
	(50.84)***	(50.44)***	(23.09)***
Experience	0.0280	0.0288	0.0310
	(156.85)***	(151.90)***	(119.03)***
Tenure	0.018	0.019	0.014
	(194.88)***	(191.80)***	(110.59)***
Log firm size	0.0155	0.0140	0.0240
	(90.02)***	(79.35)***	(86.16)***
Gross profit (pw)	**-2.71E-03**	**-8.92E-03**	**-5.19E-04**
R^2	0.03	0.03	0.03
Adj. R^2	0.03	0.03	0.03
F	24,363	23,884	13,049
Lester Range	-0.011	-0.038	-0.004

Notes: (1) Significant at 1% (***), 5 % (**), and 10% (*); (2)All regressions include 6 year dummies, 105 industry dummies, 9 job dummies, 27 region dummies and human capital x gender interactions, Robust standard errors, allowing for worker clustering;

Table 9: Number of Workers and Firms (sample of firms with more than 30 workers present in 1999-2001)

	All firms		Exporting firms	
	Workers	Firms	Workers	Firms
1999	4,282,851	17,535	2,420,956	5,090
2000	4,498,212	17,535	2,524,928	5,090
2001	4,616,837	17,535	2,747,058	5,090

Table 10: Spell Fixed Effects and Spell Fixed Effects 2SLS Regressions

	(2) No IV	(3) Financial IV	(3) All IV
Schooling	0.022	0.022	0.023
	(126.74)***	(126.39)***	(93.41)***
Experience	0.043	0.043	0.056
	(119.84)***	(119.55)***	(98.56)***
Tenure	0.011	0.011	0.004
	(70.70)***	(70.87)***	(22.19)***
Log firm size	0.02	0.02	0.03
	(61.70)***	(79.11)***	(67.51)***
Gross profit (pw)	**-0.0208**	**0.0147**	**0.0124**
	(-1.18)	**(56.59)****	**(48.18)****
R^2	0.02	0.03	0.03
Adj. R^2	0.02	0.03	0.03
F	8,904	8,988	5,282
Lester Range	-0.0003	0.0182	0.0313

Notes: (1) Significant at 1% (***), 5 % (**), and 10% (*); (2)All regressions also include a quartic in experience, a quadratic in tenure, 6 year dummies, 105 industry dummies, 9 job dummies, 27 region dummies and human capital x gender interactions, Robust standard errors, allowing for worker clustering;