Wages and Profits in Manufacturing Firms: Matched-Panel Evidence from Brazil

Pedro S. Martins
School of Business and Management, Queen Mary, University of London, United Kingdom

Luiz A. Esteves
Department of Economics & Graduate Program of Public Policy, UFPR, Brazil

Abstract

We provide evidence about the determinants of the wage structures of developing countries by examining the case of Brazil. Our specific question is whether Brazil's dramatic income and wage differentials can be explained by the division of rents between firms and their employees, unlike in competitive labour markets. Using detailed individual-level matched panel data, covering a large share of manufacturing firms and more than 30 million workers between 1997 and 2002, we consider the endogeneity of profits, by adopting different measures of profits and different instruments and by controlling for spell fixed effects. Our results, robust to different specifications and tests, indicate no evidence of rent sharing. This conclusion contrasts with findings for most developed countries, even those with flexible labour markets. Possible explanations for the lack of rent sharing include the weakness of labour-market institutions, the high levels of worker turnover and the macroeconomic instability faced by the country.

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

JEL Classification: J31, J41

Resumo

O trabalho fornece evidência sobre os determinantes da estrutura salarial dos países em desenvolvimento, mais especificamente para o caso brasileiro. A pergunta endereçada no artigo é se a elevada desigualdade salarial observada no mercado de trabalho brasileiro pode ser, em alguma medida, atribuída à filiação industrial dos trabalhadores, ou seja, se a partilha de lucros econômicos (rents) entre firmas e empregados de setores oligopolizados, decorrentes de barganha, são responsáveis por alguma parcela da desigualdade. O trabalho utiliza um painel de microdados do tipo empregador-empregado, cobrindo grande parte das empresas industriais e mais de 30 milhões de trabalhadores entre 1997 e 2002. Nossas especificações econométricas incluem o controle da endogeneidade dos lucros por meio da adoção de diferentes instrumentos, além de controlar efeitos fixos de firmas e trabalhadores

(spells). Os resultados encontrados são robustos para diferentes especificações e testes e não indicam evidência da partilha de lucros. Esta conclusão contrasta com os resultados encontrados para os países desenvolvidos, mesmo entre aqueles com mercados de trabalho flexíveis. Possíveis explicações para a ausência de partilha de lucros incluem a fraqueza das instituições do mercado de trabalho (alta informalidade, por exemplo), altos níveis de rotatividade dos trabalhadores e a instabilidade macroeconômica enfrentada pelo país durante o período analisado.

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 (see Behrman (1999)).

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, although 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 and 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 large 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 and Lemieux (1993); Blanchflower et al. (1996); Van Reenen (1996); Bronars and Famulari (2001); Arai (2003); Estevão and Tevlin (2003); Kramarz (2003); Martins (2004); etc.) [1] and maybe also in developing countries (Teal (1996), Revenga (1997), and Bigsten et al. (2003)). Moreover, rent sharing is also typically related to other sources

⋆ Submitted in March 2012, Accepted in July 2012. We thank, without implicating, Esther Duflo, Simon Commander, Rupert Harrison, and seminar participants at IPEA (Brasilia) and at the London Business School for their useful comments. We also thank Rodolfo Hoffmann (editor), anonymous referees, IPEA for logistical support and Fernando Freitas for computational assistance. A preliminary version of this paper, entitled 'Is There Rent Sharing in Developing Countries? Matched-Panel Evidence from Brazil', was published as IZA Discussion Paper nr 2317, and 'Proceedings of the 34th Brazilian Economics Meeting'. The data used in this paper are confidential but the authors' access is not exclusive.
E-mail addresses: p.martins@qmul.ac.uk, esteves@ufpr.br

[1] Margolis and Salvanes (2001) is, in part, an exception to this stylised fact.

of inequality, including gender and racial discrimination (Black and Strahan 2001), which may also be relevant in the case of developing countries.

However, there are also reasons to expect that employers in developing countries would be particularly immune to wage bargaining pressures exerted by their employees. Amongst other factors, unions are typically not particularly strong outside the developed world; minimum wages are low or not enforced; 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.[2] 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 (Gonzaga 2004), 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 also offers a number of complementary identification strategies. In particular, we use different 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). Following an approach similar to Martins (2004), 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). 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.

[2] 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 Almeida and Carneiro (2005) for a study of informality in the Brazilian labour market and WorldBank and IPEA (2002) for a detailed study of different aspects of the Brazilian labour market, and Menezes-Filho et al. (2006) for an analysis of wage differences across firms and workers in the state of São Paulo.

The structure of the remaining of the paper is as follows: Section 2 presents the theoretical issues, Section 3 presents the data and some descriptive statistics, Section 4 presents the results under different econometric assumptions and our robustness tests, and Section 5 concludes.

2. Theory

The use of game theory in labor economics has enabled the development of several models of wage determination under non-competitive markets. The solution of these models implies a wage rate determined, among other things, by the bargain power of workers (trade unions), and the firm's capacity to pay (degree of monopolization). However, the notion that wages and monopoly power are correlated is not new in the economic literature. The first author to show how the share of wages in value added of a branch of industry varies with the degree of monopoly was Michal Kalecki in his "Theory of Economic Dynamics".

For purposes of this work, our 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:

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

Where 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 with respect to w and n are, respectively:

$$\frac{\phi u'(w)}{[u(w) - u(\overline{w})]n} - \frac{1 - \phi}{\pi} = 0 \tag{2}$$

$$\frac{\phi}{n} + \frac{(1 - \phi)[f'(n) - w]}{\pi} = 0 \tag{3}$$

Equation 2 can be rewritten as:

$$\frac{u(w) - u(\overline{w})}{u'(w)} = \frac{\phi}{1 - \phi}\frac{\pi}{n} \tag{4}$$

Given that:

$$u(\overline{w}) \cong u(w) + (\overline{w} - w)u'(w) \tag{5}$$

From 4 and 5 we find:

$$w \cong \overline{w} + \frac{\phi}{1-\phi}\frac{\pi}{n} \tag{6}$$

Equation 6 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:

$$\overline{w} = c(w^0, b, U) \tag{7}$$

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 6 can thus be written as:

$$w = c(w^0, b, U) + \frac{\phi}{1-\phi}\frac{\pi}{n} \tag{8}$$

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 the share of profits captured by workers via bargaining.

3. 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 (Annual Social Information Report) is an annual census of all firms and their employees in Brazil. There is 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 identifier for each employee, each firm and each establishment. The second data source is PIA (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. We also use CCBB (Foreign Capitals Census), which has detailed information about the foreign ownership structure of firms based in Brazil. We use these data to identify foreign firms, defined as those in which at least 50% of their equity is owned by foreign investors.

RAIS is an administrative report filed by all tax registered Brazilian establishments. Since the information may be used for investigation about labor legislation compliance, firms that do not comply with it do not file in RAIS. Thus, this data set can be considered a census of the formal Brazilian labor market (State-owned enterprises, public administration and non-profit organizations are also required to file the report). Firms that do not provide accurate information will be committing an offense sanctioned by law, a threat that is likely to lead to very high standards of data quality.

RAIS covers the whole country and is carried out annually and the information is collected every year in the first quarter, referring to the previous year. Every tax registered enterprise receives a unique tax number, the CNPJ. This number is composed by a specific firm part and a complement for each unit (local plant or establishment) that the firm operates.

The main variables available from the survey at the establishment level are: Geographic location: State, metropolitan region, county; Activity sector: CNAE (National Economic Activity Classification); sector Level (10 categories); activity (42 categories); sub-activity (about 560 categories); Establishment Size: number of workers, number of wage earners, number of owners; Establishment Type: Private enterprise, private foundation, State-owned enterprise, State foundation, joint public-private enterprise, non-governmental organization, government, nonprofit enterprise, notary;

At the employee level, the following information is available: Occupation: occupation classes (CBO-Brazilian Occupation Classification system – about 350 categories); subgroup (84 categories); group (11 categories); Personal Characteristics: schooling (9 classes), age, gender, nationality; Contract Information: month of admission, month of separation, December wage rate (13th monthly salary), average yearly wage, tenure, separation cause (fired with/without fair reason, separation with/without fair reason, retiring, transfer to other units or firm), contract type (work card, civil service, isolated worker, temporary worker), contract status (in activity or paid leave, leave without paid, occupation accident, military service, maternity leave, sick leave, inactive), admission type (first placement in firm, re-employment, transferred), contract hours (exclusive overtime);

With the establishment identification number (CNPJ) it is possible to follow all establishments that file the RAIS survey. Moreover, with the worker's national insurance number, it is possible to follow all workers that remain in the formal sector and to match the worker's characteristics with those of the establishment. Therefore, we can create a panel that matches workers to their establishments and follow each of them over time. It was using the firm identification numbers that we have merged the three data sets.

PIA ("Pesquisa Industrial Anual" – Yearly Industrial Research) is our secondary data source, and it is a yearly establishment survey covering the entire country, conducted by IBGE (Brazilian Statistics Office). PIA is a longitudinal survey of a stratified sample of manufacturing establishments employing five workers or more. The panel covers all establishments (census) with 30 or more workers, plus a random sample of establishments whose size ranges from 5 to 29 workers. This random sample represents about 10% of the establishment population with these characteristics.

The survey collects information on labour inputs, labour costs, turnover, production level and a few other variables. The information on labour inputs covers both employment and the total number of hours paid. With respect to labour costs, the information available is: (a) total value of contractual wages (i.e., value of

wages and salaries as specified in labour contracts) and (b) total value of payroll. In addition to contractual wages, payroll contains information on the payment for overtime, severance payments and other firing penalties, all payments due to commissions and other incentive schemes, such as productivity premium, all fringe benefits, additional payments due to hazardous activities, night shifts and other compensating schemes, and paid vacations.

"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 (Foreign Capitals Census), remains unchanged from 1995 to 1999 (1995 data) and from 2000 to 2002 (2000 data).

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. It can be seen in the tables that 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 the real hourly wage, of more than 20% between 1997-2002, 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.[3] Tenure is also relatively low, which may be related to high levels of turnover that are characteristic of 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

[3] See Ribeiro et al. (2004) for more evidence on the process of job reallocation in Brazilian manufacturing over this period. Arbache et al. (2004) and Gonzaga et al. (2006) present (partly contradictory) evidence on the impact of trade liberalisation upon education wage differentials.

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 then 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).

4. Results

As indicated in the introduction, our analysis is based on a standard wage equation, augmented by a measure of profitability, so we can consider the following wage equation:

$$\ln w_{i_t} = \beta_0 + \beta_1' \mathbf{x}_{i_t} + \beta_2' \mathbf{f}_{i_t} + \beta_3 \frac{\pi_{L_{it}}}{n_{i_t}} + u_{i_t} \tag{9}$$

where $\ln w_{i_t}$ is the log of the hourly wage of worker i in period t, $\mathbf{x}_{i_t}$ is a vector of worker i variables in period t, $\mathbf{f}_{i_t}$ is a vector of firm variables (the firm that employs worker i in period t), $\pi_{L_{it}}$ is the net profit of the firm that employs that worker, and n_{i_t} is the number of employees of the same firm. The parameter β_3 indicates the bargaining power of workers. [4]

4.1. *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

[4] The parameter β_3 corresponds to $[\phi/(1-\phi)]$ in the equation 8.

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 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%.

Taking these numbers at face value, the gross profits estimate (our preferred estimate for reasons explained before) indicates, preliminarily, that rent sharing is 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; Arai (2003) documents ranges between 12% and 24% for Sweden; Hildreth and Oswald (1997) find a figure of 16% for the UK; and Martins (2004) presents a range of 56% for Portugal.

4.2. *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 six components of profits do not affect directly wages, 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 a different company, we believe that unions will typically be less likely to bargain

over those 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 is adopted and interest rates are 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.

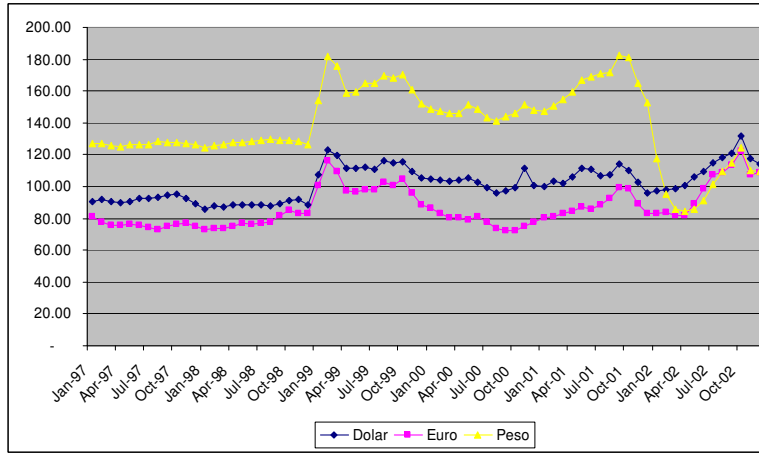
In terms of the main equation, we find that, unlike before, the coefficients are now negative, ranging between -0.05 and -0.04, and again precisely estimated. These negative findings indicate that rent sharing is not an important feature of the Brazilian labour market, unlike was suggested by the approach 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 take 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.

Fig. 1. US Dollar, Euro and Argentinean Peso Exchange Rate Indices



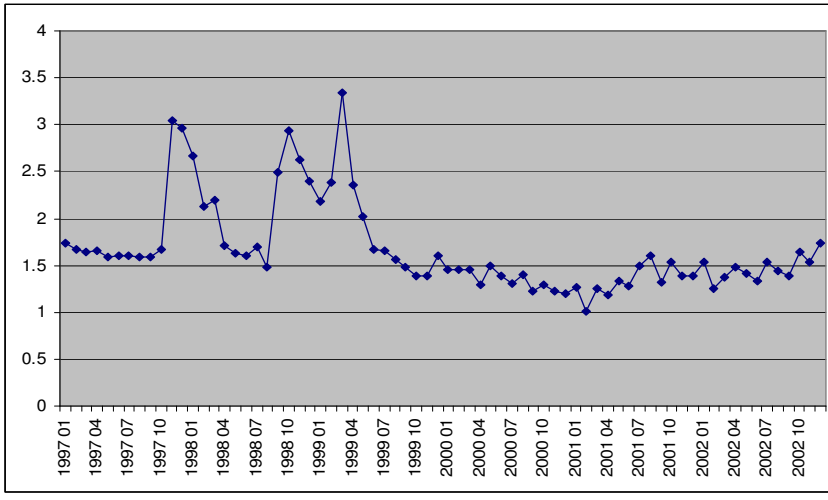
Source: Brazilian Central Bank (`www.bcb.gov.br`).

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 (ie 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.

Fig. 2. Monthly Interest Rate (%; SELIC)



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

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.

4.3. *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 different 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 (as in 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:

$$\ln w_{i_t} = \beta_0 + \beta_1' \mathbf{x}_{i_t} + \beta_2' \mathbf{f}_{i_t} + \beta_3 \frac{\pi_{L_{it}}}{n_{i_t}} + v_s + u_{i_t} \tag{10}$$

where v_s denotes the worker-firm spell fixed effect. Then, by mean-differencing equation (2) with respect to the spell means, one obtains:

$$\ln w_{i_t} - \overline{\ln w}_s = (\mathbf{x}_{i_t} - \overline{\mathbf{x}}_s)\beta_1' + (\mathbf{f}_{i_t} - \overline{\mathbf{f}}_s)\beta_2' + (\frac{\pi_{L_{it}}}{n_{i_t}} - \frac{\overline{\pi_{L_s}}}{n_s})\beta_3 + (u_{i_t} - \overline{u}_s) \tag{11}$$

In which each barred variable represents the mean of that variable for each spell (defined as a worker-firm match) 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%.[5] These results strengthen our earlier findings that Brazilian workers do not receive any share of the rents earned by their employers.

4.4. *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, not profits. 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 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 documented. 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.

[5] 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.

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 (see Tables 9 and 10 in Martins and Esteves (2006a)). 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 and Heyman (2001) and Martins (2004), 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. [6] In order to check the support for this explanation, 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). [7]

[6] 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.

[7] 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, in Martins and Esteves (2006b), we also conduct 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%.

5. 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 (1997-2002). 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 of other similar 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 become less likely 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.

References

Abowd, J., Kramarz, F., & Margolis, D. (1999). High wage workers and high wage firms. *Econometrica*, 67(2):251–334.

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

Almeida, R. & Carneiro, P. (2005). Enforcement of regulation, informal labor and firm performance. IZA Discussion Papers 1759, Institute for the Study of Labor (IZA).

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

Arai, M. & Heyman, F. (2001). Wages, profits and individual unemployment risk: Evidence from matched worker-firm data. Working Paper Series 172, Trade Union Institute for Economic Research.

Arbache, J. S. (2002). Unions and wage inequality in Brazil. Brazil jobs report, IPEA and World Bank.

Arbache, J. S., Dickerson, A., & Green, F. (2004). Trade liberalisation and wages in developing countries. *Economic Journal*, 114(493):F73–F96.

Arbache, J. S. & Negri, J. A. D. (2004). Filiação industrial e diferencial de salários no Brasil. *Revista Brasileira de Economia*, 58(2).

Behrman, J. R. (1999). Labor markets in developing countries. In Ashenfelter, O. & Card, D., editors, *Handbook of Labor Economics*, volume 3 of *Handbook of Labor Economics*, chapter 43, pages 2859–2939. Elsevier Science.

Bigsten, A., Collier, P., Dercon, S., Fafchamps, M., Gauthier, B., & Gunni, J. W. (2003). Risk sharing in labor markets. *World Bank Economic Review*, 17(3):349–366.

Black, S. E. & Strahan, P. E. (2001). The division of spoils: Rent-sharing and discrimination in a regulated industry. *American Economic Review*, 91(4):814–831.

Blanchflower, D. G., Oswald, A. J., & Sanfey, P. (1996). Wages, profits, and rent-sharing. *The Quarterly Journal of Economics*, 111(1):227–51.

Botero, J., Djankov, S., Porta, R., & Lopez-De-Silanes, F. C. (2004). The regulation of labor. *The Quarterly Journal of Economics*, 119(4):1339–1382.

Bound, J., Jaeger, D., & Baker, R. (1995). Problems with instrumental variables estimation when the correlation between the instruments and the endogenous explanatory variable is weak. *Journal of the American Statistical Association*, 90:443–450.

Bronars, S. G. & Famulari, M. (2001). Shareholder wealth and wages: Evidence for white-collar workers. *Journal of Political Economy*, 109(2):328–354.

Estevão, M. & Tevlin, S. (2003). Do firms share their success with workers? the response of wages to product market conditions. *Economica*, 70:597–617.

Ferreira, F. H. G., Leite, P. G., & Litchfield, J. A. (2006). The rise and fall of Brazilian inequality, 1981-2004. Policy Research Working Paper Series 3867, The World Bank.

Gonzaga, G. (2004). Labor turnover and labor legislation in Brazil. *Economía: Journal of the Latin American and Caribbean Economic Association*, 4:165–220.

Gonzaga, G., Menezes Filho, N., & Terra, C. (2006). Trade liberalization and

the evolution of skill earnings differentials in Brazil. *Journal of International Economics*, 68(2):345–367.

Hildreth, A. K. G. & Oswald, A. J. (1997). Rent-sharing and wages: Evidence from company and establishment panels. *Journal of Labor Economics*, 15(2):318–37.

Kramarz, F. (2003). Wages and international trade. CEPR Discussion Papers 3936, C.E.P.R. Discussion Papers.

Lester, R. A. (1952). A range theory of wage differentials. *Industrial and Labor Relations Review*, 5(4):483–500.

Margolis, D. N. & Salvanes, K. G. (2001). Do firms really share rents with their workers? IZA Discussion Papers 330, Institute for the Study of Labor (IZA).

Martins, P. S. (2004). Rent sharing before and after the wage bill. IZA Discussion Papers 1376, Institute for the Study of Labor (IZA).

Martins, P. S. & Esteves, L. A. (2006a). Is there rent sharing in developing countries? matched-panel evidence from Brazil. IZA Discussion Papers 2317, Institute for the Study of Labor (IZA).

Martins, P. S. & Esteves, L. A. (2006b). Rent sharing in Brazilian ABC Region. Mimeo, QMUL.

Menezes-Filho, N., Muendler, M.-A., & Ramey, G. (2006). The structure of worker compensation in Brazil, with a comparison to France and the United States. University of California at San Diego, Economics Working Paper Series 2005-01R2, Department of Economics, UC San Diego.

Revenga, A. (1997). Employment and wage effects of trade liberalization: The case of Mexican manufacturing. *Journal of Labor Economics*, 15(3):S20–43.

Ribeiro, E. P., Corseuil, C., Santos, D., Furtado, P., Amorim, B., & S, L. (2004). Trade liberalization, the exchange rate and job flows in Brazil. *Journal of Policy Reform*, 7(4):209–223.

Shea, J. (1997). Instrument relevance in multivariate linear models: A simple measure. *The Review of Economics and Statistics*, 79:348–352.

Teal, F. (1996). The size and sources of economic rents in a developing country manufacturing labour market. *Economic Journal*, 106(437):963–76.

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

WorldBank (2005). World development indicators. Report, World Bank.

WorldBank & IPEA (2002). Brazil jobs report. Report, World Bank.

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

	All Firms		All Exporting 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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker	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 per worker		**0.04**	
		(62.12)***	
Gross profit per worker			**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; (3) using 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	0.07	0.07	0.07
	(891.50)***	(892.22)***	(631.86)***	(632.43)***
Gender	0.15	0.15	0.19	0.19
	(105.01)***	(104.46)***	(84.75)***	(84.40)***
Experience	0.04	0.04	0.05	0.05
	(224.52)***	(224.72)***	(154.83)***	(155.09)***
Tenure	0.04	0.04	0.04	0.04
	(366.74)***	(367.15)***	(257.07)***	(257.47)***
Foreign firm	0.16	0.16	0.14	0.14
	(454.98)***	(464.16)***	(324.73)***	(334.14)***
Log firm size	0.07	0.07	0.04	0.04
	(806.10)***	(803.03)***	(276.93)***	(272.43)***
Net profit per worker	**-0.05**		**-0.07**	
	(-115.85)***		**(-79.64)*****	
Gross profit per worker		**-0.04**		**-0.05**
		(-80.14)***		**(-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; (3) using robust standard errors, allowing for worker clustering;

Table 7
2SLS Auxiliary regressions

Instruments	Net Profits per worker Financial IV	Gross Profits per worker Financial IV	Net Profits per worker All IV	Gross Profits per worker 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; (3) using robust standard errors, allowing for worker clustering; (4) 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 per worker	**-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 × gender interactions; (3) using robust standard errors, allowing for worker clustering;

Table 9
Number of Workers and Firms (*)

	All Firms	All Firms	Exporting 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

Note: (*) Sample of firms with more than 30 workers present in 1999-2001;

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 per worker	**-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 × gender interactions; (3) using robust standard errors, allowing for worker clustering;