Inter-American Development Bank
Banco Interamericano de Desarrollo (BID)
Research Department
Departamento de Investigación
Working Paper #608

Privatized Firms, Rule of Law and Labor Outcomes in Emerging Markets

By

Alberto Chong*
Gianmarco León**

*Inter-American Development Bank
**University of California, Berkeley

June 2007

Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

Chong, Alberto.

Privatized firms, rule of law and labor outcomes in emerging markets / by Alberto Chong, Gianmarco León.

p. cm.
(Research Department Working paper series ; 608)
Includes bibliographical references.

1. Privatization. 2. Employees. 3. Business enterprises. 4. Administrative agencies. I. León, Gianmarco. II. Inter-American Development Bank. Research Dept. III. Series.

HD3850 .C762 2007

Inter-American Development Bank
1300 New York Avenue, N.W.
Washington, DC 20577

The Research Department (RES) produces a quarterly newsletter, *IDEA (Ideas for Development in the Americas)*, as well as working papers and books on diverse economic issues. To obtain a complete list of RES publications, and read or download them please visit our web site at: http://www.iadb.org/res.

Abstract[1]

This paper takes advantage of a recent large firm-level dataset to compare labor indicators of privatized, private, and public firms around the world, particularly wages, benefits, labor composition, education and training, unionization, and quality of management. While labor productivity increases after privatization, the ratio of permanent workers to temporary workers also increases. Convergence depends to some degree on the quality of the institutions, namely, the rule of law. Not only is this true for the ratio of permanent workers to temporary workers, but also for education of the workforce, and for the manager's years of experience. On the other hand, the rule of law appears to be less important in the case of labor productivity and training.

JEL Classification: O10
Keywords: Privatization, Labor, Firms, Institutions, Public Sector, Cross-Country

[1] César Calderon, Hugo Ñopo, Anna Serrichio, Máximo Torero, and Luisa Zanforlin provided valuable comments and suggestions. The findings and interpretations in this paper are those of the authors and do not necessarily represent the views of the Inter-American Development Bank or its corresponding executive directors. The standard disclaimer applies. Corresponding author: Alberto Chong, Research Department, Inter-American Development Bank, Stop B-0900, 1300 New York Ave, NW, Washington, DC 20577, USA. Fax: (202) 623-2481, Tel: (202) 623-1536. E-mail: albertoch@iadb.org.

1. Introduction

While there is some empirical evidence showing that labor productivity tends to increase following privatization, the reasons for this increase in productivity remain unclear. Critics of privatization argue that employment reductions are the crucial factor. While the scant available evidence indicates that labor cost reductions are a source of the gains after privatization, these savings do not explain the bulk of the higher observed profitability (La Porta and López-de-Silanes, 1999). Increased labor productivity may not necessarily be due solely to labor cost reductions, and, even when it is, other productivity-enhancing measures may play a role, since labor cost reductions can also come from lower wages and benefits.[2] In fact, transfers from workers to profits may move in opposite directions. The fraction of profitability changes that may be attributed to labor cost savings encompasses the lower costs stemming from layoffs and the higher costs from wage increases for the remaining workers. It is believed that pay differentials tend to increase, partly in response to labor market conditions and especially in order to attract and provide incentives in the recruitment and retention of both experienced and skilled professionals and managers (World Bank, 2005). At the same time, it is said that privatization tends to produce "flatter" organizations, removing layers of middle management as labor contracts tend to be simplified, allowing managers to deploy workers in more flexible ways. Workers and unions are generally concerned that a post-privatization focus on profit and financial performance on the part of the private operator will lead to a deterioration of working conditions because of an unwarranted intensification of work, which may be expected in the context of increasing productivity. Thus, working hours may increase (World Bank, 2005). Additionally, it is believed that there may be an erosion of national-level collective bargaining, with a shift to enterprise-level bargaining or individual pay determination, a trend intensified by the increased use of subcontractors. Finally, it is expected that pay systems may change after privatization, as new managers will seek to relate earnings more directly to productivity performance. Privatization may have compositional effects on the labor force and hurt unskilled workers disproportionately (World Bank, 2005).

[2] Chong and López-de-Silanes (2006) provide evidence that for some Latin American countries, the real and industry-adjusted wages of workers in privatized firms increased after privatization. Both real and industry-adjusted wages for median firms increased by about 100 percent in Mexico and Peru. Bolivia enjoyed real wage increases of almost 110 percent, while in Argentina the industry-adjusted increase was about 70 percent. Colombia showed the smallest increase, but even in this case, workers in privatized firms increased their wages more than others in the private sector.

This paper focuses on a relatively broad set of labor outcomes and analyzes the differences between a very large number of private, public, and privatized firms around the world, mostly in emerging markets. In particular, it examines whether any differences are structural and whether convergence between privatized and private firms may occur, and also looks at the role of the rule of law. The specific focus is on wages, benefits, labor composition, education and training, unionization, and quality of management.[3]

While there has been some theoretical work on the link between privatization and labor outcomes (Haskel and Szymansky, 1992), this is to our knowledge the first cross-section paper at the firm level that provides empirical evidence in a systematic manner.[4] Furthermore, the country-specific empirical evidence that is available is limited and focuses almost exclusively on the impact of specific sectors on employment and wages. For instance, Monteiro (2003) argues that the wages of workers in the Portuguese banking sector follow a non-monotonic pattern after privatization. She finds that wages decrease at first, but later recover and converge to private-sector wages. Similarly, Chong, López-de-Silanes and Torero (2007) also find that wages in Peru show an initial negative effect but later return to private-sector standards. They also find that various measures of quality of life converge toward the standards of the private sector. Workers who were able to remain in the companies after privatization were better off than those who were laid off, partly because the companies were more productive or oligopolistic. These results counter the belief that workers lose in the long term after privatization and that workers who lose their jobs are condemned to unemployment or poverty.[5]

Whereas most of the scant studies on labor outcomes after privatization focus on wages, there are several issues that have remained unanswered. For example, the rise in average wages depends on the composition of the dismissed workers. If the dismissed workers were those with less qualifications and lower wages, the average wage will go up. However, blue-collar workers appear to actually fare better than their white-collar counterparts. Chong and Lopez-de-Silanes

[3] We are not able to make a rigorous impact evaluation of workers after privatization, as we do not have pre- and post-privatization data, but only have information on workers who stayed in firms after privatization.

[4] Haskel and Szymanski (1992) develop a theoretical model in which the objective function of the privatized firm focuses on profit maximization and the minimization of the union's bargaining power. Their model predicts convergence between wages in the privatized firms and other private firms.

[5] Other relevant studies that focus on wages and employment are Tansel (1998), who uses retrospective data for Turkey; Galiani and Sturzenegger (2005), who focus on a single firm in Argentina; Haskel and Syzmanski (1993), who study the United Kingdom; Brown, Earle, and Vakhitov (2006), who study Ukraine; and Chong and López-de-Silanes (2005), who show that adverse selection plagues privatization retrenchment programs, which casts doubt on the negative impact on employment.

(2006) show that wages for a cross-section of firms appear to exhibit the same trend, with sharp rises in blue-collar real and industry-adjusted wages and smaller, though still substantial, wage increases for white-collar workers. It appears that unskilled workers do not fare worse than skilled labor after privatization.

The paper is organized as follows. The next section describes the data employed, especially recently released firm data from the World Bank that cover a large number of countries. The third section presents the empirical approach, the fourth section presents the findings, and Section 5 analyzes convergence patterns between privatized and private firms. The sixth section focuses on the role of institutions, particularly the rule, and the Section 7 considers potentially omitted variables. Finally, Section 8 summarizes and concludes.

2. Data

Our main data source is the Productivity and the Investment Climate from the World Bank (2006), a comprehensive firm-level survey that covers several thousand business establishments in about 75 countries. The main objective of the survey was to provide governments and private-sector agents with quantitative data to allow them to adequately assess the business environment and firm performance in an internationally comparable data set. The main focus of the survey is on the microeconomic and structural dimensions of a country's business environment. Thus, the survey provides considerable detail on factors related to the effective functioning of product markets, financial and non-financial factor markets, and infrastructure services, including weaknesses in the legal, regulatory, and institutional frameworks. The data also include questions on the characteristics of the business and the investment climate in which it operates, and general information about the firm such as ownership, activities, location, sales and supplies, investment climate constraints, infrastructure, and services. With respect to labor relations, the survey includes wages, compensation, the skills of workers, status and training, the availability of skills, unionization, business-government relations, and several others.

The data-collection process occurred between 2000 and 2005 via face-to-face interviews with managing directors, accountants, human-resource managers, and other relevant company staff. A multiple stages sampling stratified by size, sector, and location was employed within each country, based on census groups, tax authorities registries, and commercial lists. We take advantage of the available detailed information on current and previous ownership of the firm,

which includes questions about the current major shareholder, former state ownership of the firm, whether a privatization process occurred, and if so, the year it took place. Also, unlike other firm-based surveys, this one includes a broad section on labor relations, which provides detailed information on the wages and compensation of temporary and permanent workers, the composition of the workforce with regard to tenure, educational level, training, unionization rates, and days of production lost due to strikes and civil unrest. Table 1 provides definitions of all the variables employed in this paper and Table 2 provides corresponding summary statistics.

Our most complete sample includes 34,751 firms in 75 countries.[6] The geographical composition of our sample includes many African, Latin American, and Eastern European countries, regions where privatization was pursued more actively. This is shown in Table 3. The other countries in the sample are mostly in Asia and Africa. About 5 percent of the interviewed firms were involved in a privatization process, and about the same percentage are state-owned firms. While some countries have privatized much more than others, the overall numbers are consistent with the percentages of privatized firms around the world when using other sources (World Bank, 2006). The Appendix provides basic simple correlation measures among the variables employed.

3. Empirical Approach

In order to study the possible impact of privatization on a relatively wide variety of labor outcomes, our empirical analysis is based on a parsimonious but comprehensive approach. In particular, we estimate an empirical specification of the form:

$$y_{ijk} = \alpha_{ijkt} + \beta_1 priv_{ijkt} + \beta_2 privat_{ijkt} + \beta_3 sales_{ijkt} + \upsilon_j + \nu_k + \mu_t + \varepsilon_{ijkt} \qquad (1)$$

6 Overall, our sample includes observations for the following countries (the number of firms within each country in parentheses): Albania (137), Algeria (499), Armenia (302), Bangladesh (937), Belarus (199), Benin (170), Bhutan (74), Bosnia and Herzegovina (102), Brazil (1,539), Bulgaria (454), Cambodia (285), Chile (867), China (2947), Costa Rica (273), Croatia (180), Czech Republic (286), Ecuador (345), Egypt (937), El Salvador (445), Eritrea (34), Estonia (177), Ethiopia (396), Georgia (135), Germany (1,099), Greece (445), Guatemala (405), Guyana (145), Honduras (398), Hungary (433), India (2620), Indonesia (574), Ireland (428), Kazakhstan (397), Kenya (153), Korea (511), Kosovo (274), Kyrgyz Republic (248), Latvia (161), Lithuania (355), Macedonia, FYR (100), Madagascar (179), Malawi (127), Mali (123), Mauritius (139), Moldova (326), Morocco (1465), Mozambique (92), Nepal (180), Nicaragua (425), Nigeria (115), Oman (68), Pakistan (943), Peru (125), Philippines (560), Poland (791), Portugal (373), Romania (476), Russia (378), Senegal (198), Serbia and Montenegro (148), Slovak Republic (140), Slovenia (187), South Africa (498), Spain (521), Sri Lanka (285), Syrian Arab Republic (171), Tajikistan (282), Tanzania (165), Thailand (1,166), Turkey (,1181), Uganda (183), Ukraine (431), Uzbekistan (324), Vietnam (1,373), and Zambia (147).

where y_{ijkt} is an outcome variable of firm i, belonging to industry k, in country j and year t. In this context, $priv_{ijkt}$ and $privat_{ijkt}$ are our variables of interest. They are defined as dummy variables that capture those firms that have always been private and those that at some point in time were owned by the government but that now have a private agent as the major shareholder. Also, $sales_{ijkt}$ denotes the natural logarithm of the total sales during the last fiscal year in real thousand dollars. This variable is intended to control for the effects of the size of the firm on labor outcomes.[7] We also include country, industry, and year fixed effects, which are represented by the terms υ_j, ν_k, and μ_t, respectively. Finally, ε_{ijkt} is an error term. In fact, unlike other firm-level surveys, the Investment Climate dataset includes an industry categorization based on the three-digit ISIC codes.[8] As mentioned above, this allows us to control for effects due to particular industry structures or productivity differences across industries. The case of natural monopolies in public services provides a good example of the need to control for particular industry effects. As is well known, when private firms take control of public enterprises, regulatory issues are crucial because the lack of competitors and the regulatory burden may have an impact on prices and on the make up of the contractual arrangements related to the factors of production, especially human capital.

It may be argued that endogeneity issues could pose a problem in the empirical approach of this paper. For example, it has been suggested that the existence of labor streamlining activities could signal that a firm is in bad shape. A firm that is being streamlined may decide to pursue privatization not because of the streamlining activities themselves, but because such a reform may be pursued precisely when firms are inefficient and unprofitable in the first place. If this effect is not controlled for, it might be possible to incorrectly conclude that labor restructuring can cause lower rates of privatization. Endogeneity may arise, for example, as governments try to restructure the labor force of state-owned telecom enterprises before the sale in order to raise the privatization price. The resulting sign may be a reflection that firms in bad

[7] In alternative specifications we normalized this variable using number of workers. The results are very similar and are available from the authors upon request.

[8] Overall, our sample includes observations for the following industries (the number of firms in the industry is in parentheses): Textiles (2,886), Leather (843), Garments (4,342), Agro industry (499), Food (3,474), Beverages (837), Metals and machinery (3,497), Electronics (1,414), Chemicals and pharmaceutics (2,043), Construction (1,523), Wood and furniture (2,169), Non-metallic and plastic materials (1,679), Paper (590), Sport goods (44), IT services (670), Other manufacturing (490), Telecommunications (164), Accounting and finance (230), Advertising and marketing (690), Other services (933), Retail and wholesale trade (2,654), Hotels and restaurants (761), Transport (720), Real estate and rental services (433), Mining and quarrying (114), Auto and auto components (945), Other transport equipment (76), Other unclassified (31).

shape are downsizing labor. For instance, if the unobservable characteristics of a firm are positively correlated with the presence of strong unions and frequent strikes, the government may be particularly interested in dismantling them.

In fact, endogeneity does not appear to be of great concern in this paper for several reasons. In most cases in our sample, privatization occurred roughly 10 years before the firm survey was taken—on average 9.7 years before. Furthermore, privatization processes are typically embedded in the context of a much larger reform process, so the decision to privatize may not depend on the particular characteristics of a firm, but rather on a country-level political decision. In this context, it is reasonable to believe that labor outcomes, or workers' characteristics, will not affect the decision to pursue privatization. This is particularly true in emerging markets, where most of the privatization processes pursued by governments have been on massive or quasi-massive levels and where essentially all privatizations were the result of overriding political decisions in the context of structural reforms (Chong and López-de-Silanes, 2005). Given the fact that our sample size consists of mostly emerging markets, we believe the argument above is reasonably solid.[9] Even assuming that endogeneity may be a potentially relevant issue with regard to the empirical approach of this paper, most of the labor variables employed as dependent variables are very unlikely to be endogenous. In fact, this is the case for the following variables: (i) experience of the manager; (ii) education of the workforce; (iii) training of the workforce; (iv) composition of the workforce; and, admittedly, to a lesser extent, wages and productivity. As a further robustness check in the latter two cases—wages and productivity—we apply an instrumental variables approach. As unlikely as it may be, especially in emerging markets, it is theoretically possible that endogeneity may drive privatization decisions when firms are not productive enough or when excessive pay and benefits is present.

4. Findings

Table 4 shows the results when using the benchmark specification (1) for a broad set of labor outcomes. The first column shows the dependent variables while the other columns report the estimated coefficients of the independent variables. Our variables of interest are the dummies for both private and privatized firms. As defined in Table 1, a private firm dummy takes a value of 1 when the firm is owned by a private agent and always has been like this, and 0 otherwise. A firm

[9] When excluding the four countries that are not emerging-market economies (Spain, Portugal, Korea and Ireland) and replicating all the exercises performed in this paper, the results do not change.

is defined as private if the largest shareholder is an individual, family, domestic company, foreign company, bank, investment fund, manager of the firm, or employee of the firm. On the other hand, a privatized firm is defined as one that used to be owned by the government but whose largest shareholder at the time of the survey was a private agent, as defined as above. The variable employed is a dummy variable that takes the value of 1 when the above definition holds and 0 otherwise. Government-owned enterprises are used as the base category.

Along the lines of several recent studies (Megginson and Netter, 2001; Chong and López-de-Silanes, 2005), we find evidence of improved performance in both private and privatized firms in terms of productivity, which is significantly higher than that of state-owned firms. Interestingly, when testing the ratio of total wages and compensation divided by total gross sales, we find a statistically significant difference in labor productivity in the case of permanent workers, but not temporary workers, since the coefficients of both the private firm and privatized firm dummies yield statistically significant and negative coefficients. That is, for a given level of wages and compensation to permanent workers, total sales and benefits must be higher in both private and privatized firms in relation to—state-owned enterprises. Notice that the productivity of permanent workers appears to be higher in private firms than in privatized ones. This does not hold in the case of temporary workers, in which case we do not observe any significant differences in productivity. This is also shown in Table 4.

Somewhat surprisingly, the observed difference in labor productivity between permanent and temporary workers is not reflected in average wages. In fact, when focusing on the wage structure it is clear that, on average, privatized firms tend to pay higher wages to their managerial staff than to unskilled or production workers, as shown by the fact that the coefficient of the wages of managers is statistically significant at conventional levels but is not so in the case of unskilled and production workers. Interestingly, this finding is partly consistent with the conventional wisdom that less-qualified workers tend to be losers in privatization processes (Kikeri, 1999).[10] It is also consistent with the typical relative supply of labor in emerging markets. Whereas the supply of less-qualified workers is abundant, the supply of highly qualified workers and managers is quite scarce. Furthermore, there is a growing literature analyzing remunerations to top managers, which argues that the salaries paid to executives and top

[10] This result is not really surprising. For a number of reasons (e.g., political) state-owned enterprises tend to pay wages and benefits in excess of marginal productivity. In fact, this is particularly true for unskilled workers (Kikeri, 1999). Privatization may simply be linking payment to marginal productivity.

managers tend to rise after privatization since pay-scale constraints are released, and since executives are also more explicitly linked to observable measures of firm performance and have more bargaining power. Another important argument states that privatized firms tend to invest more widely in the managerial sector in order to restructure the firm and catch up with the organizational structures of the private sector. Our results may be reflecting this fact.

An additional strand of the literature claims that privatization leads to significant reductions in the rights of workers as well as in job security (Feffer, 2005). The main argument is that the new jobs at privatized firms are offered mostly through temporary contracts, particularly in the case of unskilled workers. This type of contract tends to be more flexible in terms of firing and hiring, but it also reduces protection and effective compensation to workers. We further analyze this issue by including the ratio of temporary to total workers as a dependent variable; the results are shown in Table 4. We also find some slight differences in the proportion of permanent skilled workers who receive job training with respect to unskilled workers who do so. Privatized firms train a smaller proportion of their unskilled workers when compared with private and state-owned enterprises, which is consistent with the fact that the government tends to provide more labor stability than private enterprises. It has been claimed that private companies groom skilled workers for managerial positions, while lower-skilled tasks tend to be left to temporary workers (Chong and López-de-Silanes, 2005).

Long-term contracts, such as those offered by the government or to qualified workers in private firms, may provide incentives for employers to invest in human capital. In fact, this appears to be the case. Regarding the allocation of training among permanent workers by type of firm, we obtain negative coefficients for our private and privatized dummies only in the corresponding regression that takes into account the proportion of unskilled workers who received training. Interestingly, when testing the proportion of skilled workers who received training, we do not find any statistically significant differences among firms. Thus, it appears that privatized firms offer less formal training to their unskilled workers compared to government firms.

As expected, state-owned firms have much higher unionization rates than private and privatized firms. Unsurprisingly, we also find that bigger firms, as measured by total sales, have bigger unions. Also, the dummy for privatized firms yields negative but statistically insignificant coefficients. Perhaps privatized firms still have to honor some contracts and labor structures from

the time they were state-owned. Interestingly, we do not observe any statistically significant differences among type of firms with respect to lost days of production or strikes and civil unrest.[11]

When it comes to the education of the labor force, we find some substantial differences among types of firms. Although the workforce composition within privatized firms is skewed toward workers with lower educational levels, we also find that the top managers in privatized firms have significantly more experience in the field than those elsewhere. This evidence reinforces the conventional wisdom in the developing world that privatized firms place particular emphasis on the managerial staff.

5. Convergence between Private and Privatized Firms

Why are there any differences between privatized and private firms if they both operate under the same set of rules and incentives? A possible explanation may be that time matters. Privatized firms cannot be transformed from one day to the next, and there may be an adjustment period after which full convergence may occur (Chong, López-de-Silanes and Torero, 2007). To test this idea, we replace the dummy for privatized firms with another explanatory variable that captures the number of years since the state-owned enterprise became private.[12] The results are shown in Table 5. The interpretation of the regression coefficients is straightforward. If we obtain the same sign for both the coefficient of the private firm dummy and for the number of years since privatization occurred, a convergence pattern may be present, since the marginal effect of the continuous variable will point toward an increase, or decrease, for each year since the privatization occurred.

In the case of the labor-productivity measures considered in this paper, we do not find evidence of a convergence pattern between private and privatized firms, either in terms of the productivity of permanent workers or of temporary workers. Furthermore, when focusing on wages, we find no statistically significant differences among private, privatized, or state-owned firms in terms of wages and compensation to permanent and temporary workers. A similar finding holds in the case of the managerial staff. Namely, there are no statistically significant

[11] Because of space constraints, these results are not shown in the tables but are available from the authors upon request.
[12] Our sample did not include privatized firms that became state-owned firms again.

differences between types of ownership and managerial pay over time. Again, convergence does not appear to occur.

However, in the case of number of temporary workers vis-à-vis number of permanent workers, we find evidence that convergence between private and privatized firms may occur, as our variable of interest—years after privatization—yields a positive coefficient that is statistically significant. We also find that privatized firms offer less training to their unskilled workers, compared with both state-owned and private-sector firms. Interestingly, this gap tends to increase as time since privatization increases. This result may be construed as giving credence to the view that, at least in this aspect, privatization tends to be less beneficial to more vulnerable workers, since they are typically the ones who occupy unskilled occupations; however, it is unclear if this is actually the case since we do not have information on the rate of workers who go from temporary to permanent status.

Finally, in terms of the educational levels of the workforce, we also find a divergence rather than a convergence pattern among types of firms. The results are shown in Table 5. Privatized firms tend to have more uneducated workers and fewer employees with more than 12 years of formal education, while private firms seem to concentrate relatively highly educated workers. The pattern diverges as time since privatization increases. This may occur because of technological differences between types of firms. Human capital requirements may be different for newly privatized firms as machinery and equipment for such firms are typically more capital intensive. This is somewhat consistent with previous findings in Latin America (Chong and López-de-Silanes, 2005).

6. Rule of Law

A further reason for a lack of convergence in several labor outcomes between private-sector firms and privatized firms may be a rather poor institutional setting that does not allow firms to take full advantage of existing market conditions (World Bank, 2006). Table 6 shows the results when a proxy for rule of law is included (ICRG, 2006). Unlike the previous section, we do observe a pattern of convergence between private firms and privatized firms in the case of productivity of permanent workers.[13]

[13] We have already shown that there is no difference in the productivity of the temporary workers.

Also, when it comes to the wages and compensation of temporary workers, the private sector seems to pay more than the government or privatized firms, but this only happens when we control for rule of law. The enforceability of labor legislation may explain these results. A strange result obtained here is a divergence between the average wages of permanent workers in private and privatized firms within a context of good institutional quality. As time goes by, private firms tend to pay higher wages to permanent workers, whereas privatized firms tend to pay lower ones.

The results shown in previous sections regarding the percentage of temporary workers in the workforce hold even after controlling for institutional quality. This means that regardless of the level of rule of law, privatized and private firms always have a more flexible workforce than government-owned firms, which allows them to easily adapt their production capacity to the business cycle. Also, there is a convergence in the composition of the workforce in terms of the educational level between private and privatized firms under an adequate institutional setting, which is consistent with the findings above. Finally, the differences observed between privatized, private, and government-owned firms with respect to the percentage of the workforce that receives on-the-job training disappear once we control for institutional quality.

7. Potentially Omitted Variables

The aim of this section is to assess the robustness of the results in the previous section by following a method developed by Sala-i-Martín (1997). He develops a robustness test by looking at the entire distribution of the estimator of the variable of interest by focusing on the fraction of the density function lying on each side of 0.[14] Given that 0 divides the area under the density into two sections, Sala-i-Martín denotes the larger of the two areas, *cdf(0),* regardless of whether it is above or below 0. Under the assumption that the distribution of the coefficient of interest is non-normal, the *cdf(0)* is calculated as follows. We consider a group of *n* variables classified as: (i) *dependent variable* (y_i), as measured by income quintiles, (ii) *core explanatory variables* ($x_{B,i}$), or vector of basic determinants and (iii) *ancillary variables* ($x_{A,i}$), representing a set of related auxiliary variables identified as related to income quintile determination.

Using our benchmark specification, we augment our empirical models by using the pool of ancillary variables X_A. The idea is to choose up to two variables at a time, and perform

[14] If 95 percent of the density function for the estimates of the coefficient of interest lies to the right of 0, one could say that this variable is more likely to be correlated with our dependent variable.

regressions using all the possible combinations based on our pool of ancillary variables.[15] In general, we find that our key results do not change, since all of the coefficients of the variables of interest that yield statistically significant coefficients are also statistically significant under this sensitivity test as well.

8. Summary and Conclusions

This paper examines the link between privatization and a broad set of labor outcomes for a cross section of firms in several emerging markets around the world. While some recent studies have focused on the impact of privatization on employment, and to a much lesser extent on wages, most of this research tends to focus on one specific country and in several cases yields somewhat contradictory results that stress the need for further empirical work. Focusing on the potential labor differences between private, public, and privatized firms for a very large number of firms around the world, we are able to examine whether any differences between firms are structural or whether convergence may occur, and investigate the determinants of such behavior. The particular focus in this paper is on wages, benefits, labor composition, education and training, unionization, and quality of management. We find that while labor productivity increases after privatization, the ratio of permanent workers to temporary workers increases, and that convergence toward the average labor outcome depends to some degree on the quality of the institutions, namely, the rule of law. This is particularly true in the case of the ratio of temporary workers to permanent workers, the education of the workforce, and the years of experience of the manager. On the other hand, we find that the rule of law appears to be less important in the case of labor productivity and training.

---

[15] The ancillary variables employed are urban, percentage of female workers, fiscal deficit, inflation rate, rate of growth, income inequality, size of the informal sector, perception of corruption at the firm level, and perception of bureaucratic quality at the firm level. The source for all the variables except the informal sector is the World Bank (2006). For the informal sector variable, the source is Chong and Gradstein (2007). We test our basic specification for all possible combinations of ancillary variables and compute the coefficient estimates, its variance, the (integrated) likelihood, and the individual *cdf(0)* for each regression. This is summarized in the following vector: $\{\hat{\gamma}_{I,j}, \hat{\sigma}^2_{I,j}, L_{I,j}, \Phi_{I,j}(0/\hat{\gamma}_{I,j}, \hat{\sigma}^2_{I,j})\}$ *;* (ii) We compute the aggregate *cdf(0)* of our coefficient of interest γ_1 as the weighted average of all individual *cdf(0)s* $\Phi_I(0) = \sum_{j=1}^{M} \omega_{I,j} \Phi_{I,j}(0/\hat{\gamma}_{I,j}, \hat{\sigma}^2_{I,j})$ where the weights, $\omega_{I,j}$, are the integrated likelihoods, $\omega_{I,j} = \frac{L_{I,j}}{\sum_{k=1}^{M} L_{I,k}}$. The variable of interest is said to be strongly correlated (i.e., is robust) with probability of ending up on a determined quintile if the weighted cdf(0), is greater than or equal to 0.95.

References

Brown, D., J. Earle, and V. Vakhitov. 2006. "Wages, Layoffs, and Privatization: Evidence from Ukraine." *Journal of Comparative Economics* 34(2): 272-294.

Chong, A. and M. Gradstein. 2007. "Institutions and Informality." *Journal of Public Economics*. Forthcoming.

Chong, A., F. Lopez-de-Silanes, and M. Torero. 2007. "Back to Reality: What Happens to Workers After Privatization?" Manuscript. Washington, D.C.: Inter-American Development Bank.

Chong, A. and F. Lopez-de-Silanes, eds., 2005. *Costs and Benefits of Privatization in Latin America*. Palo Alto, United States: Stanford University Press.

Chong, A. and F. Lopez-de-Silanes, 2006. "Privatization, Labor Policies, and Rehiring around the World." *Revise and Resubmit Journal of Public Economics* .

Fallick, B. 1996. "A Review of the Recent Empirical Literature on Displaced Workers." *Industrial and Labor Relations Review* 50(1): 5–16.

Feffer, J. 2005. *Living in Hope: People Challenging Globalization.* Philadelphia: American Friends Service Committee.

Galiani, S. and F. Sturzenneger. 2005. *The Impact of Privatization on the Earnings of Restructured Workers*. Working Paper. John F. Kennedy School of Government, Harvard University.

Haskel, J. and S. Szymanski. 1992. "A Bargaining Theory of Privatisation." *Annals of Public and Cooperative Economics* 63 (2): 207-227.

-----. 1993. "Privatisation, Liberalisation, Wages and Employment: Theory and Evidence for the UK." E*conomica* 60(238): 161-182.

ICRG (2006). Dataset of the International Country Risk Guide. Washington, DC.

Inter-American Development Bank. 2004. *Se Buscan Buenos Empleos.* Economic and Social Progress Report 2004. Washington D.C.: Inter-American Development Bank.

Kikeri, S.1999. "Privatization and Labor: What Happens to Workers When Governments Divest?" World Bank Technical Paper 396. Washington, D.C.: World Bank.

La Porta, R. and F. López-de-Silanes. 1999. "The Benefits of Privatization: Evidence from Mexico." *Quarterly Journal of Economics* 114(4): 1193–242.

López-de-Silanes, F.1997. "Determinants of Privatization Prices." *The Quarterly Journal of Economics* 112(4): 965-1025.

Megginson, W. and J. Netter. 2001. "From State to Market: A Survey of Empirical Studies on Privatization." *Journal of Economic Literature* 39(2): 321–89.

Monteiro, N. 2003. "The Impact of Privatization on Wages: evidence from the Portuguese Banking Industry." Universidade do Minho, Núcleo de Investigação em Políticas Económicas (NIPE) Working Paper 11/04. Braga, Portugal.

Parker, D. and S. Martin. 1996. "The Impact of UK Privatization on Employment, Profits and the Distribution of Business Income." *Public Money and Management* 16(1): 31-37.

Rama, M. 1999. "Efficient Public Sector Downsizing." *World Bank Economic Review.* Washington, D.C.: World Bank.

Sala-i-Martin, X. 1997. "I Just Ran Two Million Regressions." *American Economic Review* 87(2): 178–83.

Tansel, A. 1998. "Workers Displaced Due to Privatization in Turkey: Before versus after Displacement." *METU Studies in Development* 25(4): 625–47. Middle East Technical University, Ankara, Turkey.

World Bank. 2005. PPIF Labor Toolkit. Mimeo, Washington, D.C.: World Bank.

World Bank. 2006. World Development Report. Washington, D.C.: World Bank.

Table 1. Definitions of Variables

Variable	Definition
Government owned	Dummy variable that takes the value of 1 when the firm is owned by the government and 0o otherwise. A firm is defined as government owned if the government or government agency (local or national) is the firm's largest shareholder.
Private	Dummy variable that takes the value of 1 when the firm is owned by a private agent and 0 otherwise. A firm is defined as private if the firm's largest shareholder is an individual, family, domestic company, foreign company, bank, investment fund, manager of the firm, or the employee of the firm.
Privatized	Dummy variable that takes the value of 1 when the firm has been privatized and 0 otherwise. A firm is defined as privatized when it was owned by the government at some point and currently the largest shareholder is a private agent (as defined above).
Time since privatization	Time between the moment when the firm was privatized and the moment of the interview. For the cases when the firm has never been privatized, this variable takes the value of 0.
Total wages and compensation (perm. workers)/Total sales	Ratio between the total wages plus compensation paid by the firm to permanent workers (all benefits, including food, transportation, social security, etc) and total sales made by the firm during the last fiscal year.
Total wages and comp. (temp. workers)/Total sales	Ratio between the total wages plus compensation paid by the firm to temporary workers (all benefits, including food, transportation, social security, etc) and total sales made by the firm during the last fiscal year.
Log(Average wages and compensation temp. workers)	Average wages and compensation paid by the firm to each temporary worker (all benefits, including food, transportation, social security, etc). It is calculated as the quotient between the wages and compensation paid to temporary workers divided by the average number of temporary workers employed during the last fiscal year.
Average wages perm. Workers	Average wages and compensation paid by the firm to each permanent worker (all benefits, including food, transportation, social security, etc). It is calculated as the log of the quotient between the wages and compensation paid to temporary workers and the average number of temporary workers employed during the last fiscal year.
Average wages perm. workers (managers)	Average wages and compensation paid by the firm to each permanent worker in a managerial position (all benefits, including food, transportation, social security, etc) It is calculated as the log between the wages and compensation paid to temporary workers divided by the average number of temporary workers employed during the last fiscal year.
Log(Average wages perm. workers (prod. workers))	Average wages and compensation paid by the firm to each permanent production (skilled and unskilled) worker (all benefits, including food, transportation, social security, etc). It is calculated as the quotient between the wages and compensations paid to temporary workers divided by the average number of temporary workers employed during the last fiscal year.
Temporary workers/Total number of workers	Ratio between the average number of temporary workers during the last year and the average number of workers in the firm.
% perm. skilled employees that received training last year	Percentage of total permanent skilled employees who received formal training during the last year.
Percent permanent unskilled employees who received training last year	Percentage of total permanent unskilled employees who received formal training during the last year.
Percent of workforce with less than 12 yrs. Education	Percentage of workforce at the establishment with less than 12 years of formal education.
Percent of workforce with more than 12 yrs. Education	Percentage of workforce at the establishment with more than 12 years of formal education ("some university or higher").
Experience of top manager	Years of experience of the top manager in the field
Rule of Law	Synthetic Index that includes several indicators measuring the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts. Together, these indicators measure the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions, and importantly, the extent to which property rights are protected. Higher indicator denotes a higher quality rule of law. We use the average value of this index for year 2000 (ICRG, 2006).
Sales	Natural logarithm of the total sales, expressed in thousand of constant 2000 US dollars.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Government	34,751	0.06	0.23	0.00	1.00
Private	34,751	0.89	0.31	0.00	1.00
Privatized	34,751	0.05	0.22	0.00	1.00
Time since privatization	34,685	0.40	2.12	0.00	93.00
Sales	34,751	6.48	2.51	-9.18	21.56
Rule of law	34,477	0.01	0.73	-1.42	1.90
Average wages and compensation temp. workers	2,619	4.77	2.29	-0.91	7.73
Average wages perm. workers	12,440	6.12	2.77	-7.77	16.15
Average wages perm. workers (managers)	8,758	7.23	2.64	-4.16	16.08
Average wages perm. workers (prod. workers)	4,877	5.64	2.88	-6.11	13.58
Temporary workers/Permanent workers	24,196	0.15	0.24	0.00	1.00
Percent permanent skilled employees received training	15,518	25.90	37.11	0.00	100.00
Percent permanent unskilled employees received training	11,233	19.11	33.74	0.00	100.00
Percent workforce with fewer than 12 years education	34,751	53.99	42.38	0.00	100.00
Percent workforce with more than 12 years education.	24,779	18.75	24.25	0.00	100.00
Years of experience of top manager in the field	17,839	8.89	9.55	0.00	50.00

Table 3: Distribution of Firms in Sample by Ownership Status, Industrial Sector and Region

	Private		Privatized		Government		Total	
	%	No.	%	No.	%	No.	%	No.
Industrial sector								
Manufacturing	91.2	23,292	4.4	1,124	4.4	1,120	72.4	25,536
Services	83.5	6,237	5.8	432	10.7	797	21.2	7,466
Agro industry	86.3	466	5.0	27	8.7	47	1.5	540
Construction	81.7	1,292	9.4	148	8.9	141	4.5	1,581
Other	69.1	96	19.4	27	11.5	16	0.4	139
Total	89.0	31,383	5.0	1,758	6.0	2,121	100.0	35,262
Region								
Africa	89.4	2,450	5.5	152	5.0	138	7.8	2,740
East Asia Pacific	84.8	6,291	2.2	165	12.9	960	21.0	7,416
Europe and Central Asia	82.0	9,796	10.8	1,291	7.2	857	33.9	11,944
Latin America and the Caribbean	99.0	4,933	0.6	31	0.4	19	14.1	4,983
Middle East and North Africa	96.8	3,039	0.8	25	2.4	76	8.9	3,140
South Asia	96.7	4,874	1.9	94	1.4	71	14.3	5,039
Total	89.0	31,383	5.0	1,758	6.0	2,121	100.0	35,262

Table 4. Does Privatization Make a difference in Labor Outcomes?

	Private		Privatized		Log(Sales)		Obs.	R-sq.
Productivity								
Total wages and comp. (perm. workers)/Total sales	-0.078	(0.018)***	-0.032	(0.014)**	-0.034	(0.005)***	15595	0.27
Total wages and comp. (temp. workers)/Total sales	-0.008	(0.016)	0.001	(0.015)	-0.010	(0.002)***	4021	0.09
Average wages								
Log(Average wages and compensation temp. workers)	0.043	(0.102)	0.034	(0.120)	0.061	(0.017)***	2619	0.32
Log(Average wages perm. workers)	0.043	(0.049)	-0.063	(0.102)	0.107	(0.018)***	9873	0.58
Log(Average wages perm. workers (managers))	0.098	(0.091)	0.308	(0.105)***	0.159	(0.017)***	6955	0.42
Log(Average wages perm. workers (prod. workers))	0.132	(0.113)	0.082	(0.155)	0.068	(0.018)***	3939	0.79
Composition of the workforce								
Temp. workers/Perm. Workers	0.081	(0.028)***	0.064	(0.024)**	-0.004	(0.002)**	24196	0.08
Training								
% perm. skilled emp. who received training	1.139	(1.933)	-1.204	(1.556)	2.732	(0.471)***	15518	0.03
% perm. unskilled emp. who received training	-1.971	(1.970)	-3.329	(1.485)**	1.783	(0.314)***	11233	0.02
Education of the workforce								
% of workforce with fewer than 12 yrs. educ	0.412	(0.770)	5.588	(0.930)***	-0.801	(0.189)***	34751	0.33
% of workforce with more than 12 yrs. educ.	0.498	(1.312)	-5.481	(1.210)***	0.968	(0.204)***	24779	0.13
Quality of the top manager								
Years of exp. of the top manager in the field	-0.992	(1.231)	2.111	(1.161)*	0.345	(0.073)***	17839	0.02

The dependent variables are shown in the first column, and the control and interest variables are shown in the next columns. All results come from country fixed effects regressions using industry and year dummies. Also, as in Table 5, we control for the log of total sales in the previous fiscal year. Heteroskedasticy robust standard errors are corrected for clusters at the industry and country levels in all cases (shown in parentheses). * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 5. Do Privatized Firms Converge with the Firms in the Private Sector?

	Private		Time since privatization		Obs.	R-sq.
Productivity						
Total wages and comp. (perm. workers)/Total sales	-0.062	(0.014)***	-0.001	(0.001)	12427	0.26
Total wages and comp. (temp. workers)/Total sales	-0.007	(0.013)	0.000	(0.001)	4008	0.09
Average wages						
Log(Average wages and compensation temp. workers)	0.023	(0.074)	0.005	(0.006)	2611	0.32
Log(Average wages perm. workers)	0.054	(0.047)	-0.004	(0.008)	9861	0.58
Log(Average wages perm. workers (managers))	-0.018	(0.114)	0.005	(0.009)	6950	0.42
Log(Average wages perm. workers (prod. workers))	0.085	(0.101)	0.003	(0.009)	3933	0.79
Composition of the workforce						
Temp. workers/Perm. workers	0.070	(0.028)**	0.005	(0.002)**	24160	0.08
Training						
% perm. skilled emp. who received training	1.258	(1.980)	-0.113	(0.160)	15494	0.03
% perm. unskilled emp. who received training	-1.496	(1.966)	-0.289	(0.169)*	11211	0.02
Education of the workforce						
% of workforce with fewer than 12 yrs. educ	-0.806	(0.850)	0.361	(0.086)***	34685	0.33
% of workforce with more than 12 yrs. educ.	2.031	(1.180)*	-0.361	(0.095)***	24746	0.13
Quality of the top manager						
Years of exp. of the top manager in the field	-1.723	(1.129)	0.034	(0.072)	17810	0.02

The dependent variables are shown in the first column, and the control and interest variables are shown in the next columns. All results come from country fixed effects regressions using industry and year dummies. Also, as in Table 5, we control for the log of total sales in the previous fiscal year. Heteroskedasticy robust standard errors are corrected for clusters at the industry and country levels in all cases (shown in parentheses). * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 6. Does the Rule of Law Matter?

	Overall effect: private firms in a country with average RL			Overall effect: Time since privatization in a country with average RL			Obs.	R-sq.
Productivity								
Total wages and comp. (perm. workers)/Total sales	-0.076	(0.017)	***	-0.021	(0.019)		12427	0.26
Total wages and comp. (temp. workers)/Total sales	-0.014	(0.03)		0.001	(0.017)		3932	0.09
Average wages								
Log(Average wages and compensation temp. workers)	0.179	(0.109)	*	0.066	(0.156)		2546	0.32
Log(Average wages perm. workers)	0.095	(0.057)	**	-0.084	(0.098)	***	9861	0.58
Log(Average wages perm. workers (managers))	0.168	(0.079)		0.497	(0.119)		6777	0.42
Log(Average wages perm. workers (prod. workers))	0.249	(0.166)		0.201	(0.186)		3928	0.79
Composition of the workforce								
Temp. workers/Perm. Workers	0.078	(0.028)	***	0.062	(0.024)	**	23888	0.08
Training								
% perm. skilled emp. who received training	1.173	(2.009)		-1.112	(1.642)		15471	0.03
% perm. unskilled emp. who received training	-1.087	(1.714)		-2.485	(1.548)		11204	0.02
Education of the workforce								
% of workforce with fewer than 12 yrs. educ	1.206	(0.852)		5.347	(1.014)	***	34411	0.33
% of workforce with more than 12 yrs. educ.	-0.450	(1.335)		-5.051	(1.268)	***	24601	0.13
Quality of the top manager								
Years of exp. of the top manager in the field	-0.688	(1.284)		2.133	(1.126)	*	17563	0.02

The dependent variables are shown in the first column. In the next columns we report the overall effect of private dummy, and the time after privatization for the mean value of Rule of Law within the sample considered; the coefficient and standard errors reported are obtained after running fixed effects regressions (country, year, and time levels are accounted for), which include private dummy, the time since privatization, the interactive terms between each of these variables and Rule of Law, and the log of total sales. Full regression results are available upon request to the authors. Heteroskedasticy robust standard errors are corrected for clusters at the industry and the country levels in all cases (shown in parentheses). * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 7. Potentially Omitted Variables

	Labor Outcomes		Convergence		Rule of Law	
Productivity	Average	Cdf(0)	Average	Cdf(0)	Average	Cdf(0)
Total wages and comp. (perm. workers)/Total sales	-0.037	0.95	-0.001	0.62	-0.027	0.86
Total wages and comp. (temp. workers)/Total sales	0.001	0.73	0.001	0.65	0.001	0.89
Average wages						
Log(Average wages and compensation temp. workers)	0.035	0.88	0.007	0.69	0.079	0.86
Log(Average wages perm. workers)	-0.060	0.91	-0.007	0.75	-0.083	0.99
Log(Average wages perm. workers (managers))	0.303	0.99	0.006	0.64	0.507	0.87
Log(Average wages perm. workers (prod. workers)	0.076	0.90	0.005	0.64	0.211	0.86
Composition of the workforce						
Temp. workers/Perm. workers	0.067	0.97	0.006	0.91	0.059	0.93
Training						
% perm. skilled emp. who received training	-1.195	0.93	-0.110	0.88	-1.123	0.61
% perm. unskilled emp. who received training	-3.333	0.95	-0.291	0.90	-2.471	0.73
Education of the workforce						
% of workforce with fewer than 12 yrs. educ	5.601	0.99	0.377	0.99	5.322	0.99
% of workforce with more than 12 yrs. educ.	-5.486	0.99	-0.378	0.99	-5.093	0.99
Quality of the top manager						
Years of exp. of the top manager in the field	2.268	0.92	0.047	0.84	2.192	0.94

Appendix: Correlation Matrix

(p-values shown below correlation coefficients)

	Government	Private	Privatized	Time since privatizat.	Log (Sales)	Rule of law	Total wages and comp. (perm. w.)/ Total sales	Log (Average wages and compensa-tions temp. w.)	Log (Average wages perm. w.)	Temp. workers/ Perm. w.	% perm. skilled emp. received training	% perm. unskilled emp. who received training	% of w. with more than 12 yrs. educ.
Private	-0.710												
	0.000												
Privatized	-0.056	-0.664											
	0.000	0.000											
Time since privatization	-0.046	-0.551	0.839										
	0.000	0.000	0.000										
Log(Sales)	0.088	-0.072	0.010	0.018									
	0.000	0.000	0.077	0.001									
Rule of law	-0.086	0.149	-0.120	-0.084	0.101								
	0.000	0.000	0.000	0.000	0.000								
Total wages and comp. (perm. workers)/Total sales	0.007	0.036	-0.054	-0.028	-0.422	0.021							
	0.434	0.000	0.000	0.002	0.000	0.022							
Log(Average wages and compensations temp. w.)	0.014	-0.012	0.002	0.004	0.024	0.118	0.097						
	0.481	0.549	0.919	0.843	0.215	0.000	0.000						
Log(Average wages perm. w.)	-0.024	0.083	-0.096	-0.048	0.012	0.068	0.276	0.373					
	0.017	0.000	0.000	0.000	0.247	0.000	0.000	0.000					
Temp. workers/Perm. w.	-0.010	0.043	-0.051	-0.041	-0.002	0.007	-0.094	-0.048	-0.034				
	0.139	0.000	0.000	0.000	0.806	0.252	0.000	0.015	0.006				
% perm. skilled emp. who received training	0.041	-0.002	-0.035	-0.032	0.178	0.049	-0.130	0.039	-0.085	0.028			
	0.000	0.776	0.000	0.000	0.000	0.000	0.000	0.187	0.000	0.002			
% perm. unskilled emp. who received training	0.028	0.012	-0.043	-0.044	0.164	0.048	-0.141	0.025	-0.063	0.060	0.537		
	0.003	0.191	0.000	0.000	0.000	0.000	0.000	0.409	0.002	0.000	0.000		
% of workforce with more than 12 yrs. educ.	0.048	-0.034	0.003	0.007	-0.039	-0.070	0.042	-0.189	0.023	-0.004	0.103	0.017	
	0.000	0.000	0.641	0.278	0.000	0.000	0.000	0.000	0.059	0.580	0.000	0.104	
Years of exp. of the top manager in the field	0.032	-0.068	0.065	0.035	0.008	0.056	-0.049	-0.091	-0.051	-0.035	0.040	0.035	0.012
	0.000	0.000	0.000	0.000	0.313	0.000	0.000	0.000	0.000	0.000	0.003	0.012	0.187