Inter-American Development Bank
Banco Interamericano de Desarrollo (BID)
Research Department
Departamento de Investigación
Working Paper #485

Privatization and Labor Force Restructuring around the World

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February 2003

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

Chong, Alberto.

Privatization and labor force restructuring around the world / by Alberto Chong, Florencio López-de-Silanes.

p. cm. (Research Department Working paper series ; 485)
Includes bibliographical references.

1. Privatization. 2. Labor supply. I. Lopez-de-Silanes, Florencio. II. Inter-American Development Bank. Research Dept. III. Title. IV. Series.

338.61 C199--------dc21

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

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Abstract[1]

Critics of privatization argue that poor labor force restructuring is a key concern and that governments should establish better retrenchment programs. Using new data from a random sample of 400 companies in the world, we test competing theories about the wisdom of retrenchment programs and their effect on prices paid by buyers and re-hiring policies by private owners after privatization. Our results show that adverse selection plagues retrenchment programs carried out by governments before privatization. Controlling for endogeneity, several labor retrenchment policies yield a negative impact on net privatization prices. In confirmation of the adverse selection argument, various types of voluntary downsizing lead to a higher frequency of re-hiring of the same workers by the new private owners. Compulsory skill-based programs are the only type of program that is marginally associated with higher prices and lower re-hiring rates after privatization, but the political and economic costs of this policy may make it somewhat impractical. A qualified "do not intervene" appears to be the safest bet with respect to labor retrenchment before privatization.

JEL Classification: G32, H10, J45, O1
Key words: Privatization, Downsizing, Adverse Selection, Corporate Governance

[1] We are grateful to Alexander Dyck, Eduardo Engel, William Megginson, Martín Rama, Jaime Saavedra, and seminar participants at the University of Michigan, Fondazione Eni Enrico Mattei, the Inter-American Development Bank, the World Bank, and the Latin American and Caribbean Economic Association for comments and suggestions. Virgilio Galdo and Alice Hong provided research assistance, and Madison Boeker provided editing. The Research Committee of the World Bank supported this project through grant RPO 683-69. The Yale School of Management provided support through its International Institute of Corporate Governance. If you would like to contact Alberto Chong, he can be reached at AlbertoCh@iadb.org.

1. Introduction

In the last two decades many countries have embarked on major privatization programs, but there are still several countries that have been reluctant to privatize. This is particularly true in developing countries, as reflected by the fact that state-owned enterprises in these countries continue to account for more than 10 percent of gross domestic product, 20 percent of investment, and about 5 percent of formal employment (Kikeri, 1999). While there is growing evidence on the benefits of privatization (see, for example, Megginson and Netter, 2001, and La Porta and López-de-Silanes, 1999), the unwillingness to privatize appears to be associated with a rather negative perception of the privatization process with respect to the labor force. Critics argue that poor labor force restructuring is a key concern and that governments should establish better retrenchment programs.

On the other hand, opponents of the government's restructuring of to-be-privatized firms argue that public unions can influence the future of politicians, effectively reducing the government's bargaining power (Freeman, 1986, and López-de-Silanes, Shleifer and Vishny, 1997). It has also been argued that it is not worth spending resources in restructuring the labor force before privatization, as governments may not be able to identify the particular workers who should be retained (Haltiwanger and Singh, 1999, and Rama, 1999). Governments that administer the human resources of these firms risk retrenching the wrong, more productive personnel. This could result in the loss of know-how that, at a minimum, could exacerbate short-run post-privatization efficiency problems and, at worst, may be linked with permanent damage to the productive structure of the firm. Dismissing the workers that the new owners would rather keep may not only fail to add value to the firm, but it could also reduce privatization prices. This is particularly true in developing countries where available information is even more lacking (Rama, 1999).

Although labor restructuring is one of the most difficult and sensitive issues in privatization, the available empirical literature is quite scarce as a result of the lack of data. Our paper contributes to this literature in three ways: by creating a new cross-country database with detailed information about labor retrenchment policies before privatization and labor re-hiring efforts after the firms go into private hands; by documenting the effects of different labor restructuring policies on the net privatization prices paid by buyers; and by analyzing worker re-hiring in privatized firms that were subjected to various types of retrenchment programs.

The paper pays particular attention to the quality of various labor retrenchment processes. In fact, not all targeting is created equal. From an empirical perspective, it may well be the case that a state-owned enterprise might be able to fetch a higher privatization price by applying a targeting mechanism that could prove very costly afterwards. An example is the case of age-biased retrenchment, where retrenchment targets older and typically more expensive workers. Although privatization prices may be thought to increase as a result of this policy through expected lower operation costs of the firm, the net impact on future efficiency is unclear as some of these workers may also have been more productive, more experienced or better trained.

Another example is the case of voluntary downsizing, whereby workers are offered severance packages to induce them leave the firm. This kind of program could provide the wrong incentives, as the best workers are likely to leave and the worst to stay. As in the case of age-biased downsizing, short-term financial gains through potential higher privatization prices may prove costly because of the post-privatization losses due to economic inefficiencies (Rama, 1999).

Unlike the previous literature, which focused on the effects of restructuring on prices for the case of Mexico (López-de-Silanes, 1997), the nature of our data allows us to look at two complementary slices of the picture before and after privatization across countries. We are able to analyze the impact of a large set of labor policies before privatization and observe private firms' reactions in terms of re-hiring previously fired workers. Our analysis uses these two types of results to provide an evaluation of the price effect of labor restructuring policies and the managerial quality of the downsizing efforts carried out by the government before privatization.

The database was constructed by randomly selecting 400 firms privatized between 1982-2000 around the world. We obtained pre- and post-privatization data by sending a detailed questionnaire to the CEOs of privatized firms and accessing privatization files. We followed up with each of the firms and corroborated their answers with several public sources and data for these firms coming from international financial agencies and privatization ministries. The result is a comprehensive cross-country database with firm characteristics, detailed labor restructuring policies before privatization, and labor re-hiring policies after the firm entered the private sphere.[2]

[2] An additional benefit of this data is that it allows us to consider the effect of failed privatizations on prices, rarely treated in the literature. Research on privatization implicitly sets aside failed privatizations since data is typically available only for companies that actually attract bidders. This potentially underestimates the impact of labor

The basic thrust of our results is that adverse selection plagues retrenchment programs carried out by governments before privatization. Controlling for endogeneity, labor downsizing is not effective in boosting net privatization prices.[3] This finding may appear somewhat counterintuitive, as, according to the conventional wisdom, sellers will always want the government to downsize prior to privatization. However, this is fairly consistent with the political view on prior restructuring before privatization (López-de-Silanes, 1997) as described above. In fact, to further study the results in the area of downsizing, we focus on the nature of the retrenchment process prior to privatization and its impact on re-hiring. Confirming the adverse selection argument, several kinds of voluntary downsizing lead to a higher frequency of re-hiring of the same workers by the new private owners.

The exception is the case of skill-based programs, as such programs are marginally associated with higher prices and lower re-hiring rates after privatization in particular, but not robustly, in the case of compulsory skill-biased programs. One could argue that the nature of the program itself, typically based on written exams or panel reviews, may partly explain these results. Unfortunately, this policy is one of the most politically difficult to implement by the government and requires a tough stance. Results show that the managerial quality of the government may have an impact in the results, but as a general policy it appears that not much time and effort should be spent on labor restructuring before privatization. Results also show that endogeneity is controlled for, pay cuts do not raise prices while employment guarantee programs forced on the buyer do carry a significant discount in prices.

The paper is organized as follows. The next section describes the data collection process and discusses the empirical methodology. In Section 3, we test whether labor restructuring has an impact on privatization prices and whether such results hold when failed privatization and/or potential endogeneity are taken into account. Section 4 extends our results on prices for specific types of downsizing measures. Section 5 provides a new look at the effect of prior downsizing by the government by analyzing the nature of post-privatization re-hires by private owners. Section 6 concludes.

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changes for these companies, which are likely the ones that went through more thorough restructuring efforts prior to privatization. Methodologically, this issue is addressed by using a simple non-linear procedure for the entire, truncated distribution of privatization prices.

2. Data and Methodology

Our sample was formed based on a list compiled by the authors of about 1,500 privatizations around the world covering the period 1982-2000.[4] The two main sources for this list are the World Bank Privatization database and Privatisation International, which together arguably provide the largest source of privatization transactions in the world. From this original list, we selected a random sample of 400 big and small firms to whom we sent a detailed questionnaire designed by the authors. The questionnaire was addressed to the CEO with a recommendation to direct it to the chief financial officer and the director of human resources of the firm.[5]

In order to ensure the quality of our data, we employed four additional sources. First, we took advantage of the fact that in several developing countries many privatizations have been performed as part of structural adjustment or other lending programs with the support of the World Bank. We were able to access a wide range of the World Bank's internal documents to double check and, in some instances, complement the information collected in our survey. In particular, we made extensive use of the World Bank's electronic Intranet system called *ImageBank*, which allows full access to such documents.[6] Second, we also made broad use of *NEXIS* to search a number of national and international publications.[7] Third, whenever possible we interviewed officials from the World Bank, the International Monetary Fund, and the Inter-American Development Bank who were directly associated with the privatization programs in different countries.[8] Finally, when necessary, we directly contacted the privatization offices or corresponding ministries (e.g., finance, industry) of each country to request specific pre-

[3] As defined by the amount that accrues to the government after all costs are taken into account, adjusted by shares sold and divided by average sales during the three years prior to privatization.

[4] We excluded voucher privatizations. As has been discussed elsewhere, there are fundamental differences between that privatization technique and others, which would have made comparisons particularly difficult (Boycko, Shleifer and Vishny, 1994).

[5] While directors of human resources answered 71.4 percent of the labor part of the questionnaires, public relations managers answered 16.6 percent of them. Personnel working at human resources departments other than managers answered about 5.5 percent, and personnel working at public relations answered 6.5 percent, usually on behalf of managers. Financial information was typically provided by the office of the chief financial officer or, in the case of small firms, by the office of the CEO.

[6] Typical World Bank documents include Country Economic Reports, Staff Appraisal Reports, President's Reports, Supervision Documents, Project Completion Reports, Audit Reports, Operation Evaluation Studies and Sector Reports. We covered about 63.4 percent of the sample.

[7] To do this, we mainly employed the *Wall Street Journal*, the *Financial Times*, *Oxford Analytica*, and the Economist Intelligence Unit. We covered around 70.1 percent of the sample.

[8] We also specifically selected firms totaling about 15 percent of the total sample and double or triple checked most of the information.

privatization information that was missing.[9] Whenever we found discrepancies we again contacted the national privatization agencies and the firms themselves to clarify the issues.[10]

We organized the questionnaire into four sections. The first area covers pre-privatization firm characteristics and asks about sales, assets, profits, liabilities, management changes, and sector of origin. The second area covers pre-privatization labor characteristics and policies, and asks about number of blue and white collar workers, presence and incidence of unions, number of strikes, political affiliation of unions, labor restructuring measures and targets. The third area focuses on the privatization process, and in particular, on privatization prices, transaction methods used, shares sold, and foreign participation. Finally, the fourth area includes post-privatization labor re-hiring policies. We tried to get both dummy variables and exact numbers of workers for every possible category. However, we were not able to achieve this, as most respondents did not provide enough numerical information about the workers involved in various retrenchment and re-hiring programs, so we settled for dummy variables that tell us if the policies were undertaken or not.[11] Table 1 provides definitions of the specific variables that we collected.

Table 2 shows the results of our efforts to gather data. Out of the 400 cases targeted, we ultimately collected data for 308 privatizations in 84 countries for the period 1982-2000. Of those, 16 are failed privatizations or operations in which preparation for privatization occurred but in which the sale did not materialize. As the table indicates, the complete information for our 308 firms accounts for 97.21 percent of total sales. Twenty-five companies comprising about one percent of total sales supplied quite deficient information that could not be further completed and thus, was ultimately not used. Additionally, 26 firms did not respond to our requests, denied the existence of information, or simply refused to provide it. Twenty-two firms, accounting for 0.78 percent of total sales, could not be included since they have been liquidated and no longer exist. Finally, 19 firms could not be included in our sample as they have merged and no longer keep separate accounting and financial statements. The pattern in our resulting sample in terms of region, year of privatization, and sector fits closely with the compiled list of privatizations of

[9] Using this approach, we covered 73.2 percent of the sample.
[10] We found most discrepancies in developing countries, particularly Africa and the Middle East. Whenever data led to significant discrepancies that could not be reconciled, the firms were eliminated from the sample. This occurred in 6 cases in total: 4 from Africa, 1 from the Middle East, and 1 from Asia. These firms were classified under the category of firms that supplied incomplete information in Table 2.
[11] In fact, only 26.3 percent of respondents provided some numerical information.

Privatisation International and the World Bank, particularly when excluding voucher privatizations. We can therefore reasonably conclude that our sample is unbiased.

Figure 1 shows the distribution of our sample by region of the world with respect to the pattern found in the original privatization lists. Whereas 33 percent of the privatizations in our sample are from Latin America, 8 percent from Asia, 21 percent from Africa and the Middle East, 25 percent from developed countries, and 13 percent from Transition Economies, the corresponding percentages for the original list are 29, 10, 20, 23, and 18 percent, respectively. Similarly, Figure 2 compares the distribution of privatizations in our sample and the original list of privatizations. In both cases, the bulk of privatizations—more than half of operations in our sample—were carried out between the mid-1990s and late 1990s. Finally, Figure 3 compares the distribution of privatizations by broad sector category and, as before, the resulting pattern is remarkably similar in both cases.[12]

Table 3 presents summary statistics for the variables used in this paper. The set of variables is organized according to firm attributes, privatization characteristics, labor characteristics, labor restructuring policies, and some basic post-privatization hiring measures. Along the lines of López-de-Silanes (1997), the net privatization price is defined as the amount that accrues to the government after all privatization and restructuring costs are taken into account, such as government commitments at the time of sale, and other adjustments are made to the sale contract. This number is adjusted by the percentage of company shares sold and divided by the average net sales during the three years prior to privatization. The real value of the resulting number as of December 2000 is the dependent variable employed, which is labeled "Net Privatization Price / Sales."[13]

The labor downsizing variable may be viewed as a basic summary measure of labor restructuring, as it is typically the most widely employed and most relevant from a policy perspective. This variable is defined as a dummy variable that equals one if the firm undertook any reduction in the labor force up to three years prior to privatization, and zero otherwise. We

[12] The World Bank privatization data, which are for developing and transition economies, also only contain information on number of shares sold and foreign participation. When we compare our developing country sub-sample (231 observations) to the one from the World Bank we also find a very consistent pattern between both databases.

[13] López-de-Silanes (1997) also uses firms' total assets and total liabilities to develop a so-called *Privatization Q*. In our case, such a variable was not possible to construct. However, as a rough proxy in our regressions we include a dummy variable that equals one when total liabilities are greater than total assets (see Table 1 for variable definition).

follow Haltiwanger and Singh (1999) and classify this variable by type, as voluntary and compulsory, and by targeting nature, as age-biased, skill-biased, and female-biased downsizing. Table 4 provides a breakdown of our sample along these lines. Voluntary downsizing is defined as any kind of non-compulsory labor downsizing in which the worker chooses to leave, typically as a result of a monetary or non-monetary severance compensation package by the firm. Monetary packages are usually given as a function of two variables: wage and seniority. Typically, the older the worker and the higher the current wage, the larger the severance package.[14] Pension enhancements and similar benefits can also be included under this category. Non-monetary packages include any type of in-kind payment that ranges from training to other similar enhancements to the safety net intended to help workers that leave, for example by providing food and clothing.[15]

The type of targeting employed, if any, is another useful classification of labor downsizing. As mentioned above, three are considered in this paper: age-biased, skill-biased, and gender-biased downsizing. Clearly, age-biased downsizing includes any labor cut that uses age as a reference. This type of downsizing may be applied in the context of voluntary or involuntary downsizing programs. In fact, while voluntary age-biased downsizing is found in nearly 34 percent of total downsizing cases (and 82 percent of total voluntary cases), this kind of downsizing is not limited to choice, as it may be implemented by force as well. In fact, one-half of all the involuntary downsizing cases are age-biased. This is illustrated in Table 4. The most common age-biased downsizing programs are voluntary early retirement programs through pension enhancements, which target older workers.[16] Mandatory retirement of a specific group of older workers is relatively common in developing countries as well.

Skill-biased downsizing includes any labor cut that uses any written or oral method, test, interview, or certification to measure skills or occupational ability as a retrenchment reference. Thus, skill-biased programs restrict the program along detailed occupational or skill groupings (Haltiwanger and Singh, 1999). A typical example is testing workers on general or particular labor skills in order to decide whether to keep them. The Peruvian Tax Administration in the

[14] Recent research proposes using compensation schemes based on additional characteristics of the individual or his or her household (such as education, gender, and others) and not just wage and seniority (Rama, 1999, and Chong and Rama, 2001).
[15] This last is not uncommon in African countries.
[16] This program typically improves pension benefits if the worker retires earlier than the legal or agreed-upon age. It has been applied widely in developing and developed countries.

early 1990s provides a classic example of this. All workers were required to pass a written test to keep their jobs. Those workers that did not pass were fired, and the new potential workers brought in to replace the old ones also had to pass a written exam. As a consequence of this, turnover in the Tax Agency reached about 30 percent. Another example is the case of the Central Bank of Ecuador. After a disastrous attempt to downsize using voluntary programs, the Central Bank decided to classify all of its personnel into three categories: those who were essential for its functioning, those who were clearly redundant, and those about whom it was difficult to tell. This classification was based on the nature of the worker's unit, occupation and educational attainment. Essential workers did not have the option of leaving (they were ring fenced), redundant workers did not have the option of staying, and the rest were offered a voluntary separation program (Rama and MacIsaac, 1999).

Gender-biased retrenchment refers to labor cuts based on any implicit or explicit gender-based indicators. Practically all gender-biased retrenchment is female-biased. Since most developed countries have laws against gender discrimination and in both developing and developed countries such bias is, at least explicitly, considered unethical, we expect this variable to bias downwards. Finally, neutral downsizing refers to those labor cuts that do not include any of the three target groups above. Though in theory a firm may apply more than one targeted downsizing mechanism at the same time, interestingly, the overlap of retrenchment policies is relatively small in the case of our sample of firms; 87 percent of firms did not apply more than a single mechanism. Less than 1 percent of firms in our sample applied skill, age, and female-biased retrenchment at the same time when downsizing, as shown in Table 4.[17]

Roughly 78 percent of our sample of firms carried out some labor force downsizing, most of it compulsory, as illustrated in Table 5.[18] A similar percentage is found when looking at regions.[19] However, the data show great variation in the labor cuts before privatization both in terms of their nature as well as across regions. For instance, age-biased downsizing is the most predominant type in our sample, with 49 percent of firms using it. On the other hand, skill-biased

[17] Also, while voluntary and compulsory downsizing may have been used simultaneously, as the above example of the Central Bank of Ecuador shows, this was an extremely uncommon occurrence according to our sample. Among the three instances where this occurred, we treated one as two separate episodes, and in the others we chose the predominant downsizing method.

[18] This percentage is strikingly similar to the one found by Haltiwanger and Singh (1999) for 41 retrenchment programs in 37 countries using a mainly public sector sample. They also find that compulsory downsizing is as predominant as voluntary downsizing (46 percent in our sample).

retrenchment is used by only 13 percent of state-owned enterprises worldwide, mostly by developed countries with 15 percent. Additionally, Table 5 also includes two other labor restructuring policies, employment guarantees (after privatization) and pay cuts (prior to privatization). These are dummy variables that capture whether a specific firm proceeded with that policy in any of the three years that preceded privatization. As their names indicate, their interpretation is straightforward.

Table 6 provides some simple correlations of our labor downsizing measures. Two features stand out. First, the general downsizing measure is, as expected, correlated with its components, particularly voluntary downsizing. Second, the voluntary downsizing measure is significantly correlated with age-biased downsizing, since early retirement programs are frequently used as a downsizing mechanism. Otherwise, however, there is little significant correlation among downsizing measures.

Table 7 provides a first analysis of the data. We divide the sample into two groups according to whether any labor restructuring took place in a state-owned enterprise. The table shows the value of the mean and median of the share adjusted net privatization prices of the firms, the difference in net price means and medians, and the *t*-statistic and *z*-statistics associated with that difference in means and medians, respectively. Most labor restructuring policies yield statistically significant differences in means and medians. Interestingly, this finding does not provide support to the idea that governments should pursue labor restructuring—quite the opposite. Governments that restructured labor in state-owned enterprises before privatization obtained significantly lower privatization prices compared to those that did not. This finding, however, does not consider that other prior restructuring policies may be playing a role and, in particular, does not take into account endogeneity problems. In fact, it may be argued that the firms that downsize are the ones that need to do so, as they are the worst performers. According to these results, only labor restructuring through pay cuts yields increased prices, and even in this case the difference in means is only weakly statistically significant.

[19] In Latin America, Africa, and Industrial Countries, 82, 79, and 79 percent of the firms did some labor force downsizing, respectively.

3. Downsizing and Privatization Prices

In this section we present regression analysis on the link between labor restructuring policies and privatization prices. Net privatization prices are regressed against a set of variables that has been classified in four groups. The first is firm and privatization characteristics. We use a dummy that equals one when net total liabilities are greater than zero for the average of the three years prior to privatization. Similarly, we include a set of dummy variables to take the economic sector into account.[20] We also include the percentage of shares sold, a variable that takes into account whether foreign participation was allowed, as well the type of privatization sale, in particular, public offerings and direct sales. The second group includes firm labor characteristics, as reflected by the presence of unions and the existence of strikes and related physical protests during the three years leading up to privatization. The third group reflects labor restructuring policies applied prior to privatization, namely employment guarantees, pay cuts and labor cuts, including whether such downsizing was compulsory or voluntary, and whether there is any skill, age, or gender bias in the labor downsizing operation. Finally, the fourth group includes country-specific macroeconomic variables, specifically the gross domestic product and the rate of inflation.[21]

The first column in Table 8 presents our basic results. We first use a simple ordinary least squares approach and assume that labor restructuring policies are exogenous. In this case, sixteen observations are excluded from our sample as they represent failed operations, that is, privatizations of state-owned enterprises that for one reason or another did not find a buyer and consequently have no privatization price. With respect to the first group of variables, firm and industry characteristics, we find, as expected, a negative but statistically insignificant coefficient in the case of net liabilities. We also find that the coefficient of the share of the firm that was privatized yields a negative and statistically significant link with privatization prices. The result suggests that an additional 10 percent of privatized share decreases privatization price by 3 percent. Additionally, foreign participation yields a positive and statistically significant sign at 1

[20] These dummies are not reported in the regressions. We considered the following economic sectors: (i) mining (metallic minerals and nonmetallic minerals); (ii) manufacturing (canned fish and seafood; sugar mills; tobacco products; beverages; textiles, clothing and leather; wood; paper and printing; heavy machinery; transportation equipment); (iii) services (hotels and restaurants; land and sea transportation; communications; and recreation); and (iv) others (land; unclassified firms).

percent. This result implies that allowing foreign participation is associated with a 32-percent increase in privatization prices. Public offerings yield a positive and statistically significant sign and are associated with a 17-percent increase in the privatization price. Direct sales yield a negative and statistically insignificant sign (Dewenter and Malatesta, 1997, and López-de-Silanes, 1997).

With respect to labor characteristics, we find that the presence of unions in the three years prior to privatization is associated with a privatization price 24 percent lower, as the sign of the coefficient is negative and statistically significant at 1 percent. We also find that strikes and other forms of physical protest, though positive, are not statistically linked with privatization prices.[22] These findings are similar to those in López-de-Silanes (1997) for the case of Mexico.[23]

When focusing on the set of labor policy variables, our key set of interest, we find that the downsizing summary measure is associated with a privatization price 8 percent lower, as the sign of the coefficient is negative and statistically significant at 5 percent. Again this is under the assumption of exogeneity and when excluding failed privatizations. Similarly, we find that using employment guarantees prior to privatization is linked with a privatization price 16 percent lower, as the corresponding sign is negative and statistically significant at 1 percent. If maximizing revenues is the sole objective of policymakers, applying this kind of policy is self-defeating.[24] Pay cuts prior to privatization yield the expected negative sign, although the coefficient is not statistically significant.

A problem, however, with the empirical results above is that they do not take into account potential endogeneity issues. Governments try to restructure the labor force of the state-owned enterprises before the sale in order to raise the privatization price. The negative sign may be simply a reflection that the firms in the worst shape are shedding labor. For instance, if the

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[21] Since the country-specific macroeconomic variables capture any specific variation among countries in our sample, country dummies are excluded when using them and vice versa. Results do not change. Also, other macroeconomic variables were considered and the results are very similar.

[22] Since unions and strikes are relatively highly correlated it is not a surprise that the latter yields a statistically insignificant coefficient. When excluding the unions variable or constructing a combined "unions-strikes" variable the signs are negative and statistically significant at 1 percent.

[23] They are consistent with the *political* view of labor restructuring by which unions may try to block privatizations, which is costly to buyers (Shleifer and Vishny, 1994; Lopéz-de-Silanes, Shleifer and Vishny, 1997; and Boycko, Shleifer, and Vishny, 1996).

[24] However, governments frequently have multiple, and often contradictory, objectives. The value of this finding from a policy perspective is, perhaps, to make policymakers aware that there appears to be a trade-off between objectives and their cost.

unobservable characteristics of a firm are positively correlated with the presence of strong unions, the government may be particularly interested in dismantling such unions.

Using a method by López-de-Silanes (1997) we apply a two-step instrumental variables approach by estimating a non-linear reduced-form equation that describes the probability that a particular labor restructuring policy will be implemented.[25] The instruments used are classified into two groups: firm-level determinants and macroeconomic-level determinants. The firm-level variables included are: (1) a dummy variable to reflect whether a leading agent bank organized privatization, (2) the involvement of a Ministry of Finance or Economy before privatization, (3) the political affiliation of unions, (4) whether the country was undertaking structural reform during privatization of the firm, and (5) sectoral dummies. The macroeconomic variables considered are: (1) the average growth rate in the three years prior to privatization, (2) the legal origin of the country, and (3) the average degree of openness in the three years prior to privatization. In general, these variables correspond with the micro and macro variables employed in López-de-Silanes (1997). As required in this procedure, none of these variables is statistically significant when included in the price equation. Also, the *F*-statistic for the excluded instruments is statistically significant at 1 percent. Appendix 1A-1D shows the first stage probit for some of the labor downsizing measures used in this research.[26] The set of instruments used for each labor restructuring variable is shown in Table 9.

The second column in Table 8 presents our findings when correcting for endogeneity using the above method.[27] The results for privatization and firm characteristics are, essentially, identical to the non-instrumented results above. Furthermore, our findings for labor characteristics are very similar to our previous findings, as the presence of unions is associated with a privatization price 24 percent lower. With respect to our key group of variables of interest, labor policies, we find that employment guarantees are negatively linked with net privatization prices, and the link is statistically significant. However, we find that when controlling for endogeneity, neither pay cuts nor downsizing appears to significantly change privatization

[25] These variables are *excluded instruments*, as they are not included in the privatization price equation. These instruments have very low statistical power when included directly in the price equation, but they are highly correlated with the labor restructuring actions of the firm, as shown by applying *F*-statistics to test for the joint hypothesis that they are all equal to zero (López-de-Silanes, 1997).

[26] Because of space considerations, the first stage for all the other labor restructuring measures and for the firm labor conditions are not presented. We would be happy to provide them upon request.

prices. That is, while the conventional wisdom has it that prospective buyers will prefer governments to scale back labor before privatization, our results so far show that that may not be the most appropriate policy.[28]

A key question remains: To what extent is it necessary to carry out labor restructuring in order to sell state-owned enterprises? After all, there are at least three incentives that could cause firms to be over-restructured before privatization. First, corrupt managers of state-owned firms may want to take a "last cut," for instance, by colluding with labor unions before "letting go" of their positions of power. The same applies to high-ranking government officials. Second, investment bankers involved in the process might want to restructure in hopes of attaining higher fees. Third, government agencies may want to restructure in order to "look good" and show that they are doing their job. However, the evidence in this paper points to the fact that it is not true that if the firm is restructured its chances of being sold increase. This is consistent with López-de-Silanes (1997). In fact, when analyzing our data on the 16 failed privatizations in which preparation for privatization occurred but the sale ultimately did not take place, we find that although all of them applied labor-downsizing mechanisms, none of them was sold when offered on the market.[29]

4. Voluntary and Targeted Downsizing and Adverse Selection

Governments frequently intervene in the labor downsizing process by using voluntary downsizing schemes as well as skill, age, or gender benchmarks. The inclusion of voluntary schemes is shown in columns 3-4 of Table 8. In fact, voluntary downsizing schemes usually account for a very large percentage of total labor downsizing (Haltiwanger and Singh, 1999).[30] The reason for their popularity is simple. Such schemes are not politically costly, they are attractive to workers and thus bypass the power of unions, and they can be relatively easily

[27] All the coefficients of economic sectors have positive signs and are not statistically significant in the ordinary least square regression. However, they become statistically significant at 10 percent when including failed privatizations.

[28] These results are actually similar to those in López-de-Silanes (1997) regarding labor restructuring in Mexico. In fact, he finds that labor cuts yield a negative sign at 10 percent statistical significance when not controlling for endogeneity, and a positive sign also at 10 percent statistical significance. Neither result is robust.

[29] Admittedly, this is a small sample. Still, when running probits where 1 equals *firm sold*, and zero otherwise, with the same controls used as in the price regressions, we find that either the labor restructuring variables are not statistically significant or, if so, they have the "wrong" sign. That is, in several instances downsizing measures applied prior to privatization decrease the probability of the firm being sold. Results are available upon request.

designed and administered by governments (Rama, 1999; Jeon and Laffont, 1999). We find that regardless of the econometric method, this variable yields a negative and statistically significant sign.[31] In fact, our results suggest that voluntary downsizing is associated with about a 12 percent decrease in privatization prices. Interestingly, this negative link may be a reflection of adverse selection, as workers with the best outside prospects will tend to leave and those with the worst outside perspectives will tend to stay. The human capital of the firm then deteriorates and the privatization price will reflect this. A loss of know-how associated with short-run post-privatization efficiency problems may have occurred and, at an extreme, this may be linked with permanent damage to the productive structure of the firm. Consequently, dismissing workers that the new owners would rather have kept is unlikely to add value to the firm and could reduce the privatization price. In other words, despite the fact that voluntary separation programs are politically palatable and thus, attractive to policymakers, the findings here show that, as predicted by theory (Kahn, 1985, Diwan, 1994, and Jeon and Laffont, 1999), such downsizing mechanisms do not help governments adequately identify those workers who are less productive. In fact, governments will tend to separate the wrong workers from their jobs, possibly at an excessively high cost (Haltiwanger and Singh, 1999, and Rama, 1999).

Governments also try to manage the downsizing process by focusing on three downsizing categories that are particularly predominant: age-biased, skill-biased, and female-biased downsizing. Table 10 shows our findings using these measures. Controlling for endogeneity, we find that downsizing using age as a benchmark results in a decrease of around 10 percent in privatization prices, as the sign of the corresponding coefficients is negative and statistically significant at 1 percent (column 2).[32] On the other hand, our findings suggest that skill-biased downsizing is positive but barely significant with respect to privatization prices when controlling for endogeneity (column 2 of Table 10). According to this finding, using skills as a benchmark

[30] In our sample, for instance, voluntary downsizing accounts for about 41 percent of total downsizing as shown in Table 5.

[31] The statistical significance ranges from 1 percent in the simple ordinary least squares case to 5 percent in the instrumental variables case.

[32] In the case of age-biased downsizing, ordinary least squares coefficients are statistically significant at 1 percent (column 1). In the case of administered downsizing by skills, ordinary least squares yield similar signs as in the instrumental variables methods, but the coefficients are not statistically significant in the former. As we argue above, and as López-de-Silanes (1997) shows, endogeneity is a problem.

indicator may increase prices by 13 percent. When controlling for endogeneity, the female bias variable is negative but statistically insignificant.[33]

The results above further suggest that adverse selection may be an issue in downsizing programs prior to privatization, since both voluntary downsizing and age-biased downsizing appear to reduce privatization prices. Workers that are dismissed using these methods may not necessarily be the least productive or least skilled, since an inadequate identification of workers may have taken place. Furthermore, the fact that skill-biased downsizing yields a positive, though marginally statistical significant, link with privatization prices appears to provide some corroborating evidence along these same lines, especially if one believes that skills are correlated with productivity.[34]

Classifying targeted downsizing as voluntary or compulsory provides further analysis. Doing so yields two additional categories: voluntary-targeted downsizing and compulsory-targeted downsizing. Furthermore, as before, voluntary or compulsory targeted downsizing may be age-biased, skilled-biased or female-biased driven, which results in three voluntary-targeted downsizing categories and three compulsory-targeted downsizing categories (see Table 4). Voluntary-targeted results are shown in Table 11. The classic example of voluntary age-biased downsizing is early retirement programs.[35] As this table shows, voluntary age-biased downsizing is negative and statistically significant at 1 percent when using the non-instrumented method, and negative and statistically significant at 5 percent in the two-step procedure. This result further confirms the idea that adverse selection is a problem when applying administered or targeted downsizing in the public sector, as older workers are not necessarily the least productive ones, and the best older workers may have the greatest incentives to leave first. Moreover, similar to the case above, the voluntary skill-biased downsizing variable is positive but it is insignificant.[36]

[33] In fact, this variable is never statistically significant and does change signs depending on the methodology employed. People admitting to gender bias were few. This is hardly surprising, as people may not be truthful for fear of retaliation. Also, certain legal and societal considerations may be at issue.

[34] In fact, the link between education and productivity is widely accepted in the economics of education literature.

[35] In the skill-biased category finding a "clean" example is somewhat more difficult. After all, who would want to take a voluntary test when she knows it may be used to fire her? Somewhat like pleading the Fifth Amendment in the United States, though, where for all practical purposes invoking legal protection is frequently associated with a presumption of guilt, not taking a "suggested exam" may expose the worker to retaliation. While one may argue that this mechanism is not really voluntary, from the perspective of the firms, ministries, and privatization agencies (from whom we mainly obtained the data), the explicit method is clearly understood as voluntary.

[36] High correlation with the voluntary age-biased variable may be a problem, as 14 out of the 20 observations that are positive are also voluntary age-biased (Table 4).

Table 11 also shows results when using compulsory targeted variables. As the name implies, in this category there is no choice for the worker. Firms simply choose the workers that will stay and those that will leave using age, skills (for example, when managers in each division choose the most skilled ones), or gender, as a retrenchment reference. Though the signs in the compulsory age-biased variable and compulsory skill-biased variable are similar to our previous results, the age coefficient, unlike the voluntary- targeted case, is now statistically insignificant. This result is consistent with the fact that voluntary programs are theoretically expected to produce somewhat larger adverse selection problems than compulsory ones (Jeon and Laffont, 1999; Levy and McLean, 1997; Kahn, 1985). In fact, while in voluntary age-biased programs it may be expected that more productive workers will leave rather than less productive workers, in mass compulsory programs it is reasonable to expect that both the good and the bad will leave. The net effect will tend to cancel out.[37]

In summary, so far we have found that when controlling for endogeneity, labor retrenchment and pay cuts do not have any bearing on net privatization prices. Employment guarantee programs affect prices negatively, as their implementation lowers privatization prices by 16 percent, *ceteris paribus*. Furthermore, our results show that, if anything, targeted labor downsizing appears to produce a selection of the wrong group of workers, the less productive ones, reflected in the fact that voluntary and age-biased downsizing reduce net privatization prices between 10 and 15 percent, *ceteris paribus*. This is further suggested by the fact that voluntary age-biased retrenchment appears to be the driving force behind the negative link between voluntary downsizing and prices, which suggests that there may be incentives for the most productive older workers to leave first. In fact, while governments resort to a different array of productivity-identification methods in order to select which workers to fire and which to keep, the evidence above shows that their application results in the opposite effect of the one originally desired, that is, lower privatization prices instead of higher ones. Buyers may not be willing to pay higher prices since, when the best workers leave, rebuilding the labor force can be very costly and take considerable time. Permanent loss of know-how and damage to the productive

[37] On the other hand, in some specifications we find a positive link between compulsory skill-biased measures and privatization prices. Though not a very robust result, it appears that compulsory exams, as a relatively good objective measure of productivity, in some cases may help keep the more productive workers. This may be reflected in an increase in privatization prices. Still, from a practical perspective, this policy prescription is highly controversial, as its applicability will clearly depend on the political climate of the country. In fact, countries where

structure may have occurred, for instance, as a result of a loss in complementarities between factors of production.

5. A Silver Bullet: Re-Hires after Privatization

According to the results above, a negative link between labor restructuring and privatization prices is not puzzling. The reason why prospective buyers may want to pass on the opportunity of having governments deal with bloated labor forces, severance packages, and simply cleaning house through worker dismissal appears to be linked with the fact that the resulting human capital loss can be considerable. Rebuilding human capital in the form of searching and training can be a very slow and not necessarily successful process, especially in those instances where firm-specific know-how was lost. Consequently, privatization prices may be penalized.

As much as adverse selection reasonably appears to be a factor in why buyers may not be willing to bid higher prices for state-owned enterprises, it could also be the case that some other unobserved but correlated factor produces a negative link between labor downsizing and privatization prices. The question is whether there is a measure that can provide strong evidence of the presence of adverse selection in the downsizing process prior to privatization. In short, is there a silver bullet?

In the context above, notice that firms can pursue the option of re-hiring the workers that were let go prior to privatization. If successful, firms could save substantial time and effort in search and training. Re-hires provide a very good measure of the quality of the downsizing process and allow a better understanding of the pervasiveness of adverse selection during retrenchment.[38] After all, why would a firm need to re-hire a worker who was deemed expendable a relatively short time ago? Unless, of course, the retrenchment before privatization was badly done. In fact, nearly 44 percent of firms did some re-hiring after privatization, of which Latin America was the most active, with upwards of 50 percent, and Asia the least active with a little more than 21 percent.[39] This is shown in Figure 4.

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skill-biased programs have been used rather successfully did so under not-so-democratic regimes. Two examples in our sample are Chile in the 1980s (Pinochet) and Peru in the 1990s (Fujimori).

[38] While Haltiwanger and Singh (1999) introduced a similar concept, we are the first to apply rigorous econometric methods using re-hires. We work with re-hires up to 18 months after privatization. We test shorter periods (12 months) and longer ones (24 months), and the empirical results do not vary.

[39] According to our data nearly 70 percent of firms did some re-hiring after privatization. This number is misleading since total increases in personnel are due not only to re-hires, but also to hires of workers not previously associated

In theory, if firms were able to fully re-hire at zero cost all the good workers that were previously fired, privatization prices would not be penalized. However, more often than not, that is not the case and, in practice, a negative link between retrenchment and prices will likely remain. The reasons are simple. First, since the best workers are the ones that leave first, chances are they would already be employed elsewhere and have no intention or incentive to come back to the old firm. Second, additional incentives are needed to re-hire workers after privatization, which will likely increase the cost of re-hiring. It is not easy to lure good workers back, especially given their potential alternatives outside. The offering of additional pay, perks, or higher position may be necessary. Third, legal considerations may not allow fired workers to be re-hired.[40] Finally, workers move and are not easily reachable, which again will increase costs. If firms are willing to re-hire workers despite potentially increased costs both in monetary and administrative terms, it is probably because such workers are worth it. These reasons further support the validity of re-hires as an indicator of the quality of the downsizing process prior to privatization.

From the findings in the previous section, it is clear that, with respect to privatization prices, some downsizing measures are worse than others. Voluntary downsizing measures and, in particular, age-biased measures, are particularly bad, while some skill-biased measures appear to be relatively less harmful or at least irrelevant. If adverse selection is the culprit, it is expected that the basic link between the outcome on prices of the particular downsizing measure considered and the likelihood of re-hiring maintains a similar pattern. In other words, if voluntary downsizing is indeed linked with adverse selection, as suggested from the results with prices, the probability of re-hiring should be high. On the other hand, if skill-biased downsizing adequately distinguishes between more and less productive workers, then the probability of re-hiring should be lower.

A first approach in showing that the degree of re-hires is an ideal measure of the quality of the labor downsizing process prior to privatization consists of studying its relationship with voluntary downsizing as an explanatory variable. Using re-hires as the dependent variable, we find that the coefficient of the voluntary downsizing variable is positive and statistically

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with the firm. While the latter may be attributed to the natural progression of privatized firms as an ongoing concern, the former may reasonably be linked with the quality of the downsizing prior to privatization.

[40] This is particularly true in cases where public sector participation in the privatized firm is maintained. This legislation is usually enacted because of revolving door and double-dipping issues.

significant at 5 percent. That is, voluntary downsizing before privatization increases the probability of re-hiring workers after privatization.[41] Results are shown in the upper panel of Table 12, specification 1. In fact, since typical voluntary downsizing mechanisms are theoretically flawed with adverse selection problems, this finding is not surprising (Jeon and Laffont, 1999, and Kahn, 1985). As mentioned above, workers who leave voluntarily are usually those who have the highest chances of obtaining work outside in less time. They are also the ones who are most able to find jobs better-matched to their abilities and skills outside of the public sector and quasi-public sector.

On the other hand, it could be argued that the incidence of re-hires after privatization does not necessarily reflect the presence of voluntary downsizing, but rather the presence of high labor firing costs and related rigidities. Potential buyers may want to take advantage of regulations that allow for a "clean slate" approach so that state-owned enterprises are permitted to have as many workers as possible retrenched before privatization, only to be re-employed by the privatized firm. In this way, high labor costs are avoided while the human capital of the firm is preserved. To test this idea, two labor cost measures are employed. The first is an indicator of labor rigidities as measured by the extent to which the country has signed agreements with the International Labor Organization. This variable is defined as the cumulative number of ILO conventions ratified by the country at the time of privatization and is based on legal documents as compiled by Rama and Artecona (2001).

The second variable is an index of labor firing costs constructed from legislation in Heckman and Pagés (2001). This measure summarizes the tenure-severance pay profile using a common set of dismissal probabilities across countries and computes the expected future costs, at the time a worker is hired, of dismissing her in the future (also see Table 1).[42] We find that the coefficients of both labor rigidity measures are negative but statistically insignificant using re-hires measures. This is also shown in the upper panel in Table 12. It appears that labor rigidities do not change the probabilities of re-hires when controlling for voluntary downsizing.

Re-hiring after privatization occurs not only at the firm level, but also in some instances from the very same departments or areas from which the workers had been previously fired (see

[41] That is, when controlling for shares sold, sectoral dummies, macroeconomic controls (rate of growth, rate of inflation, initial gross domestic product).

Figure 4). When exploring this more restrictive measure of re-hires as the dependent variable we find that the coefficient of the voluntary downsizing variable is not statistically significant. This is shown in the lower panel in Table 12.[43] Additionally, and similar to the *re-hires* variable, labor rigidity measures yield negative and statistically insignificant coefficients with respect to the *re-hires-same* variable. This is also shown in the lower panel in Table 12.

Voluntary downsizing is only part of the story. In fact, re-hires after privatizations are closely linked with targeting sometimes applied before privatization according to skills, age, and gender. This is shown in the first column in the upper panel of Table 13. Using re-hires as the dependent variable, we find that the age-targeted retrenchment variable yields a positive and statistically significant sign at 1 percent. Age-targeted retrenchment prior to privatization increases the probability of re-hiring by a huge 30 percent after privatization. On the other hand, the skill-targeted coefficient is negative and statistically significant at 5 percent. Skill targeting decreases the probability that firms will employ re-hires after privatization by 20 percent. Finally, the female-biased retrenchment coefficient is positive but it is not statistically significant. These results are quite consistent with our findings regarding net privatization prices. In fact, they strongly suggest that adverse selection may be a problem, as voluntary downsizing increases prices, but age-biased downsizing reduces prices and increases the probability of re-hiring after privatization, and skill-biased downsizing marginally increases net privatization prices and reduces the probability of re-hiring after privatization. Even more revealing, the results above hold when using the more restrictive re-hiring measure. These findings are shown in the lower panel of Table 13. Again, the corresponding coefficient for the age-biased variable is positive and statistically significant at 1 percent while the coefficient of the skill-biased variable is negative and statistically significant at 5 percent.[44]

Similar to the case with voluntary downsizing, the incidence of re-hires after privatization may not necessarily reflect poor management, but rather high labor firing costs and related

[42] Since the Heckman and Pagés (2001) sample is relatively limited, we also use an alternative measure suggested by them—legal origin. They show that French legal origin is very highly correlated with labor separation costs. In fact, we find very similar results. We would be happy to provide these additional estimations upon request.

[43] Data appears to be the likely culprit of this result as only 11 percent of the sample was re-hired to the same department or area, compared to more than 44 percent that were simply re-hired. Furthermore, Asia and the Transition Economies did practically no re-hiring to the same department. As mentioned above, another explanation may be related with the fact that enticing the best workers back after having them fired entails an additional cost. Additional pay or promotions may be necessary. In this context, the fact that the more restrictive measure of re-hires after privatization is not significantly linked with voluntary downsizing before privatization is not surprising.

[44] As before the coefficient of the female-biased variable is positive but not statistically significant.

rigidities. To explore this issue, we run probit regressions using the same two measures of labor costs used above. This is also shown in Table 13. When using ILO conventions as an additional explanatory variable, we find that that control is negative but statistically insignificant. Excessive labor costs and regulations do not seem to be a determinant of the probability of re-hires after privatization. Moreover, the signs and statistical significance of the age and skills variables do not change. The age-bias variable is always positive and is statistically significant at 1 percent in both *re-hires* and *re-hires-same*. Age-biased downsizing prior to privatization increases the probability of re-hires by 36 percent and increases the probability of re-hires to the same department by 16 percent.

On the other hand, the skill-bias variable is always negative, implying a lower probability of re-employment as it is statistically significant at 5 percent for both re-hires in general and re-hires to the same department or area in the firm. Skill-biased downsizing prior to privatization is linked with a lower probability of re-employment that ranges between 12 percent (*re-hires-same*) and 22 percent (general *re-hires*). Very similar results are obtained when using the Heckman-Pagés firing costs variable instead. In fact, this variable is negative but statistically insignificant, suggesting that high firing costs do not seem to have a bearing on the probability of re-hires. The signs of the skill-bias and age-bias variables are maintained, as well as their corresponding statistical significance.[45]

Finally, analogous to the analysis performed with privatization prices, Tables 14 and 15 provide evidence related to voluntary targeting and compulsory targeting, respectively.[46] According to our results in Table 14, voluntary age-biased downsizing increases the probability of re-hiring between 23 percent and 34 percent, as the corresponding coefficients in the three specifications presented are positive and statistically significant.[47] This finding provides further evidence of adverse selection. On the other hand, voluntary skill-biased downsizing yields the expected negative sign as before, but in this case the corresponding coefficients are statistically insignificant. Similarly, Table 15 shows that compulsory age-biased downsizing is weakly linked with a higher probability of re-hiring, as the corresponding signs are positive and statistically

[45] We also use data for temporary workers, defined as those workers who were downsized prior to privatization but re-hired after privatization on a temporary basis, presumably in order to take advantage of lower labor costs. As expected, we find that voluntary downsizing increases the probability of temporary hiring.
[46] Insufficient observations did not allow us to provide further evidence using *re-hires same* as the dependent variable for these two tables.
[47] However, statistical significance using the Heckman-Pagés labor firing costs only reaches 10 percent.

significant at 10 percent only when excluding labor rigidity measures. This is consistent with the "canceling out" idea described in the case of prices. On the other hand, compulsory skill-biased downsizing prior to privatization appears to lower the probability of re-hiring after privatization, regardless of the specification. This is consistent with the fact that in some specifications we obtain a positive and statistically significant link between that variable and privatization prices (see footnote 37).

In summary, our findings with respect to re-hiring policies are consistent with the adverse selection hypothesis in labor restructuring by the government before privatization. What governments do before privatization does have a direct bearing on how firms behave after privatization. Voluntary downsizing is associated with a 16-30 percent higher probability of re-hiring workers that were fired prior to privatization. Age-biased downsizing yields a higher probability of re-hiring workers, which in the case of voluntary age-biased downsizing reaches around 34 percent and in the case of compulsory age-biased downsizing around 12 percent—sometimes even re-hiring workers to the very same departments. The one exception to these results is skill-based downsizing, which in some specifications leads to significantly lower re-hiring rates by private firms.

6. Summary and Conclusions

Despite its importance, labor has probably been the single least addressed issue in privatization (Megginson and Netter, 2001). There is ambivalence with respect to the optimal policy approach to labor restructuring in privatization processes as reflected by the recommendations of development agencies around the world. In fact, such institutions have had a difficult time taking a position on whether or not it is a good idea to restructure a firm and, in particular, how to deal with labor force changes prior to privatization. Early advice called for labor restructuring prior to privatization under the premise that governments are better able to cushion any financial blow to displaced workers, mainly through safety nets (Nellis and Kikeri, 1989). Subsequent recommendations called for a less meddlesome approach by discriminating between large firms and smaller ones. It was suggested that smaller firms with relatively little overstaffing be sold with essentially no labor restructuring, under the logic that such a decision should be left to the new owners who would be in better position to choose which workers they would like to retain or dismiss (Kikeri, Nellis, and Shirley, 1992). A final view came later when prior restructuring in

privatization, including the labor area, was found to be associated with lower net privatization prices paid by buyers (López-de-Silanes, 1997).

This paper is the first to provide a formal cross-country analysis of the effects of a detailed list of labor restructuring measures before privatization to provide guidance for those countries still embarking on the privatization process. The lack of information on what happens to the labor force during the privatization process has exacerbated the fears and concerns of workers and governments, and delayed privatization in several countries (Kikeri, 1999). We address some policy concerns by testing several competing theories that aim to answer the following key question: Should governments restructure labor before privatization, as measured by privatization prices? While, as a general principle, dismissing redundant workers should increase the privatization price, in practice governments have a very difficult time identifying the genuinely redundant workers as asymmetric information problems remain. Firing the wrong workers may even reduce the privatization price.

Our data allow us to analyze the impact of labor restructuring measures not only on prices, but also on the re-hiring policies followed by firms after they are privatized. The benefit of such data is that we are able to say something about the management quality of retrenchment policies followed by governments around the world, and, in particular, we are able to investigate adverse selection issues. In fact, we find that overall labor retrenchment does not significantly impact privatization prices; if anything, voluntary retrenchment has a negative impact on net prices, suggesting a potential problem of adverse selection. Through a detailed analysis of various targeting policies, the paper also shows that government administration of the downsizing process may result in adverse selection, reflected in the re-hiring of the same workers after privatization.

Politically palatable downsizing mechanisms such as voluntary downsizing programs are very costly in terms of adverse selection. More elaborate mechanisms, such as compulsory skill programs, are politically very difficult to implement, but appear to be better at distinguishing the more productive workers from the less productive ones. In fact, we did find that it might be possible for governments to achieve some positive results through managing the process by using a skill-focused retrenchment. This type of policy is associated with lower probability rates of re-hiring of the same workers after privatization. However, it is also associated with negative political effects, as workers may find it too aggressive and react negatively towards the whole

privatization process. The fact that the political costs of this type of program are higher suggests that there may be some not easily observable or measurable firm characteristics that could explain the marginally positive results of these policies. Another reason for this result is the possibility that the level of documentation and design of this type of program simply makes it more palatable to buyers. The political difficulties of using such a policy and the problems it might cause in terms of the overall objective of achieving privatization should be considered.

In summary, governments should think long and hard before they restructure labor forces in preparation for privatization. The political consequences may be dire and the positive impact on privatization prices non-existent. Furthermore, the data on re-hiring policies shows that firms in which retrenchment takes place may ultimately lose some of their most valuable workers. While a qualified "do not intervene" appears to be the safest bet with respect to labor retrenchment before privatization, another policy alternative might be to set up a social safety net or labor reallocation program before privatization, and then let the new private owners decide who is redundant and who is not. Setting up the program before privatization may help with the political viability of the process and letting the new owners manage the retrenchment could help avoid adverse selection.

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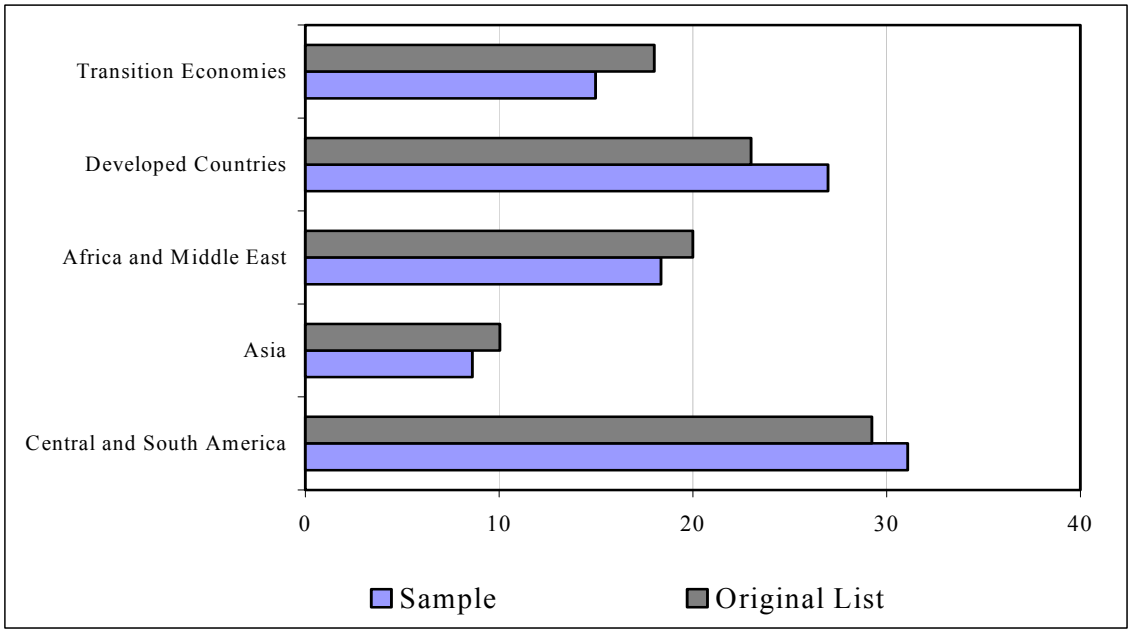
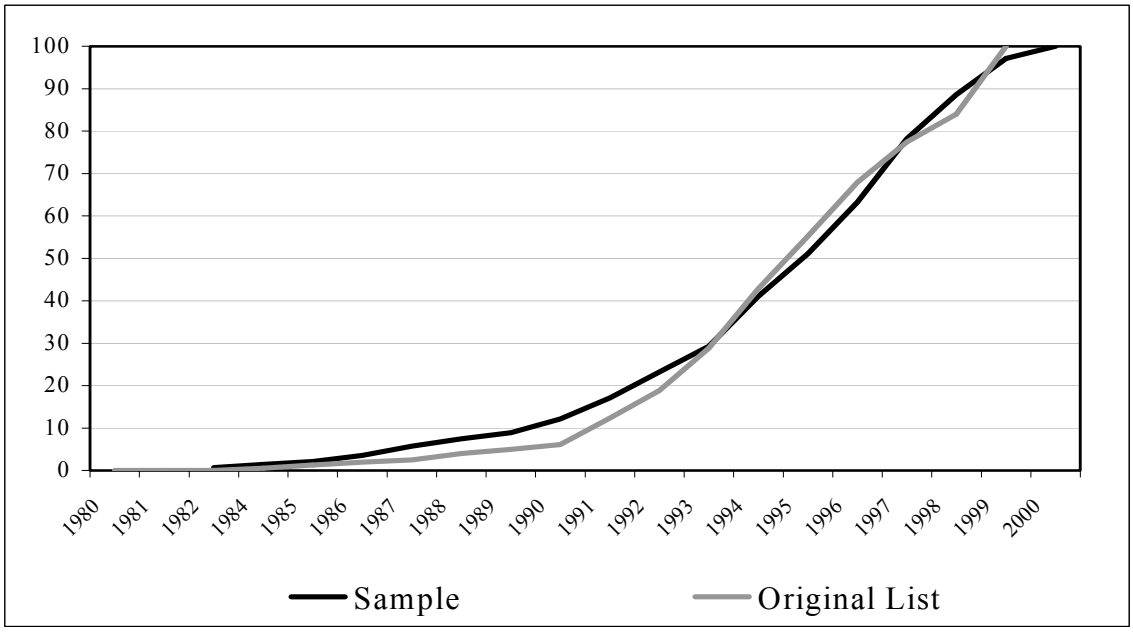
Figure 1. Distribution of Privatizations by Region (%)



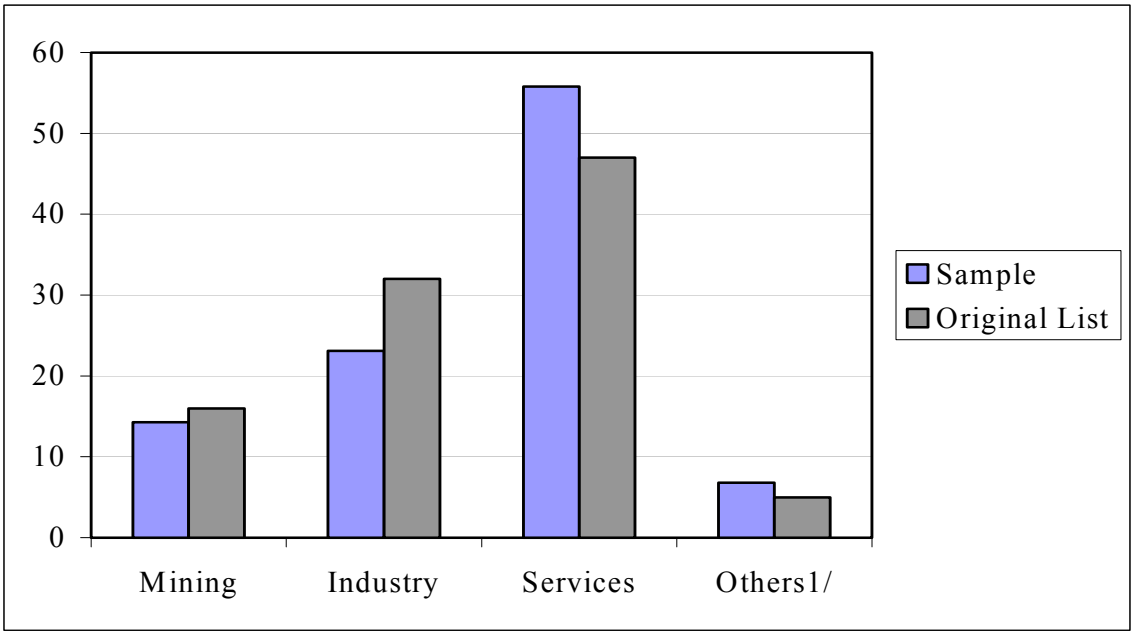
Source: Data collected by authors. Original List based on 1500 firms. Sample reflects 308 firms.

Figure 2. Accumulated Distribution of Privatizations by Year (%)



Source: Data collected by authors. Original List based on 1500 firms. Sample reflects 308 firms.

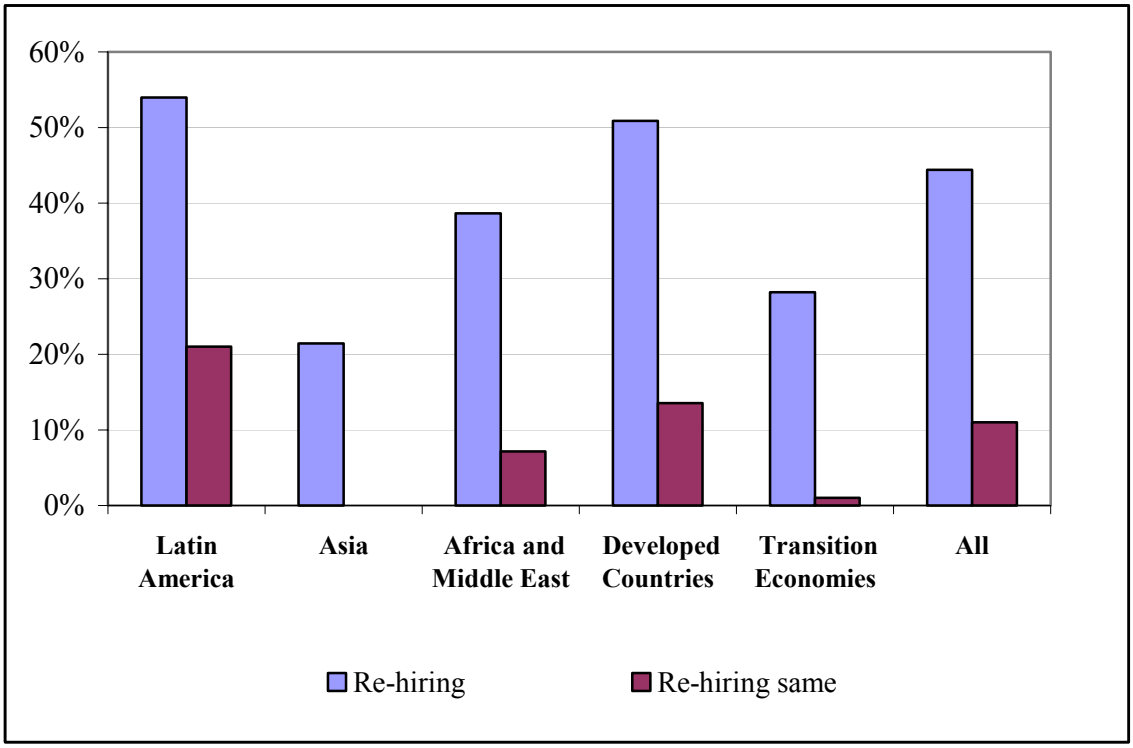
Figure 3. Distribution of Privatizations by Sector (%)



1/ Includes land and unclassified firms.

Source: Data collected by authors. Original List based on 1500 firms. Sample reflects 308 firms.

Figure 4. Labor Re-Hiring by Region (%)



Source: Data collected by authors. Original List based on 1500 firms. Sample reflects the 225 firms that applied downsizing measures before privatization.

Table 1. Description of Variables

Variable	Description
Firm Characteristics	
Net Privatization price/sales	The net real value of the nominal price of sale in U.S dollars after all privatization and restructuring costs are taken into account adjusted by the percentage of company shares sold, and divided by total sales before privatization.
Sales	The net real value of the three-year average of firm sales before privatization denominated in U.S dollars.
Net total liabilities	Dummy variable equal to 1 if net total liabilities are greater than zero up to three years prior to privatization, and 0 otherwise.
Privatization Characteristics	
Ministry of Finance or Economy	Dummy variable equal to 1 if the ministry of finance or economy was responsible for that company, and 0 otherwise.
Foreign participation	Dummy variable equal to 1 if foreign participation was allowed in the privatization process, and 0 otherwise.
Share sold	Percentage of firm's shares sold in privatization.
Type of sale	Dummy variable equal to 1 to take into account method of privatization sale. Two dummies are considered to account for initial public offering and direct (non-competitive) sales respectively, and 0 otherwise (reflecting other methods such as purchases by employees, joint ventures, or secondary offerings).
Agent bank	Dummy variable equal to 1 if leading agent bank organized privatization process. Leading agent bank is defined as bank that organized most privatizations in the country at the time of our research. Agent banks are in charge of obtaining information on the state-owned enterprise, suggesting restructuring measures, and organizing the sale itself.
Labor Characteristics	
Unions	Dummy variable equal to 1 if firm had unions up to three years prior to privatization, and 0 otherwise.
Political affiliation of unions	Dummy variable equal to 1 if political affiliation of union is the same as the political party linked with the ruling government at the time of privatization, and 0 otherwise.
Strikes	Dummy variable equal to 1 if there were any protest, picketing or strikes prior to privatization, and 0 otherwise.
Labor Policies	
Downsizing	Dummy variable equal to 1 if firm undertook any downsizing of the labor force up to three years prior to privatization, 0 otherwise. Downsizing may be classified as voluntary or compulsory, and may be targeted according to age (age-biased downsizing, skills (skill-biased downsizing), gender (female-biased downsizing), or may be neutral (no particular group targeted).
Voluntary downsizing	Dummy variable equal to 1 if there was any kind of voluntary downsizing of the labor force three years prior to privatization, 0 otherwise. Voluntary downsizing is defined as any non-compulsory, worker-based decision downsizing. Typically severance packages, pension enhancements, and other benefits are offered to incentivize workers to leave the firm.
Employment guarantee	Dummy variable equal to 1 if there was any promise of employment guarantee up to three years prior to privatization, 0 otherwise.
Pay cut	Dummy variable equal to 1 if there was any pay cut to the salary or wage of the worker three years prior to privatization, 0 otherwise.
Re-hires	Dummy variable equal to 1 if the privatized firm re-hired previously fired workers (up to three years prior to privatization) after privatization, 0 otherwise.
Re-hires same	Dummy variable equal to 1 if the privatized firm re-hired previously fired workers (up to three years prior to privatization) and placed the worker in the same department or are from which he was originally fired, 0 otherwise.

Table 1., continued

Variable	Description
Country-Specific Variables	
Law origin	Legal origin of the country in which company is geographically based. Five possible legal origins are considered: English common law; French civil code; German commercial code; Scandinavian commercial code; and Socialist laws (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998).
Gross domestic product	Gross Domestic Product (US$ PPP) in logs. Average of the three years prior privatization (World Bank, 2001a).
Inflation	Average rate of inflation in the country three years prior privatization (World Bank, 2001a).
Openness	Average sum of exports and imports of goods and services measured as a share of gross domestic product three years prior to privatization (World Bank, 2001a).
OECD	Dummy equal to 1 if the country is an OECD country, 0 otherwise.
Economic Growth	Average rate of growth of the country three years prior privatization (World Bank, 2001a).
Fiscal Deficits	Average fiscal deficits as a percentage of gross domestic product three years prior to privatization (World Bank, 2001a).
ILO conventions	Cumulative number of International Labor Organization (ILO) conventions ratified by the country at the time of privatization. Based on legal documents (Rama and Artecona, 2001).
Labor firing costs	Measure that summarizes the tenure-severance pay profile using a common set of dismissal probabilities across countries. The measure computes the expected future cost, at the time a worker is hired, of dismissing her in the future due to unfavorable economic conditions. The index is constructed to include only firing costs that affect firms' decisions at the margin. It includes the cost of providing statutory advance notice and severance pay conditional on each possible level of tenure that a worker can attain in the future. Measure thus reflects marginal costs of dismissing full-time indefinite workers (Heckman and Pages, 2001).
Structural Reform	Dummy variable equal to 1 if the privatization process took place in a context of structural reform, 0 otherwise.

Table 2. Observations in the Sample

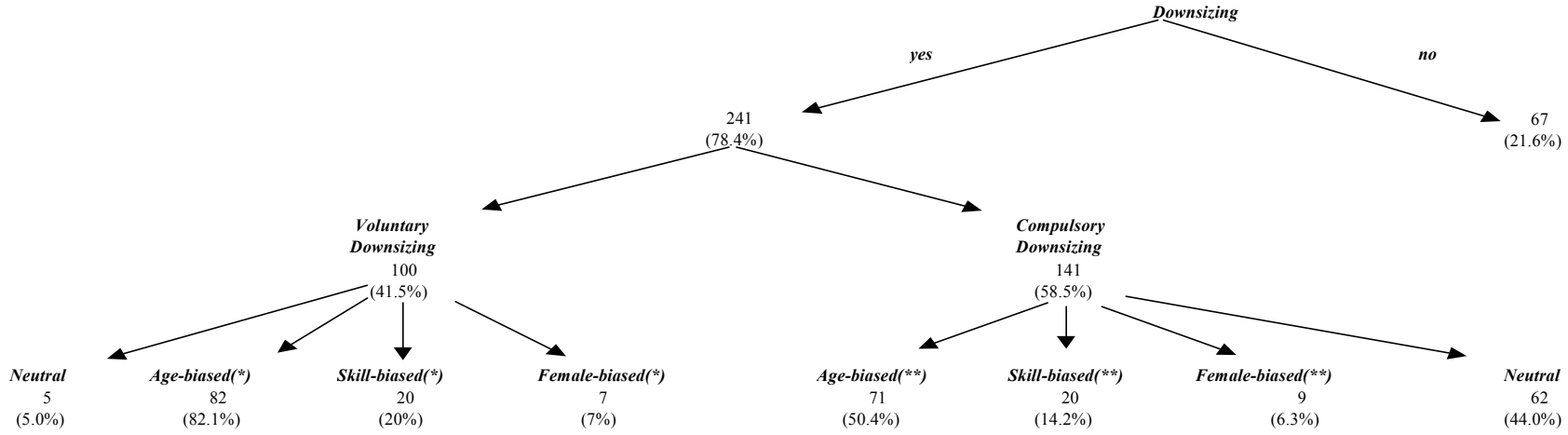
	Number	Percentage of sales
Firms in our final sample	308	97.21
Firms that supplied incomplete information	25	1.04
Firms merged and keep no independent records	19	0.12
Firms that were liquidated and no longer exist	22	0.78
Firms that denied or refused to give information	26	0.85
All Privatized Firms (1982-2000)	400	100.00

This table breaks our world sample between 1982 and 2000 into two groups. For each group we provide the number of firms and the percentage of pre-privatization sales in the total.
Source: Data collected by authors.

Table 3. Summary Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Firm Characteristics:						
Net Privatization Prices/sales	308	0.587	0.609	3.228	0.000	1.367
Sales	308	1.415	0.140	3.167	0.001	21.991
Net total liabilities	308	0.432	0.000	0.496	0.000	1.000
Mining	308	0.143	0.000	0.350	0.000	1.000
Industry	308	0.231	0.000	0.422	0.000	1.000
Services	308	0.558	1.000	0.497	0.000	1.000
Privatization Characteristics:						
Ministry of Finance	308	0.449	0.000	0.498	0.000	1.000
Foreign participation	308	0.682	1.000	0.467	0.000	1.000
Shares sold	308	0.509	0.506	0.282	0.010	1.000
Public offering	308	0.653	1.000	0.477	0.000	1.000
Direct Sale	308	0.198	0.000	0.399	0.000	1.000
Labor Characteristics:						
Unions	308	0.844	1.000	0.363	0.000	1.000
Strikes	308	0.474	0.000	0.500	0.000	1.000
Labor Policies:						
Downsizing	308	0.782	1.000	0.413	0.000	1.000
Voluntary downsizing	308	0.325	0.000	0.469	0.000	1.000
Age-biased downsizing	308	0.497	0.000	0.501	0.000	1.000
Skill-biased downsizing	308	0.130	0.000	0.337	0.000	1.000
Female-biased downsizing	308	0.058	0.000	0.235	0.000	1.000
Employment guarantee	308	0.282	0.000	0.451	0.000	1.000
Pay cut	308	0.075	0.000	0.263	0.000	1.000
Re-hiring	225	0.444	0.000	0.498	0.000	1.000
Re-hiring Same	225	0.110	0.000	0.315	0.000	1.000
Country-Specific Variables:						
English common law	308	0.253	0.000	0.436	0.000	1.000
French commercial code	308	0.500	0.500	0.501	0.000	1.000
German commercial code	308	0.117	0.000	0.322	0.000	1.000
Scandinavian commercial code	308	0.019	0.000	0.138	0.000	1.000
Socialist/communist laws	308	0.110	0.000	0.314	0.000	1.000
Gross domestic product	308	25.398	25.452	1.851	19.448	28.856
Inflation	308	109.876	11.485	292.683	0.618	1667.207
Openness	308	31.137	28.158	31.953	0.000	314.588
Economic growth	308	3.028	2.726	3.811	-11.144	21.320
Fiscal deficits	308	-2.580	-2.279	3.475	-14.003	13.629
ILO conventions	221	54.164	52.000	28.883	1.000	123.000
Labor firing cost	151	2.526	2.718	1.216	0.443	4.756

Table 4. Decomposition of Labor Downsizing Measures



(*):

	#	%
Age-biased and skill-biased	14	(14)
Age-biased and female-biased	3	(3)
Skill-biased and female-biased	3	(3)
Age-biased, skill-biased and female-biased	0	(0)

(**):

	#	%
Age-biased and skill-biased	12	(8.5)
Age-biased and female-biased	5	(3.5)
Skill-biased and female-biased	3	(2.1)
Age-biased, skill-biased and female-biased	3	(2.1)

This table shows the decomposition of labor downsizing cases in our sample in terms of cases and percentages (in parentheses). Downsizing may be voluntary or compulsory (non-voluntary). Additionally, it may be classified according to its targeting nature as age-biased, skill-biased, and female-biased. Thus, voluntary and compulsory downsizing may be targeted. Since one firm may opt to pursue more than one targeted downsizing method, biases do not add up to 100 percent. For instance, one firm may concurrently pursue age-biased downsizing and skill-biased downsizing in its downsizing program. The corresponding numbers for all the possible combinations are shown in (*) and (**).

Table 5. Labor Restructuring Measures Around the World

	Latin America	Asia	Africa and Middle East	Developed Countries	Transition Economies	All
Downsizing	82.2%	58.3%	79.7%	79.2%	76.2%	78.2%
Voluntary downsizing	32.5%	12.5%	45.3%	28.6%	14.3%	32.5%
Age-biased downsizing	57.4%	29.2%	54.7%	54.5%	26.6%	49.7%
Skill-biased downsizing	12.5%	13.9%	9.4%	15.6%	11.9%	13.0%
Female-biased downsizing	5.0%	8.3%	14.1%	0.0%	4.8%	5.8%
Employment guarantee	8.4%	20.1%	51.6%	13.0%	52.4%	28.2%
Pay cut	8.9%	0.0%	1.6%	13.0%	7.1%	7.5%
Sample	32.8%	7.8%	20.8%	25.0%	13.6%	100.0%

Source: Data collected by authors.

Table 6. Simple Correlation of Labor Downsizing Measures

	Downsizing	Voluntary downsizing	Age-biased downsizing	Skill-biased downsizing	Female-biased downsizing	Employment guarantee	Pay cut
Downsizing	1						
Voluntary downsizing	0.3656[a]	1					
Age-biased downsizing	0.5239[a]	0.4483[a]	1				
Skill-biased downsizing	0.2037[a]	0.1447	0.1184	1			
Female-biased downsizing	0.0643	0.0342	-0.0261	0.1508	1		
Employment guarantee	0.1036	0.027	0.0113	0.0365	0.2126[a]	1	
Pay cut	-0.0456	-0.0099	-0.009	-0.0584	-0.0803	-0.0788	1

[a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Table 7. Labor Restructuring and Privatization Prices: Tests of Means and Medians

		SOEs where measure was taken (a)	SOEs where measure was not taken (b)	Difference (a)-(b)	T-statistic for change in mean[1/] Z-statistic for change in median[2/]
Downsizing					
	mean	0.5532	0.7085	-0.1552	3.547 [a]
	median	0.5711	0.7070	-0.1360	3.576 [a]
Voluntary downsizing					
	mean	0.4818	0.6376	-0.1557	4.064 [a]
	median	0.4716	0.6259	-0.1543	3.909 [a]
Age-biased downsizing					
	mean	0.5265	0.6467	-0.1202	3.320 [a]
	median	0.5136	0.6320	-0.1184	3.184 [a]
Skill-biased downsizing					
	mean	0.5616	0.5908	-0.0292	0.534
	median	0.6074	0.6157	-0.0083	0.371
Female-biased downsizing					
	mean	0.3533	0.6015	-0.2482	3.213 [a]
	median	0.3765	0.6150	-0.2385	2.977 [a]
Employment guarantee					
	mean	0.4200	0.6496	-0.2296	5.853 [a]
	median	0.3664	0.6508	-0.2844	6.936 [a]
Pay cut					
	mean	0.6893	0.5787	0.1106	-1.585 [c]
	median	0.7424	0.6006	0.1417	-1.725 [c]

Table 7 reports mean and median values of the privatization price/sales in the group of firms where the labor restructuring measure was taken compared to those firms where it was not. The third column shows the difference in mean and medians between the net privatization price of the group of firms that took the measure compared to the group that did not. The fourth column reports the resulting t-statistics and z-statistics of the difference in means and medians of the two groups respectively. 1/ T-test for Ho about difference between means. Unequal N's 2/ Z-test for Ho about difference between medians. Unequal N's. (Wilcoxon rank sum). [a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Table 8. Labor Restructuring and Privatization Prices
(Dependent variable: Net privatization price/sales)

Variables	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
1.- Firm and privatization characteristics:				
Net total liabilities	-0.0201	-0.0241	-0.0231	-0.0232
	(0.026)	(0.026)	(0.026)	(0.026)
Share Sold	-0.0040 [b]	-0.0038 [b]	-0.0039 [b]	-0.0041 [b]
	(0.002)	(0.002)	(0.002)	(0.002)
Foreign participation	0.1500 [a]	0.1504 [a]	0.144 [a]	0.1524 [a]
	(0.032)	(0.032)	(0.032)	(0.032)
Public offering	0.0763 [c]	0.0817 [c]	0.0803 [b]	0.0853 [b]
	(0.043)	(0.044)	(0.042)	(0.043)
Direct Sale	-0.0094	-0.0118	-0.0086	-0.0038
	(0.047)	(0.049)	(0.046)	(0.048)
2.- Labor Characteristics:				
Unions	-0.1319 [a]	-0.1464 [a]	-0.1314 [a]	-0.1437 [a]
	(0.034)	(0.034)	(0.035)	(0.034)
Strikes	0.0010	-0.0065	0.0003	0.0062
	(0.029)	(0.028)	(0.028)	(0.028)
3.- Labor Policies:				
Downsizing	-0.0587 [b]	-0.0286		
	(0.031)	(0.022)		
Voluntary downsizing			-0.0752 [a]	-0.0536 [b]
			(0.028)	(0.021)
Employment guarantee	-0.0990 [a]	-0.1025 [a]	-0.107 [a]	-0.1121 [a]
	(0.032)	(0.033)	(0.032)	(0.033)
Pay cut	0.0662	0.0089	0.0708	0.0212
	(0.046)	(0.033)	(0.045)	(0.031)
4.- Macroeconomic Variables:				
Gross Domestic Product	0.0511 [a]	0.053 [a]	0.0526 [a]	0.0562 [a]
	(0.009)	(0.009)	(0.009)	(0.009)
Inflation	0.0001 [b]	0.0001 [b]	0.0001 [c]	0.0001 [b]
	(0.000)	(0.000)	(0.000)	(0.000)
OECD	0.025	0.0164	0.0112	0.0055
	(0.043)	(0.042)	(0.042)	(0.043)
Constant	-0.6978 [b]	-0.7284 [b]	-0.728 [b]	-0.8548 [b]
	(0.311)	(0.320)	(0.300)	(0.328)
Observations	292	292	292	292
R-squared	0.52	0.52	0.53	0.52
F	20.03	19.95	21.67	21.19
Prob > F	0.000	0.000	0.000	0.000

The dependent variable is net privatization price/sales, defined as the amount that accrues to the government after all privatization and restructuring costs are taken into account, such as government commitments at the time of sale and other adjustments are made to the sale contract. This number is adjusted by the percentage of company shares sold and is divided by the average net sales during the three years prior to privatization. The real value of the resulting number as of December 2000 is used. Columns (1) and (3) consider prior restructuring measures and the rest of variable as "exogenous" and provide estimates from OLS regressions. Column (2) and (4) show the second stage of the two-step procedure in order to account for endogeneity. All regressions include sectoral controls and firm size controls. Robust standard errors are given in parentheses. [a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent.

Table 9. Instruments for Potentially Endogenous Variables

	Leading Agent Bank	Ministry of Finance or Economy	Political Affiliation of unions	Undertaking Structural Reform	Legal origin[1]	Macro controls[2]	F-statistic on excluded instruments
Downsizing	Yes		Yes	Yes	Yes	Yes	4.44
Voluntary downsizing	Yes	Yes		Yes	Yes	Yes	4.12
Age-biased downsizing		Yes	Yes	Yes	Yes	Yes	3.70
Skill-biased downsizing		Yes	Yes	Yes	Yes	Yes	3.45
Female-biased downsizing		Yes	Yes	Yes	Yes	Yes	3.31
Employment guarantee	Yes		Yes	Yes	Yes	Yes	3.22
Pay cut	Yes		Yes	Yes	Yes	Yes	3.44

[1] This set includes English Common Law, German Commercial Law, Scandinavian Commercial Law.

[2] This set includes the rate of growth, the legal origin of the country, and the degree of openness,.

Table 8 reports the group of instruments used in the first-step regression. The rows give the names of the dependent variables in the first-step regression. The columns describe the different groups of instruments used in each regression, noting "Yes" if that group is used in the estimation of each dependent variable. The last column gives the F-statistic on the excluded instruments.

Table 10. Labor Targeting and Privatization Prices (Dependent variable is net privatization price/sales)

Variables	OLS	IV
	(1)	(2)
1.- Firm and privatization characteristics:		
Net total liabilities	-0.0201	-0.0197
	(0.026)	(0.026)
Share Sold	-0.004 [b]	-0.0039 [b]
	(0.002)	(0.002)
Foreign participation	0.1503 [a]	0.1563 [a]
	(0.032)	(0.032)
Public offering	0.0712 [c]	0.0783 [b]
	(0.044)	(0.043)
Direct Sale	-0.0122	0.0031
	(0.048)	(0.047)
2.- Labor Characteristics:		
Unions	-0.116 [a]	-0.1523 [a]
	(0.036)	(0.034)
Strikes	0.0045	0.0057
	(0.028)	(0.027)
3.- Labor Policies:		
Age-biased downsizing	-0.0819 [a]	-0.0845 [a]
	(0.026)	(0.027)
Skill-biased downsizing	0.0203	0.0653 [c]
	(0.036)	(0.038)
Female-biased downsizing	-0.0016	0.0039
	(0.059)	(0.049)
Employment guarantee	-0.1048 [a]	-0.1119 [a]
	(0.032)	(0.033)
Pay cut	0.0736 [c]	0.0171
	(0.045)	(0.046)
4.- Macroeconomic Variables:		
Gross Domestic Product	0.0535 [a]	0.0563 [a]
	(0.009)	(0.009)
Inflation	0.0001 [b]	0.0001 [c]
	(0.000)	(0.000)
OECD	0.0235	0.0013
	(0.042)	(0.043)
Constant	-0.7677 [a]	-0.7592
	(0.294)	(0.339)
Observations	292	292
R-squared	0.54	0.53
F	18.6	19.64
Prob > F	0.000	0.000

The dependent variable is net privatization price/sales, defined as the amount that accrues to the government after all privatization and restructuring costs are taken into account, such as government commitments at the time of sale and other adjustments are made to the sale contract. This number is adjusted by the percentage of company shares sold and divided by the average net sales during the three years prior to privatization. The real value of the resulting number as of December 2000 is used. Column (1) considers prior restructuring measures and the rest of variable as "exogenous" and provide estimates from OLS and TOBIT regressions. Column (2) shows the second stage of the two-step procedure to take account of endogeneity. All regressions include sectoral controls and firm size controls. Robust standard errors are given in parentheses. [a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent.

Table 11. Voluntary and Compulsory Targeting and Privatization Prices
Dependent variable is net privatization price/sales

Variables	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
1.- Firm and privatization characteristics:				
Net total liabilities	-0.0203	-0.0241	-0.0238	-0.0208
	(0.026)	(0.026)	(0.026)	(0.027)
Share Sold	-0.0039 [b]	-0.0043 [b]	-0.0043 [a]	-0.004 [b]
	(0.002)	(0.002)	(0.002)	(0.002)
Foreign participation	0.1464 [a]	0.1569 [a]	0.1513 [a]	0.151 [a]
	(0.032)	(0.032)	(0.032)	(0.033)
Public offering	0.0744 [c]	0.0799 [b]	0.0806 [c]	0.0832 [b]
	(0.042)	(0.043)	(0.045)	(0.044)
Direct Sale	-0.0163	0.0016	-0.0095	-0.0109
	(0.046)	(0.047)	(0.048)	(0.048)
2.- Labor Characteristics:				
Unions	-0.1244 [a]	-0.1344 [a]	-0.1305 [a]	-0.144 [a]
	(0.034)	(0.035)	(0.035)	(0.035)
Strikes	-0.0008	0.0024	-0.0085	-0.0012
	(0.028)	(0.027)	(0.028)	(0.028)
3.- Labor Policies:				
Voluntary age-biased downsizing	-0.0911 [a]	-0.0568 [b]		
	(0.032)	(0.022)		
Voluntary skill-biased downsizing	0.0347	0.0111		
	(0.050)	(0.018)		
Voluntary female-biased downsizing	-0.1408 [c]	0.0078		
	(0.073)	(0.035)		
Compulsory age-biased downsizing			-0.0221	-0.081
			(0.032)	(0.066)
Compulsory skill-biased downsizing			0.0311	0.0142
			(0.046)	(0.046)
Compulsory female-biased downsizing			0.0604	0.0587
			(0.071)	(0.066)
Employment guarantee	-0.1052 [a]	-0.1161 [a]	-0.1062 [a]	-0.0999 [a]
	(0.032)	(0.033)	(0.033)	(0.034)
Pay cut	0.0664	0.0723 [c]	0.0718	0.0141
	(0.044)	(0.043)	(0.046)	(0.046)
4.- Macroeconomic Variables:				
Gross Domestic Product	0.0528 [a]	0.0561 [a]	0.0516 [a]	0.0532 [a]
	(0.009)	(0.009)	(0.009)	(0.009)
Inflation	0.0001 [c]	0.0001	0.0001 [b]	0.0001 [b]
	(0.000)	(0.000)	(0.000)	(0.000)
OECD	0.01	-0.0017	0.0205	0.0301
	(0.042)	(0.043)	(0.042)	(0.043)
Constant	-0.7304 [a]	-0.8516 [c]	-0.7558 [a]	-0.841 [c]
	(0.297)	(0.334)	(0.303)	(0.344)
Observations	292	292	292	292
R-squared	0.54	0.53	0.52	0.52
F	21.24	19.74	17.6	17.64
Prob > F	0.000	0.000	0.000	0.000

The dependent variable is net privatization price/sales, defined as the amount that accrues to the government after all privatization and restructuring costs are taken into account, such as government commitments at the time of sale and other adjustments are made to the sale contract. This number is adjusted by the percentage of company shares sold and divided by the average net sales during the three years prior to privatization. The real value of the resulting number as of December 2000 is used. Columns (1) and (3) consider prior restructuring measures and the rest of variable as "exogenous" and provide estimates from an OLS regression. Columns (2) and (4) show the second stage of the two-step procedure to take account of endogeneity. All regressions include sectoral controls and firm size controls. Robust standard errors are given in parentheses. [a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Table 12. Voluntary Downsizing and Re-Hiring

	Dependent Variable: re-hire								
	Probit (1)		dF/dX	Probit (2)		dF/dX	Probit (3)		dF/dX
Voluntary downsizing	0.4228	(0.184)[b]	[0.1664]	0.6616	(0.218)[b]	[0.2576]	0.9103	(0.278)[b]	[0.3014]
Union	0.8231	(0.300)[a]	[0.2886]	0.7164	(0.349)[b]	[0.2547]	1.2093	(0.477)[b]	[0.4211]
ILO Conventions				-0.0069	(0.004)	[-0.0026]			
Labor Firing Cost							-0.1969	(0.136)	[-0.0782]
Constant	-2.857	(1.763)[c]		-6.6483	(2.307)[b]		-4.9752	(2.858)[c]	
Observations	225			165			120		
Log likelihood	-144.49			-102.02			-94.92		
Wald chi2	18.37			18.60			22.01		
Prob > chi2	0.010			0.02			0.000		

	Dependent Variable: re-hire same								
	Probit (1b)		dF/dX	Probit (2b)		dF/dX	Probit (3b)		dF/dX
Voluntary downsizing	0.1132	(0.230)	[0.0203]	0.1470	(0.248)	[0.0336]	0.2257	(0.277)	[0.0632]
Union	0.7471	(0.450)[c]	[0.0915]	0.7769	(0.468)	[0.1265]	0.5128	(0.549)	[0.1147]
ILO Conventions				-0.0020	(0.004)	[-0.0004]			
Labor Firing Cost							-0.1626	(0.136)	[-0.0446]
Constant	-4.9675	(2.220)[b]		-3.6663	(2.571)		-0.0369	(3.174)	
Observations	225			165			120		
Log likelihood	-75.76			-68.25			-58.78		
Wald chi2	6.27			4.01			2.83		
Prob > chi2	0.060			0.07			0.08		

All regressions include: partial privatization dummy, sectoral dummies and country macro controls
Standard errors and marginal effects are given in parentheses and brackets respectively.

[a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Table 13. Labor Targeting and Re-Hires

	Dependent Variable: re-hire								
	Probit (1)		dF/dX	Probit (2)		dF/dX	Probit (3)		dF/dX
Age-biased downsizing	0.793	(0.197) [a]	[0.2981]	1.0237	(0.238) [a]	[0.3678]	0.9944	(0.293) [a]	[0.3784]
Skill-biased downsizing	-0.565	(0.241) [b]	[-0.2085]	-0.5943	(0.278) [b]	[-0.2155]	-0.7135	(0.320) [b]	[-0.2756]
Female-biased downsizing	0.465	(0.397)	[0.1838]	0.3026	(0.498)	[0.1198]	0.5056	(0.662)	[0.1900]
Union	0.629	(0.307) [b]	[0.2278]	0.4345	(0.355)	[0.1605]	0.6888	(0.521)	[0.2639]
ILO Conventions				-0.0060	(0.005)	[-0.0023]			
Labor Firing Cost							-0.1001	(0.118)	[-0.0398]
Constant	-3.470	(1.581) [b]		-6.5214	(2.015) [b]		-2.5540	(3.004)	
Observations	225			165			120		
Log likelihood	-136.58			-94.98			-70.67		
Wald chi2	36.49			35.58			23.68		
Prob > chi2	0.000			0.000			0.000		

	Dependent Variable: re-hire same								
	Probit (1b)		dF/dX	Probit (2b)		dF/dX	Probit (3b)		dF/dX
Age-biased downsizing	1.01995	(0.306) [a]	[0.1230]	1.0219	(0.319) [a]	[0.1596]	1.3562	(0.437) [a]	[0.2382]
Skill-biased downsizing	-0.9376	(0.485) [b]	[-0.0827]	-0.9133	(0.485) [b]	[-0.1161]	-1.0959	(0.593) [b]	[-0.1708]
Female-biased downsizing	0.4138	(0.619)	[0.0733]	0.0968	(0.652)	[0.0187]	0.3396	(0.884)	[0.0912]
Union	0.4768	(0.504)	[0.0504]	0.6451	(0.502)	[0.0876]	0.2419	(0.621)	[0.0617]
ILO Conventions				-0.0013	(0.004)	[-0.0002]			
Labor Firing Cost							-0.1648	(0.127)	[-0.0380]
Constant	-5.2937	(1.761) [b]		-3.0693	(2.152)		2.4248	(3.436)	
Observations	225			165			120		
Log likelihood	-67.77			-61.21			-55.11		
Wald chi2	22.67			23.38			17.55		
Prob > chi2	0.001			0.002			0.020		

All regressions include: partial privatization dummy, sectoral dummies and country macro controls
Standard errors and marginal effects are given in parentheses and brackets respectively.

[a] Significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Table 14. Voluntary Targeting and Re-Hiring

	Dependent Variable: re-hire								
	Probit (1)		dF/dX	Probit (2)		dF/dX	Probit (3)		dF/dX
Voluntary age-biased downsizing	0.577	(0.196) [a]	[0.2266]	0.8777	(0.234) [b]	[0.3391]	0.9043	(0.290) [b]	[0.3415]
Voluntary skill-biased downsizing	-0.212	(0.313)	[- 0.0818]	-0.5496	(0.368)	[-0.1996]	-0.2445	(0.477)	[-0.0972]
Voluntary female-biased downsizing	0.159	(0.561)	[0.0629]	0.6198	(0.500) [c]	[0.2417]	0.3436	(0.647)	[0.1319]
Union	0.656	(0.285) [b]	[0.2381]	0.6159	(0.340)	[0.2236]	1.0546	(0.511) [b]	[0.3805]
ILO Conventions				-0.0064	(0.004)	[-0.0024]			
Labor Firing Cost							-0.1376	(0.122)	[-0.0546]
Constant	-2.735	(1.337) [b]		-7.3389	(2.120) [b]		-4.1581	(2.739)	
Observations	225			165			120		
Log likelihood	-144.06			-99.34			-73.07		
Wald chi2	18.94			22.91			17.67		
Prob > chi2	0.008			0.003			0.023		

All regressions include: partial privatization dummy, sectoral dummies and country macro controls
Standard errors and marginal effects are given in parentheses and brackets respectively.

[a] Significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Table 15. Compulsory Downsizing and Re-Hiring

	Dependent Variable: re-hire								
	Probit (1)		dF/dX	Probit (2)		dF/dX	Probit (3)		dF/dX
Compulsory age-biased downsizing	0.324	(0.201) [c]	[0.1279]	0.285	(0.235)	[0.1126]	0.0922	(0.277)	[0.0336]
Compulsory skill-biased downsizing	-1.164	(0.361) [a]	[- 0.3635]	-0.939	(0.375) [b]	[-0.3138]	-1.3226	(0.474) [b]	[-0.4478]
Compulsory female-biased downsizing	0.378	(0.478)	[0.1500]	0.057	(0.634)	[0.0226]	0.8865	(0.867)	[0.3055]
Union	0.681	(0.292) [b]	[0.2445]	0.596	(0.332) [c]	[0.2164]	1.1672	(0.484) [b]	[0.4069]
ILO Conventions				-0.0067	(0.004)	[-0.0026]			
Labor Firing Cost							-0.0640	(0.120)	[-0.0254]
Constant	-2.936	(1.364) [b]		-5.7978	(1.962) [b]		-4.8954	(3.242)	
Observations	225			165			120		
Log likelihood	-142.46			-103.35			-73.86		
Wald chi2	24.59			19.69			18.1		
Prob > chi2	0.000			0.011			0.020		

All regressions include: partial privatization dummy, sectoral dummies and country macro controls

Standard errors and marginal effects are given in parentheses and brackets respectively.

[a] Significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Appendix 1.A
First Stage Probit: Downsizing

Variables	Probit Model
Structural Reform	0.6274 [b]
	(0.239)
Political Affiliation of Unions	-0.6572 [a]
	(0.175)
Agent Bank	0.7660 [a]
	(0.248)
Openness	-0.0005
	(0.002)
Growth	-0.0108
	(0.022)
English Common Law	-0.2370
	(0.204)
German Commercial Code	-0.3418
	(0.269)
Scandinavian Code	-0.7483
	(0.570)
Constant	1.0402 [a]
	(0.184)
Number of observations	308
Pseudo R Squared	0.15
F-statistics on excluded instruments	4.44
Prob>F	0.000

This appendix presents the first-step regression of the two-step procedure for the case of the key labor downsizing measure. Robust standard errors are given in parentheses. [a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Appendix 1.B
First Stage Probit: Voluntary Downsizing

Variables	Probit Model
Structural Reform	0.6264 [a]
	(0.178)
Agent Bank	0.6300 [a]
	(0.178)
Ministry of Finance or Economy	0.6704 [a]
	(0.163)
Openness	-0.0027
	(0.003)
Growth	0.0505
	(0.022)
English Common Law	-0.1278
	(0.192)
German Commercial Code	-0.2117
	(0.278)
Constant	1.1661 [a]
	(0.191)
Number of observations	308
Pseudo R Squared	0.15
F-statistics on excluded instruments	4.12
Prob>F	0.000

This appendix presents the first-step regression of the two-step procedure for the case of voluntary downsizing. Robust standard errors are given in parentheses.
[a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Appendix 1.C
First Stage Probit: Age-Biased Downsizing

Variables	Probit Model
Structural Reform	0.6888 [a]
	(0.1843)
Political Affiliation of Unions	-0.2933 [c]
	(0.156)
Agent Bank	0.5973 [a]
	(0.183)
Ministry of Finance or Economy	0.8689 [a]
	(0.159)
Openness	-0.0027
	(0.002)
Growth	0.0286
	(0.022)
English Common Law	-0.1043
	(0.186)
German Commercial Code	-0.1320
	(0.249)
Constant	0.5464 [b]
	(0.183)
Number of observations	308
Pseudo R Squared	0.17
F-statistics on excluded instruments	3.70
Prob>F	0.000

This appendix presents the first-step regression of the two-step procedure for the case of age-biased downsizing. Robust standard errors are given in parentheses.
[a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Appendix 1.D. First Stage Probit: Skill-Biased Downsizing

Variables	Probit Model
Structural Reform	0.4419 [b]
	(0.210)
Political Affiliation of Unions	0.3613 [c]
	(0.198)
Agent Bank	0.7914 [a]
	(0.207)
Ministry of Finance or Economy	0.3404 [c]
	(0.202)
Openness	-0.0007
	(0.004)
Growth	-0.0288
	(0.022)
English Common Law	-0.2826
	(0.265)
German Commercial Code	0.1579
	(0.315)
Constant	-1.8125 [a]
	(0.261)
Number of observations	308
Pseudo R Squared	0.14
F-statistics on excluded instruments	3.45
Prob>F	0.000

This appendix presents the first-step regression of the two-step procedure for the case of skill-biased downsizing. Robust standard errors are given in parentheses. [a] significant at 1 percent; [b] significant at 5 percent; [c] significant at 10 percent

Appendix 2. Country Sample

Africa:

1 .- Benin (2)
2 .- Cape Verde (1)
3 .- Cote d'Ivoire (10)
4 .- Egypt (6)
5 .- Gabon (1)
6 .- Ghana (8)
7 .- Kenya (7)
8 .- Lesotho (1)
9 .- Senegal (2)
10 .- South Africa (4)
11 .- Tanzania (2)
12 .- Uganda (6)
13 .- Zambia (3)
14 .- Madagascar (3)

Americas:

15 .- Argentina (8)
16 .- Belize (2)
17 .- Bolivia (8)
18 .- Brazil (16)
19 .- Canada (4)
20 .- Chile (4)
21 .- Colombia (9)
22 .- Dominican Republic (2)
23 .- El Salvador (2)
24 .- United States (2)
25 .- Grenada (1)
26 .- Guatemala (1)
27 .- Guyana (3)
28 .- Jamaica (4)
29 .- Panama (2)
30 .- Mexico (8)
31 .- Saint Vincent (1)
32 .- Peru (13)
33 .- Puerto Rico (1)
34 .- St. Kitts and Nevis (2)
35 .- Trinidad and Tobago (2)
36 .- Venezuela (6)
37 .- Barbados (2)

Asia:

38 .- Bahrain (1)
39 .- China (1)
40 .- India (1)
41 .- Indonesia (3)
42 .- Israel (1)
43 .- Japan (8)
44 .- Jordan (1)
45 .- Korea, Rep. (5)
46 .- Kuwait (2)
47 .- Lao PDR (1)
48 .- Malaysia (3)
49 .- Pakistan (1)
50 .- Philippines (3)
51 .- Qatar (1)
52 .- Singapore (2)
53 .- Sri Lanka (1)
54 .- Taiwan (1)
55 .- Thailand (1)
56 .- Yemen, Rep. (1)

Europe:

57 .- Albania (2)
58 .- Austria (1)
59 .- Belgium (13)
60 .- Bulgaria (1)
61 .- Croatia (2)
62 .- Czech Republic (2)
63 .- Denmark (6)
64 .- Estonia (2)
65 .- Finland (2)
66 .- France (7)
67 .- Germany (5)
68 .- Hungary (1)
69 .- Ireland (3)
70 .- Italy (7)
71 .- Latvia (2)
72 .- Lithuania (2)
73 .- Netherlands (3)
74 .- Poland (10)
75 .- Portugal (3)
76 .- Russia (3)
77 .- Serbia (1)
78 .- Slovak Republic (2)
79 .- Spain (5)
80 .- Sweden (3)
81 .- Switzerland (2)
82 .- Turkey (2)
83 .- United Kingdom (13)

Oceania:

84 .- Australia (3)
85 .- New Zealand (4)