Inter-American Development Bank
Banco Interamericano de Desarrollo (BID)
Research Department
Departamento de Investigación
Working Paper #508

Employment Protection and Gross Job Flows: A Differences-in-Differences Approach

by

Alejandro Micco
Carmen Pagés

Inter-American Development Bank

August 2004

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

Micco, Alejandro.

Employment protection and gross job flows : a differences-in-differences approach / by Alejandro Micco, Carmen Pagés.

p. cm. (Research Department Working Papers ; 508)
Includes bibliographical references.

1. Job security—Econometric models. 2. Labor turnover—Econometric models. I. Pagés, Carmen. II. Inter-American Development Bank. Research Dept. III. Title. IV. Series.

331.2596 M466--------dc21

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

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

Abstract[1]

This paper examines the effect of employment protection regulation on gross job flows in a sample of developed and developing countries. By implementing a differences-in-differences test we lessen the potentially severe endogeneity and omitted variable problems associated with cross-country regressions. This test is based on the hypothesis that job security regulations are more binding in some sectors of economic activity than in others, depending on sector-specific characteristics such as the variance of demand or technological shocks. Unlike most of the existing literature, our analysis indicates that more stringent job security regulations slow down gross job flows, and this tendency is more pronounced in sectors that require higher labor flexibility. These effects occur within the sample of developed and developing countries and are very large in magnitude. Moreover, these effects are robust to changes in regulatory measures, measurement of sector flexibility requirements, control variables and samples.

Keywords: Employment Protection Regulation, Employment Reallocation, Gross Job Flows and Firm Entry and Exit

JEL Code: J23, J32, J63

[1] We thank Pedro Portugal for kindly sharing with us job reallocation data for Portugal. We also thank Olivier Blanchard for valuable suggestions and Paula Auerbach for her research assistance. This document reflects the opinions of the authors and not those of the Inter-American Development Bank or its Board of Directors.

1. Introduction

A large and growing body of literature has found that a substantial share of productivity growth is associated with the reallocation of workers from less productive to more productive firms, and from underperforming firms exiting the market to new entrants.[2] In this context, it has been argued that regulations that prevent the reallocation of workers across firms may significantly hinder productivity growth. Yet, while many economic models predict that regulations that restrict employment-at-will reduce gross job flows, empirical studies have failed to find a conclusive causal relation.[3] Thus, much of the evidence so far available suggests that all countries have high rates of job reallocation and that the levels of job reallocation are not significantly correlated with the stringency of regulations.[4]

This puzzling evidence has spurred substantial modeling efforts to complement earlier models of employment protection legislation (EPL), such as Bertola (1990) and Hopenhayn and Rogerson (1993), with features that can accommodate the apparent lack of relationship between employment protection and job reallocation. Bertola and Rogerson (1997) amend Bertola (1990) by introducing wage bargaining institutions. They argue that countries with strict EPL are also countries with very centralized wage bargaining, and that they are consequently characterized by significant wage compression. Faced with a negative shock, firms in countries with rigid wages may end up shedding more labor than firms in countries with less strict EPL and lower wage compression. Boeri (1999) states that in countries with strict EPL, firms circumvent regulations by hiring workers on short-term contracts. This again results in high flows despite stringent employment regulations. Following a different line of inquiry, Blanchard and Portugal (2001) argue that the frequency at which the data is analyzed matters; while employment protection regulations may smooth short-term fluctuations, they might be less effective in preventing flows that result from permanent shocks. Consistent with this notion, they find evidence that, while annual job flows are quite similar in the relatively flexible United States and in relatively rigid Portugal, quarterly job flows are much smaller in the latter.

---

[2] See, for instance, Foster, Haltiwanger and Krizan (1997) or Scarpetta, Hemmings, Tressel et al. (2002).

[3] Bertola and Rogerson, (1997); Alogoskoufis, Bean, Bertola et al. (1995); OECD (1996 and 1999); Davis and Haltiwanger (1999). See Bertola (1990) and Hopenhayn and Rogerson (1993) for two models where employment protection slows down labor reallocation.

[4] The only study that finds a negative and statistically significant relation between EPL and job reallocation is Gómez-Salvador, Messina and Vallanti (2003) for a cross section of 12 countries. Garibaldi, Konings and Pisarides

While the arguments above are important in developing any theory of how regulations affect gross job flows, one fundamental problem remains: measuring the causal relationship between labor market regulations and job flows is a difficult and by no means well-accomplished task. Therefore, conjectures based on such weak estimates may be unwarranted. Most estimations of the relationship between job turnover and labor market regulations use bivariate or multivariate cross-country analysis.[5] Such methodology, while suggestive, cannot control for a host of unobservable variables that are likely to be correlated with turnover and regulatory measures, potentially biasing the estimates.

First, in the majority of cases, the estimates do not control for the size or the variability of the shocks facing each country. Moreover, since countries that experience high turnover rates may have a high demand for strict employment protection regulations, cross-country studies are biased toward finding a positive relationship between labor market regulations and gross job flows.[6] Second, existing cross-section estimates do not account for the fact that turnover measures vary across countries, which introduces substantial measurement error into the dependent variable. Thus, for instance, in some countries reallocation is measured at the firm level, while in others, it is collected from plant-level information. The two measures are not strictly comparable because firm-level data miss the reallocation that occurs within plants. Similar problems arise due to differences in the definition of ownership changes and mergers and acquisitions across countries, which implies that in some countries changes in ownership are registered as firm deaths, while in others they are not. Third, existing estimates do not control for country differences in the distribution of activity across sectors or the size of firms, which in turn affects aggregate turnover rates. Measurement errors increase the standard errors of the estimates and may explain the lack of statistically significant association between turnover and EPL.[7] Fourth, given the limited number of observations, cross-country studies do not properly control for a host of country-level variables, such as labor market regulations and institutions, that are correlated with EPL and job flows. Lastly, existing estimates are based on a relatively small

(1996) show a negative association between EPL and job reallocation but do not report whether such an association is statistically significant at conventional levels.

[5] OECD, 1999; Garibaldi, Konings and Pissarides (1996); Gómez-Salvador, Messina and Vallanti (2003).

[6] An exception is Caballero, Cowan, Engel and Micco (2004).

[7] One of the few studies that use homogeneous data and controls for sector distribution as well as for the characteristics of firms is Gómez-Salvador, Messina and Vallanti (2003).

sample of industrial countries. Inferences based on these results cannot necessarily be generalized to other parts of the world.

In this paper, we develop a formal test of the causal relationship between labor market regulations and job turnover that overcomes these difficulties. Following Rajan and Zingales (1998), this test exploits differences across sectors to implement a differences-in-differences methodology.[8] In the context of a simple dynamic labor demand framework, we show that different industries require different levels of employment reallocation. Such differences arise from disparities in the variance of idiosyncratic or sector-wide shocks, as well as technological differences. For example, industries with volatile product markets require frequent and sizable adjustments in factors, while other industries characterized by stable product markets will require small adjustments in labor and capital. In this setup regulations are more binding in industries that require more flexibility.

To identify an industry's intrinsic demand for adjustment we first study the correlation of industry job flows across countries and find that this is very large; across countries, some industries tend to exhibit higher levels of job reallocation. This suggests that there are important technological or product market characteristics that determine the volatility of a sector. Given this large cross-country correlation, we can safely identify the intrinsic relative employment volatility of an industry by the level of job reallocation of that industry in any given country. Our baseline country is the United States, which according to many measures has the least restrictive employment protection regulation in our sample. Therefore, U.S. sector volatility constitutes a good proxy of sector volatility in absence of adjustment costs. In fact, our approach only requires the weaker assumption that the U.S. sector ranking is not affected by employment regulations. In addition, our results are robust to other baseline choices. The second step consists of identifying whether industries that require higher levels of reallocation are relatively less volatile in countries with more stringent job regulations.

To implement these tests, we construct a sample of average annual job reallocation rates by industry and country for a sample of developed and developing countries. We complement this data with some newly available measures of the regulatory environment. Since these are *de jure* measures, which compare labor laws according to what is written in the labor codes, we also

[8] Differences-in-differences methodologies exploiting sector differences have been applied in the corporate literature. See Claessens and Laeven (2003), Galindo, Micco and Ordoñez (2001), Galindo and Micco (2004), and Raddatz (2002).

control for differences in the level of enforcement of labor laws. The results indicate that employment protection reduces job flows, and that this is particularly the case in industries that require a higher level of reallocation. We find that these effects occur both within the sample of developed and developing countries. There is weak evidence that this effect is larger in countries with better law enforcement (proxied by rule of law measures). This result may be driven by our focus on the manufacturing sector, which tends to exhibit higher rates of compliance with regulations than other sectors of activity.

Our results are robust to changes in the way we measure labor market regulations and sector flexibility requirements. They are also robust to the inclusion of firm entry and exit regulations and additional controls to account for differences in sector volatility across countries. Lastly, they are also robust to changes in the sample of countries or sectors used in our study.

The rest of this paper is organized as follows. Section 2 motivates and describes the empirical framework. Section 3 presents the data used as well as the methodology to identify sectors in which regulations are more binding. Section 4 describes our results using both simple cross-country regressions and our differences-in-differences approach. The section also describes the results when controlling for firm entry and exit regulations as well as the results of performing a battery of robustness tests. Finally, Section 5 concludes.

2. On the Relationship Between Job Security and Job Reallocation: A Simple Theoretical Framework and Empirical Specification

Our empirical work is based on the notion that some industries require more flexibility than others in adjusting their employment levels. Firms in industries that face high volatility in their product demand or in their technologies are likely to require more flexibility than firms in more stable sectors. In the textile sector, for example, the swings of fashion imply that demand for a certain product or material is high one year and low the next. Therefore, regulations that impede adjustment are expected to be more binding in sectors that require greater flexibility. In this section we develop a simple dynamic labor demand model to illustrate this idea and to provide theoretical support for our empirical specification.

2.A. A Simple Model

Consider an environment where firm *i* faces the following demand and production function (logs)

$$y_{ijct} = d_{ijct} - \eta(p_{ijct} - p_{..ct}) \qquad \eta > 1$$
$$y_{ijct} = a_{ijct} + \alpha\, l_{ijct} \qquad 0 < \alpha < 1$$

where y_{ijct} denotes the (log) production of firm *i* in sector *j*, country *c* and period *t*, p_{ijct} is the (log) price of such a firm, d_{ijct} is a demand shifter and $p_{..ct}$ is the aggregate (log) price in country *c* and period *t*. In addition, a_{ijct} represent a productivity parameter and α denotes the output-labor elasticity. Both a_{ijct} and d_{ijct} are i.i.d random walks (RW). Assuming that there is free mobility of labor across sectors and that firms take the national wage (which is also a RW) as given, the log-change of the desired level of employment in the absence of adjustment costs can be written as:

$$\Delta l^*_{ijct} = \frac{1}{1-\alpha\gamma}\left[(1-\gamma)\Delta d_{ijct} + \gamma\Delta a_{ijct} - (\Delta w_{..ct} - \Delta p_{..ct})\right] \qquad (1)$$
$$and \quad \gamma = 1 - \frac{1}{\eta}$$

where l^*_{ijct} is the desired level of (log) employment of firm *i* in sector *j*, country *c* and period *t*, if there were not adjustment costs and $w_{..ct}$ is the country level wage.[9]

Defining the aggregate demand, productivity and real wage shocks as the simple average of firm and sector specific shocks at the country level,[10] equation (1) becomes

$$\Delta l^*_{ijct} = \frac{1}{1-\alpha\,\gamma}\left[IDS_{ijct} + AGS_{..ct}\right] \qquad (2)$$

where IDS_{ijct} denotes the idiosyncratic (firm and sector) demand and supply shocks, and $AGS_{..ct}$ denotes the same aggregate shocks minus the change in real wage.[11] In addition, assume a

[9] Henceforth wages are assumed to be the numeraire.

[10] The aggregate demand shock is defined as $\Delta d_{..ct} = \frac{1}{N_{ct}}\sum_{ij}\Delta d_{ijct}$, where N_c is the total number of firms in country *c*.

[11] That is, $IDS_{ijct} = \frac{1}{\eta}(\Delta d_{ijct} - \Delta d_{..ct}) + \gamma(\Delta a_{ijct} - \Delta a_{..ct})$ and

$$AGS_{..ct} = \frac{1}{\eta}\Delta d_{..ct} + \gamma\Delta a_{..ct} - (\Delta w_{..ct} - \Delta p_{..ct})$$

quadratic employment adjustment cost. Then, the optimal path of employment l_{ijct} is given by[12]

$$l_{ijct} = (1-\lambda_c) l^*_{ijct} + \lambda_c l_{ijct-1} \qquad (3)$$

where l_{ijct} denotes the (log) observed level of employment and λ_c is the adjustment cost in country *c*.

Using recursively equation (3) and applying the variance operator to the first difference of the resulting equation yields

$$\text{var}(\Delta l_{jc}) = \frac{(1-\lambda_c)^2}{1-\lambda_c{}^2} \text{var}(\Delta l^*_{jc}) \qquad (4)$$

where $\text{var}(\Delta l_{jc})$ represents the variance of firms' employment growth rate within sector *j*. Replacing equation (2) in the previous result we obtain

$$\text{var}(\Delta l_{jc}) = \xi_c \frac{\text{var}(IDS_{jc}) + \text{var}(AGS_{.c})}{(1-\alpha\gamma)^2} \qquad (5)$$

where $\xi_c = \frac{1-\lambda_c}{1+\lambda_c} < 1$

The former expression implies that the variance of employment in a given sector will depend on (i) the stringency of the regulatory measures (summarized in ξ_c); (ii) the variance of idiosyncratic (firm and sector) shocks (Var(IDS_{jc})); (iii) the variance of aggregate country shocks (Var($AGS_{.c}$)) and (iv) the labor share ($\alpha\gamma$).[13]

Assuming that the variance of idiosyncratic (firm and sector) shocks is equal across countries up to a constant term, $var(\Delta l_{jc})$ can be written as:

$$\text{var}(\Delta l_{jc}) = \xi_c \frac{VAR_j}{(1-\alpha\gamma)^2} + \xi_c \frac{VAR_c}{(1-\alpha\gamma)^2} \qquad (6)$$

The previous equation implies that an increase in job security (a decline in ξ_{jc}), reduces job flows. Subtracting the average variance within a country on both sides of equation (6) yields

[12] This result assumes a Random Walk without trend but it is easily extended to the case of a Random Walk with trend.

[13] This framework is easily extended to the case of different labor shares across sectors.

$$\text{var}(\Delta l_{jc}) - \overline{\text{var}(\Delta l_{jc})} = \xi_c \left(\frac{VAR_j}{(1-\alpha\gamma)^2} - \overline{\frac{VAR_j}{(1-\alpha\gamma)^2}} \right) \qquad (7)$$

where $\overline{\text{var}(\Delta l_{jc})}$ is the country average.

Equation (7) implies that the difference in employment reallocation between a volatile sector and the economy average is lower the more stringent are labor regulations. This is the inference that we test in our empirical analysis. Thus, the previous equation is a differences-in-differences equation that could be estimated using country fixed effects. In the next section, we discuss how we estimate this equation finding empirical counterparts for ξ_c and $\frac{VAR_j}{(1-\gamma\alpha\ )^2}$.

2.B. Empirical Specification

Following the empirical literature on differences in differences, our empirical approach exploits sector differences to determine whether sectors that require more adjustment flexibility are more affected by stringent employment protection laws than sectors that require less flexibility. This approach allows us to use country fixed effects to control for all observable and unobservable country characteristics. In particular, it allows us to control for differences in country and sector output volatility as well as for differences in the coverage and methodology of data collection across countries. This approach also alleviates the potential problem of endogeneity of regulations present in cross-country analysis. Thus, by using sector-level data and controlling for country-wide volatility with country fixed effects we account for the feedback from labor turnover to regulations.

In our empirical exercise we estimate two types of specifications. Following the previous literature, the first one is simply a cross-section regression, controlling for industry fixed effects. That is

$$S_{jc} = \tau_j + \alpha R_c + \beta Z_c + \varepsilon_{jc} \qquad (8)$$

where S_{jc} indicates employment reallocation in sector j in country c (our measure of employment volatility), τ_j is an industry fixed effect, R_c is a measure of employment protection regulations that vary across countries and Z_c is a vector of controls at the country level. Results based on estimating expression (8) improve upon existing estimates because they account for differences

in sector composition across countries. However, there are still a host of variables, such as differences in wage bargaining institutions and other labor market regulations contained in the error term, which can be correlated with employment protection regulations. We may also face a severe endogeneity problem as countries with higher employment volatility may mandate higher levels of job security to reduce the uncertainty faced by employees. Moreover, differences in the measure of turnover across countries reduce the precision of the estimates. Therefore, we also implement a differences-in-differences estimation based on equations (6) and (7) in the previous section. That is, we examine whether the difference in sector reallocation between sectors that require more employment flexibility and other sectors is lower in highly regulated countries. However, since the reality is more complex than our simple model, we also control for sector fixed effects and the effect of other variables that may affect differences in sector turnover across countries. That is, we estimate the following expression:

$$S_{jc} = \tau_j + \tau_c + \delta_0 R_c X_j + \delta_1 Z_{jc} + \varepsilon_{jc} \qquad (9)$$

where τ_j and τ_c are sector and country fixed-effects, X_j is a variable that measures the flexibility requirements of sector j and $Z_{jc.}$ is a vector of controls that vary at the country-sector level. Note that in our theoretical model, $X_j = VAR_j/(1-\alpha\gamma)^2$ that is, the flexibility requirements of each sector are given by their intrinsic volatility; sectors that due to the nature of their demand or technological shocks are more volatile will need more frequent adjustments and will be more constrained by stringent employment protection regulations. Therefore, the model predicts a negative coefficient on the interaction term between a sector's intrinsic volatility and employment protection regulations

Our simple theoretical model also provides guidance on how to identify X_j. Under the assumption that sector intrinsic employment volatility is equal across countries up to a constant term, and making use of the fact that regulatory costs are very low in the United States, we can take the adjustment costs in this country as the numeraire—or $\widetilde{\lambda}_{USA} = 1$ in equation (6)—and use U.S. sector job reallocation as a proxy for the difference in intrinsic variance of employment across sectors in the absence of adjustment costs—or $VAR_j/(1-\alpha\gamma)^2$ in equation (6).[14]

[14] While in recent years most US courts have adopted wrongful discharge doctrines, the United States still ranks very low in terms of mandatory dismissal costs in international terms. For several of the regulatory measures that we use in this paper, the US displays the lowest costs of regulations in the OECD sample. Taking the Heckman and

Obviously, for this proxy to be appropriate, the correlation between sector job flows between the US and in other countries should be high. That is, more stringent regulation should reduce the difference in job reallocation across sectors but not affect the sector ranking. In the next section, we describe our data and show that this is indeed the case.

3. Data and Correlations

3.A. Data

Following Davis and Haltiwanger (1999), job reallocation is defined as the sum of job creation and job destruction. The data used in this paper cover sector information at the two-digit level on manufacturing industries for 18 countries, 11 developed and 7 in the developing world, during the 1980s and 1990s (see Table 1 for a summary and Table A.3 for a full description of the job reallocation data). Plant-level data have been used for most countries, except for Argentina, Italy and the United Kingdom, where only firm-level information was available. Entry and exit data were available for all countries but Argentina, Uruguay and Venezuela.[15]

We also collect excess reallocation data for the few countries in which this measure is available. Excess reallocation data is defined as the difference between job reallocation and net job creation.[16] In the absence of heterogeneous job creation and destruction patterns across firms within sectors, excess job reallocation would be zero. Instead, excess reallocation measures tend to be quite large, indicating that a large share of job reallocation is not driven by aggregate shocks (more than 70 percent of job reallocation in our sample is driven by idiosyncratic shocks). In addition, there is a high correlation between sector job reallocation and sector excess job reallocation (0.99).

Brazil and New Zealand stand out as the countries with the highest reallocation rates, while Norway and Germany are the countries with the lowest rates among the sample of countries in which firm entry and exit data are available (see Table 1). Job reallocation is 20.8 percent in the overall sample (see Table 2.1). On average, job reallocation is very similar in OECD countries (21.14) and in Latin America (20.42). However, this is partly due to the lack of

---

Pagés (2003) Job Security index for the USA at face value the adjustment costs in the US are zero and therefore $\zeta_{USA} = 1$.

[15] See Appendix A for a further description of the sources and data characteristics for this variable and all the other variables used in the empirical analysis.

[16] See Davis and Haltiwanger (1999).

entry and exit data for some Latin American countries. The average reallocation for all Latin American countries with entry and exit data is 26.37. Cross-country comparisons, however, should be treated cautiously. Besides the treatment of entry and exit, differences in the collection and nature of the data, differences in the definition and treatment of firm mergers, and differences in the size of shocks imply that the data are not strictly comparable. This is a standard problem in cross-country exercises, which we will be able to avoid using a differences-in-differences methodology to compare countries.

To characterize job security across countries we principally use two alternative measures. The first measure is constructed by Botero, Djankov, La Porta et al. (2003) for 85 countries worldwide. This measurement, taken in 1997, is the sum of four variables, each of which takes on values between 0 and 1: (i) grounds of dismissal, (ii) dismissal procedures, (iii) notice and severance payments and (iv) protection of employment in the constitution. The rules of grounds of dismissal range from allowing the employment relationship to be terminated at will, by any party at any time, to allowing termination only on the basis of a very narrow list of "fair" causes. Procedures for dismissal require employers to obtain authorization for third parties (unions, judges, etc.) prior to dismissal. Advance notice and severance payments are measured for a worker with a 20-year tenure at a firm.

The second measure of job security is constructed by Heckman and Pagés (2003), subsequently referred to as HP, and is narrower in scope, only including provisions that have a direct impact on the monetary cost of dismissing a worker. This measure, however, has the advantage of varying across time, thus better reflecting the regulatory environment during the early years of our sample than the previous measure. It also has the advantage of better reflecting the varying schedule of advance notice and severance pay at different tenure levels. To quantify the effects of the legislation according to advance notice and severance pay, the authors construct a measure that computes the expected future firing costs, discounted at the time a worker is hired, assuming a constant probability of dismissal and discount rate across countries. The resulting cost is measured in multiples of monthly wages.

For robustness, we also use a third measure of employment regulation, the EPL index constructed by OECD (1999). Although this measure is only available for OECD countries, earlier versions of the EPL index have been widely used in the employment protection

literature.[17] This index is computed as a unweighted average of two indices that reflect the level of employment protection for regular, permanent workers and the stringency of the regulation of temporary work both in the early and in the late 1990s.[18] The higher the EPL index, the more restrictive the regulations.

Table 2.1 indicates that the measures of job security are higher on average for Latin America than for the OECD sample and that the differences are quite substantial. For instance, according to the HP measure the direct expected cost of dismissal in Latin America is greater than 3 months of pay, while in the OECD sample, payments amount to only 1.52 months of pay. The Botero, Djankov, La Porta et al. (2003) measure also reflects a cost that is much higher in the Latin America sample than in the OECD. The correlation between the Botero, Djankov, La Porta et al. (2003) and the Heckman and Pagés (2003) measures of job security is positive and statistically significant (0.59), as shown in Table 2.2. The correlation between the Botero, Djankov, La Porta et al. (2003) measure and the OECD constructed EPL index is 0.66.

It can be argued, however, that the stringency of the regulatory environment depends on the level of enforcement of the law. While direct measures of the degree of enforceability of labor laws do not exist, it is expected that countries with better overall rule of law and more effective governments are more likely to enforce labor laws. We use the simple time average of the rule of law and government effectiveness measures constructed by Kauffman, Kraay and Mastruzzi (2003) to account for law enforceability differences across countries. These indicators reflect the responses given by a large number of enterprise, citizens and expert survey respondents across the world. The values of these measures are standardized between –2 and 2. Higher values reflect better rule of law and higher government effectiveness. Table 2.1 reflects that both measures are higher in the OECD than in the Latin American sample.

3.B. Ranking Sectors According to Flexibility Requirements

In this subsection we provide evidence that there are indeed important differences across sectors in the volatility of employment and that these differences are highly correlated across the countries in our sample.

[17] See, for instance, Blanchard and Wolfers (2000); Nickell (1997); Nickell and Layard (1999); Garibaldi and Mauro (2002) and Gómez-Salvador, Messina and Vallanti (2003).
[18] See Annex 2.B of OECD (1999).

Table 3 shows the correlations of two-digit ISIC sector average job reallocation across pairs of countries. It also shows the correlation in job reallocation between each country and the simple average of job reallocation in Anglo-Saxon countries (row 19) as well as with the simple average in our sample (row 20). It is quite remarkable that the correlation across countries is very high. For instance, the pair-wise correlation between Argentina and Brazil is 0.87, and it is significant at the 1 percent level (second row, first column). This high correlation indicates that volatile sectors in Argentina tend to be the same as in Brazil. Moreover, the correlation between the sector reallocation in Argentina and all other countries of the sample, with the exception of Finland, Sweden and Venezuela, is also very high and statistically significant at conventional levels. As Table 3 shows, this is the case for most pairs of countries in our sample, even between countries that are far from one another in terms of either economic development or geographic distance. Focusing on the correlations with the U.S. (row 17), the pair-wise correlations with developing and developed countries are positive in 16 out of 17 cases, and statistically significant at the 10 percent level in 12 countries. The correlations between the U.S. and the other three Anglo-Saxon countries in our sample (Canada, the United Kingdom and New Zealand), all highly deregulated countries, is 0.85 or higher. The two countries with the lowest pair-wise correlation with the U.S., and in general with most countries, are France and Sweden.

The large correlation among countries in sector job reallocation is not exclusively the product of common sector shocks. In fact, as shown in Table B.1 in Appendix B, the correlation in sector excess job reallocation across countries is positive, large, and in most cases statistically significant. This implies that some sectors experience a higher variance of firm or plant-specific shocks than others and that these sector characteristics are correlated across countries.

In sum, our previous results show that some industries are more volatile than others, and that these sectors tend to be the same across countries. This high correlation is due to common sector shocks and also to important commonalities in the distribution of plant or firm-idiosyncratic shocks. From these results we can conclude that some industries require greater input flexibility. In the next section, we show the results of using these sector characteristics to implement a differences-in-differences estimation.

4. Results

4.A. Cross-Country Estimates

We start our analysis by estimating cross-country regressions as laid out in specification (8). The results are summarized in Table 4. As mentioned above, we view these results as a preliminary and possibly biased first step. We regress sector job reallocation on the Botero, Djankov, La Porta et al. measure of job security, controlling for each country's GDP volatility and sector fixed effects. In addition, we control for differences in survey methodology across countries by including two dummy variables. The first takes a value of one if in a given country the data is collected at the plant level data and zero if it is collected at the firm level. The second dummy takes the value of one if in a given country the survey captures entry and exit of plants and zero if it does not. In addition, since we measure job security regulation but not the rigor with which it is enforced, in some specifications we include a proxy for law enforceability and its interaction term with job security. Given that most regressors only vary across countries, we compute the standard errors allowing for within-country clustering in the error terms.

Column one restricts the sample to developed countries, whereas column two uses all available countries. In both cases, we observe that the coefficient on job security is negative, although not statistically significant at conventional levels. Macro shocks (measured as the standard deviation of the GDP growth rate) have a positive effect on reallocation, although this effect is only statistically significant in the overall sample, possibly driven by the larger size of aggregate shocks in developing countries. The coefficient on the dummy for entry and exit is positive and statistically significant, indicating that firm entry and exit explains a sizeable portion of labor reallocation. Overall, these results are consistent with those found by OECD (1999)—that is, at conventional levels of significance, higher levels of job security do not appear to reduce turnover. Finally, the coefficient on the plant dummy is negative and statistically significant in some of the specifications.

In the next two columns, we re-estimate the baseline specification once we include a control for rule of law as a proxy of law enforcement. The coefficient on job security remains negative, and it becomes larger (in absolute value), especially for the sample that includes less developed countries. Nonetheless, it remains statistically insignificant at conventional levels. Column (5) presents the results of re-estimating the former specification with a dataset that includes alternative sources of data for Brazil and Mexico. Instead of data obtained from social

security registries, we use data from a manufacturing census survey, which only collects information on continuing plants. In this sample, the coefficient on job security regulations is negative and statistically significant at conventional levels. Overall, these results suggest that the effect of job security provisions on job turnover is negative, but estimated with a large standard error.

In Columns (6)-(8), we present the results of estimating specification (8), adding an interaction term between rule of law and the job security regulations measure. A negative coefficient on this variable indicates that the negative effect of job security regulations on turnover is larger (in absolute value) the better is the rule of law in a given country. The results are again ambiguous. In the sample of developed countries, the interaction term between job security and rule of law is negative and statistically significant at conventional levels. However, in the overall sample of countries, this coefficient is lower (in absolute value) and not statistically significant regardless of the source of data for Brazil and Mexico.

We also experimented with government effectiveness as an alternative control for labor law enforceability, and the results are identical. Controlling for this variable yields an interaction coefficient that is negative but statistically significant only in the sample of developed countries.

Table B.2 in Appendix B presents the results of performing the same exercise for two alternative measures of job security: Heckman and Pagés (2003) and the OECD indices of Job Security. Results with the HP measure are more ambiguous than those obtained with the Botero, Djankov, La Porta et al. (2003) measure. For instance, in a regression controlling for GDP growth volatility and survey dummies, the coefficient on job security yields coefficients that are positive but statistically not different from zero. Similarly, controlling for rule of law yields coefficients on job security that are negative but statistically not different from zero. In addition, the coefficient on the interaction between rule of law and job security is negative but it is not statistically significant. The OECD 1990 measure, EPL90, yields results that are similar to those obtained with the Botero, Djankov, La Porta et al. (2003) measure for OECD countries, while the 1980 measure is not statistically correlated with turnover, even when controlling for rule of law.

Summarizing, Table 4 (and Table B.2 in Appendix B) presents evidence that job security is only weakly associated with lower turnover. Only when controlling for rule of law, in some particular sub-samples and with some measures of job security, are these regulations negatively associated with turnover. While the results here are somewhat more promising than those found

in the previous literature, they do not appear as sufficiently robust. However, simple cross-country estimates may be severely biased due to endogeneity or omitted variable problems. In addition, despite the relatively large number of observations, the identification comes from regulatory differences across 18 countries. The next subsection presents the results of implementing the differences-in- differences methodology described above, which allows us to circumvent these problems. We show below that the results change substantially once such country effects are properly controlled for.

4.B. Differences-in-Differences Estimation

The main advantage of this procedure is that by focusing on the differential effect across sectors within countries, we can now control for all observable and unobservable country characteristics, greatly reducing the scope for omitted variables. We can also account for endogeneity, since we control for a country's propensity to implement more restrictive regulations with country fixed effects and focus on differences across sectors using U.S. sector employment reallocation as a proxy for a sector intrinsic sector flexibility requirements. The second advantage is that this procedure relies on the differences across sectors in countries with different levels of regulation, thus multiplying the sources of variation used to estimate this equation.

Table 5 shows the results of estimating specification (9). The main result of this paper is presented in column (1). After controlling for country and sector fixed effects, we find that more intrinsically volatile industries present lower levels of job turnover, relative to less volatile sectors, in countries with more stringent employment protection laws. The sign of the coefficient on the interaction terms is negative and significant. The row labeled *differential in job reallocation* at the bottom of the table shows the magnitude of the impact of job security on job turnover differentials across sectors and countries, according to our estimation. For example, in column (1) this differential is 5.8 percent. This number should be interpreted as follows: job reallocation in an industry in the 90th percentile of flexibility requirement relative to an industry in the 10th percentile is 5.8 percentage points lower in a country with strict employment protection (that is, in the 90th percentile of job security) than in a country with low employment protection (in the 10th percentile). These are large numbers if we consider that the average level of job turnover in our sample is 22 percent.

It could be argued that these results are driven by differences in sector volatility across countries with different levels of income per capita, which in turn are correlated with differences in regulatory levels.[19] To control for such possible income effects, we add to the regression the interaction between income per capita and U.S. job reallocation. Controlling for such effects yields a larger coefficient and a larger magnitude of the impact of jobs security on turnover. In column (2), an increase in job security from the 10 to the 90 (80 to 20) percentile reduces job reallocation by 9.7 (7.3) percentage points. The coefficient on the income and flexibility requirement interaction is also negative and statistically significant at the 5 percent level, suggesting that job reallocation in more volatile sectors is relatively higher in less developed countries. Figure 1 shows the scatter plot of job reallocation against the interaction of U.S. job reallocation and job security once country fixed effects, sector fixed effects, and income levels are taken into account (regression reported in column (2), Table 5). The graph shows a clear negative relation between these two variables.

These results are robust to alternative classifications of sector flexibility requirements. In column (3) we measure sector flexibility requirements according to average sector job reallocation in the sample of Anglo-Saxon countries. While the coefficient in the interaction term is smaller, the magnitude of the impact of regulations on sector reallocation becomes slightly larger.[20] In column (4) we measure sector-specific flexibility requirements with U.S. excess reallocation. Using excess reallocation allows us to focus only on plant or firm-idiosyncratic shocks. The results are qualitatively unchanged. Measuring sector flexibility requirements according to the ranking of U.S. sector reallocation and computing job reallocation differences across sectors in percentage rates (*ln SUM*) rather than in percentage points does not alter the results (columns (5) and (6)). The magnitude of the effect in column (5) is comparable to the one estimated in column (1), that is, increasing job security from the 10 to the 90 percentile reduces turnover in volatile sectors relative to non-volatile sectors by 28 percent.

In columns (7) to (9) we assess the robustness of our results to alternative measures of regulations. Measuring the stringency of job security with the HP measure yields a coefficient on job security that is negative and statistically significant at the 10 percent level. The coefficient on

[19] Heckman and Pagés (2003) and Botero, Djankov, La Porta et al. (2003) show that, across countries, the stringency of job security regulations decreases with income levels.

[20] This result comes from the fact that sector job reallocation varies more within Anglo-Saxon countries than within the U.S.

the income and flexibility requirement interaction is also negative and statistically significant. The coefficient on the job security interaction is also negative and statistically significant at 5 percent when we use the OECD-formulated measures of employment protection. These results indicate that employment protection regulations reduce turnover regardless of the regulatory measure considered.

Finally, columns (10) and (11) show that the previous results do not depend on whether we use the manufacturing census data or the social security registry data for Brazil and Mexico. However, the coefficient on job security and the estimated magnitude of the effect on turnover is larger if manufacturing census data are used.

In sum, the results in Table 5 suggest that using a differences-in-differences methodology that controls for country, sector and income effects allows us to identify a large and negative effect of job security on turnover.

We next assess whether these results hold within the samples of developed and developing countries. The results are reported in Table 6. Columns (1) – (3) examine our main difference-in-difference estimation in the Latin American (LAC) and the developed country (DEV) samples. The coefficient is negative and statistically significant in the sample of developed countries and statistically different from zero in the LAC sample when we use the manufacturing census data for Mexico and Brazil. The results are very similar if we measure sector flexibility requirements with U.S. excess job reallocation. Finally, the last three columns present the results once we control for law enforceability. We also include the interaction effect between job security and rule of law to determine whether job security regulations are more effective in countries with better rule of law. The results provide weak evidence for this hypothesis. The coefficients on the triple interaction are negative but not statistically significant at conventional levels. However, rule of law may be a poor proxy for labor law enforcement. Alternatively, this result may be driven by our focus on the manufacturing sector, which exhibits higher levels of compliance than other sectors.

4.C. Regulations on Entry and Exit of Firms versus Employment Protection Regulations

The entry and exit of firms explains a large share of total labor reallocation (Davis, Haltiwanger and Schuh, 1996). Therefore, regulations that increase the cost of entry and exit of firms can also dampen labor reallocation. Since it is quite plausible that across countries, the political

economy that leads to the enactment of job security regulations also leads to the enactment of regulations on entry and exit, our formerly estimated coefficients may be capturing the effects of entry and exit regulations rather than, or in addition to, the effects of job security. To assess whether this is the case, we control for measures of the cost of entry and the cost of bankruptcy.[21] These are the following:

- Cost of entry: We use two alternative measures constructed by Djankov, La Porta, López-de-Silanes et al. (2002). The first measure is the minimum time required to complete all the procedures to start a firm (measured in years). The second is the minimum number of procedures that are required to open a firm.
- Bankruptcy costs: We use three alternative measures constructed by Djankov, Hart, Nenova et al. (2003). The first is the average duration that bankruptcy lawyers estimate is necessary to complete a bankruptcy process (in years). The second is the cost of the entire bankruptcy process, including court costs, bankruptcy attorneys' costs, and the cost of independent assessors, lawyers and accountants, as a proportion of the bankrupt estate.[22] The third measure, named *absolute priority*, documents the order in which claims are paid in the insolvency process, including payment of post-petition claims. A higher value of this measure indicate that creditors claims are given first priority over the claims of workers, tax collectors or shareholders.

We aggregate the cost of entry and exit measures to create two measures, which we name *CEE1* and *CEE2*. The first, *CEE1, i*s the average of the time cost (in years) of creating and closing a firm. To construct *CEE2* we standardize between zero and one the number of procedures to open a firm as well as the cost of bankruptcy as a percentage of the insolvent estate. We then take the simple average of the two standardized measures.

Table 7 shows the correlations between job security and the cost of entry and exit measures. All correlations are statistically significant at 10 percent. Countries where the cost of firm entry and exit is low tend to give priority to creditors in the insolvency process. Interestingly, there is also a strong negative correlation between *Absolute Priority* and the job

[21] These measures are available online. The address is http://rru.worldbank.org/DoingBusiness/default.aspx
[22] The cost of bribes is not included in this measure.

security measures. This suggests that the enactment of strict job security provisions is associated with giving lower priority to creditors and higher priority to workers' claims in the bankruptcy process. Within our sample Canada, Germany, Finland, the United Kingdom, Norway, New Zealand, Sweden, Uruguay, the United States and Venezuela give first priority to creditors. The rest give higher priority to other claims. The correlation between job security provisions and *CEE1* and *CEE2* is also positive and statistically significant at conventional levels.

Table 8 shows the results of estimating our baseline specification once we control for entry and exit regulations. Including *CEE1*, *CEE2* or *Absolute Priority* interacted with sector flexibility requirements does not alter our baseline results. The coefficient on the interaction between U.S. reallocation and the job security measure does not vary much and remains statistically significant at 1 percent. The coefficients on the cost of entry and exit measures and on the priority measure are negative but not statistically significant.

We next investigate whether stringent regulations on firm entry and exit are more likely to reduce turnover in those sectors that experience higher labor reallocation due to entry and exit of firms. We measure a sector's intrinsic birth and death propensity with U.S. data on labor reallocation caused by firm' births and deaths by sector. Our results suggest that entry and exit regulations play a smaller role in affecting sector differences in turnover than job security regulations.

Finally, we investigate whether firm entry and exit regulations increase the effect of job security provisions on turnover. This is the case if employers can evade labor regulations by declaring bankruptcy, laying off workers without paying workers' claims, and opening another firm shortly afterwards. There is no evidence that firms engage in such practices to avoid incurring the costs associated with labor laws. Yet, to a large extent this is due to the lack of relevant variation given the high correlation across regulations. In two out of three cases, the coefficient on the interaction of U.S. sector reallocation and job security is still statistically significant, while the triple interaction is not. In the case of the absolute priority measure, both the main effect and the triple interaction become statistically insignificant. Yet, both coefficients are jointly significant. The large correlation between job security and absolute priority measures does not allow us to identify these coefficients separately.

In sum, although regulations on entry and exit of firms and job security regulations are correlated, our main results are not driven by such a correlation. In addition, there is little

evidence that entry and exit regulations affect turnover either directly, or indirectly by increasing the effect of job security provisions.

4.D. Robustness to Sample Changes

It is well known that cross-country regressions suffer from lack of robustness. In this paper we are able to control for a host of observable and unobservable country and sector effects using a difference-in-difference methodology. Our main results are robust to changes in regulatory measures, measurement of sector flexibility requirements, control variables and use of different sub-samples. However, it could still be the case that the results are driven by the inclusion or exclusion of a given country or sector. To test for this possibility, we re-run our baseline estimates (columns (2) and (6) in Table 5) excluding one country and one sector at a time.

Table 9 reports the results of re-estimating our baseline results excluding one country at a time. The results are very robust. In all cases, the coefficient on the interaction term is negative and statistically significant at the one percent level. Excluding Mexico and Uruguay, a very small country where average job reallocation is computed with lower precision, increases the size of the estimates.[23] Similarly, Table 10 indicates that our main results do not depend on the inclusion of a given sector of activity.

5. Conclusions

This paper has shown that some sectors exhibit greater volatility than others and that these differences are strongly correlated across countries. We develop a simple empirical framework to show how differences in the variance of idiosyncratic or sector specific shocks leads to differences in the intrinsic demand for factor adjustment across sectors. The model also predicts that sectors that require more flexibility should be relatively more affected by stringent job security regulations than sectors that require less flexibility. Using sector job reallocation data for 18 countries, we implement an econometric test of this hypothesis using a differences-in-differences estimation. Our results suggest that strict job security regulations slow down job reallocation and that these effects are larger in sectors with a higher demand for adjustment. Moreover, the magnitude of these effects is large. We also investigate whether entry and exit

[23] Ideally one should weight the estimates by each sector standard deviation in job reallocation. However these data were only available for the Latin American sample.

regulations can be partly responsible for the effects we attribute to job security regulations. However, we find little evidence for this hypothesis. In addition, once we control for job security, the effect of entry and exit regulations on gross job flows is not statistically significant at conventional levels.

Our results suggest that if productivity gains resulting from job reallocation are important, constraints on dismissals may reduce an economy's productive efficiency by a substantial amount, unless such losses are compensated by productivity gains derived from more stable employment relationships. They also suggest that job security regulations will affect some countries more than others depending on their industry mix; countries whose comparative advantage is in volatile industries will be more affected by the enactment of stringent job security regulations.

References

Alogoskoufis, G., C. Bean, G. Bertola et al. 1995. *Unemployment: Choices for Europe*. Monitoring European Integration, No. 5. London, United Kingdom: Centre for Economic Policy Research.

Baily, M.N., C. Hulten and D. Campbell. 1992. "Productivity Dynamics in Manufacturing Plants." *Brooking Papers on Economic Activity* (Microeconomics 1992): 187-249.

Barnes, M., and J. Haskel. 2002. "Job Creation, Job Destruction and the Contribution of Small Businesses: Evidence for UK Manufacturing." Working Paper 461. London, United Kingdom: University of London, Department of Economics.

Bergoeing, R., A. Hernando and A. Repetto. 2003. "The Effect of Policy Distortions on Aggregate Productivity Dynamics." Santiago, Chile and Cambridge, United States: Universidad de Chile and Harvard University. Mimeographed document.

Bertola, G. 1990. "Job Security, Employment and Wages." *European Economic Review* 34(4): 851-886.

Bertola, G., and R. Rogerson. 1997. "Institutions and Labor Reallocation." *European Economic Review* 41(6): 1147-71.

Blanchard, O., and P. Portugal. 2001. "What Hides Behind an Unemployment Rate: Comparing Portuguese and U.S. Labor Markets." *American Economic Review* 91: 187-207.

Blanchard, O., and J. Wolfers. 2000. "The Role of Shocks and Institutions in the Rise of European Unemployment: The Aggregate Evidence." *Economic Journal* 110(462): C1-33.

Boeri, T. 1999. "Enforcement of Employment Security Regulations, On-the-Job Search and Unemployment Duration." *European Economic Review* 43: 65-89.

Botero, J., S. Djankov, R. La Porta et al. 2003. "The Regulation of Labor." NBER Working Paper 9608. Cambridge, United States: National Bureau of Economic Research.

Butler, I., and G. Sánchez. 2003. "Market Institutions, Labor Market Dynamics, Growth and Productivity: Argentina." Buenos Aires, Argentina: IERAL Fundación Mediterránea. Mimeographed document.

Caballero, R., K. Cowan, E. Engel and A. Micco. 2004. "Effective Labor Regulation and Microeconomic Flexibility." Cambridge, United States: Massachusetts Institute of Technology. Mimeographed document.

Camhi, A., E. Engel and A. Micco. 1997. "Dinámica de empleo y productividad en manufactura: Evidencia micro y consecuencias macro." In: F. Morandé and R. Vergara, editors. *Análisis Empírico del Crecimiento en Chile*. Santiago, Chile: Centro de Estudios Públicos.

Casacuberta, C., G. Fachola and N. Gandelman. 2003. "Employment, Capital and Productivity Dynamics: Trade Liberalization and Unionization in the Uruguayan Manufacturing Sector." Montevideo, Uruguay: Universidad de la República and Universidad ORT, Uruguay. Mimeographed document.

Claessens, S., and L. Laeven. 2003. "Financial Development, Property Rights, and Growth." *Journal of Finance* 58(6): 2401-36.

Davis, S., and J. Haltiwanger. 1999. "Gross Job Flows." In: O. Ashenfelter and D. Card, editors. *Handbook of Labor Economics*. Volume 3. Amsterdam The Netherlands: North-Holland.

Davis, S., J. Haltiwanger and S. Schuh. 1996. *Job Creation and Destruction*. Cambridge, United States: MIT Press.

Djankov, S., R. La Porta, F. López-de-Silanes et al. 2002. "The Regulation of Entry." *Quarterly Journal of Economics* 117: 1-37.

Djankov, Simeon, Oliver Hart, Tatiana Nenova, and Andre Shleifer. 2003. "Efficiency in Bankruptcy." Working Paper, Department of Economics, Harvard University, July.

J. Baldwin, T. Dunne, and J. Haltiwanger and J. Baldwin. 1998. "A Comparison of Job Creation and Job Destruction in Canada and the United States." *Review of Economics and Statistics* 80(3): 347-56.

Foster, L., J. Haltiwanger and C.J. Krizan. 1997. "Aggregate Employment Dynamic: Building from Microeconomic Evidence." *American Economic Review* 87(1): 115-137.

Galindo, A., and A. Micco. 2004. "Do State-Owned Banks Promote Growth? Cross-Country Evidence for Manufacturing Industries." *Economic Letters*. Forthcoming.

Galindo, A., A. Micco and G. Ordoñez. 2002. "Financial Liberalization: Does It Pay to Join the Party?" *Economia* 3(1).

Garibaldi, P., J. Konings and C. Pissarides. 1996. "Gross Job Reallocation and Labor Market Policy: Some Facts." In: D.J. Snower, editor. *Unemployment Policy: How Government Should Respond to Unemployment?* Cambridge, United Kingdom: Cambridge University Press.

Garibaldi, P., and P. Mauro. 2002. "Anatomy of Employment Growth." *Economic Policy* 17(34): 67-106.

Gómez-Salvador, R., J. Messina and G. Vallanti. 2003. "Gross Job Flows in Europe." Paper presented at the conference New Directions in Labour Market Flexibility Research, London, United Kingdom, November 26.

Gourinchas, P-O. 1999. "Exchange Rates Do matter: French Job Reallocation and Exchange Rate Turbulence, 1984-1992." *European Economic Review* 43(7): 1279-1316.

Grey, A. 1995. "Jobs Gains and Job Losses: Recent Literature and Trends." OECD Jobs Study Working Paper Series No. 1. Paris, France, Organisation for Economic Co-operation and Development.

Heckman, J., and C. Pagés. 2003. "Introduction to *Law and Employment: Lessons from Latin America and the Caribbean*." NBER Working Paper 10129. Cambridge, United States: National Bureau of Economic Research.

Hopenhayn, H., and R. Rogerson. 1993. "Job Turnover and Policy Evaluations: A General Equilibrium Analysis." *Journal of Political Economy* 101: 915-38.

Kaplan, D., G. Martínez and R. Robertson. 2003. "Worker and Job Flows in Mexico." Mexico City, Mexico and St. Paul, United Status: Departamento de Economía and Centro de Investigación Económica, Instituto Tecnológico Autónomo de México (ITAM), Dirección de Planeación y Finanzas, Instituto Mexicano del Seguro Social (IMSS), Department of Economics, Macalester College. Mimeographed document.

Kaufmann, D., A. Kraay and M. Mastruzzi. 2003. "Governance Matters III: Governance Indicators for 1996-2002." World Bank Policy Research Department Working Paper, Washington, DC, United States: World Bank.

Lora, E. 2001. "Structural Reforms in Latin America: What Has Been Reformed and How to Measure It." Research Department Working Paper 466. Washington, DC, United States: Inter-American Development Bank, Research Department.

Medina, P., M. Meléndez and F. Seim. 2003. "Productivity Dynamics of the Colombian Manufacturing Sector." Bogota, Colombia and Stanford, United States: Universidad de los Andes and Stanford University. Mimeographed document.

Menezes-Filho, N. 2003. "Labor Market Dynamics in Brazil." Sao Paulo, Brazil: Universidade de Sao Paulo, Fundação Instituto de Pesquisas Econômicas.

Nickell, S. 1997. "Unemployment and Labor Market Rigidities: Europe versus North America." *Journal of Economic Perspectives* 11(3): 55-74.

Nickell, S., and R. Layard 1999. "Labor Market Institutions and Economic Performance." In: O. Ashenfelter and D. Card, editors. *Handbook of Labor Economics*. Volume 3. Amsterdam, The Netherlands: Elsevier Science.

Organisation for Economic Co-operation and Development (OECD). 1996. *Employment Outlook 1996*. Chapter 5. Paris, France: OECD.

OECD. 1999. *Employment Outlook 1999*. Chapter 2. Paris, France: OECD.

Raddatz, C. 2002. "Liquidity Needs and Vulnerability to Financial Underdevelopment." Cambridge, United States: Massachusetts Institute of Technology. Mimeographed document.

Rajan, R., and L. Zingales. 1998. "Financial Dependence and Growth." *American Economic Review* 88(3): 559-586.

Scarpetta, S., P. Hemmings, T. Tressel et al. 2002. "The Role of Policy and Institutions for Productivity and Firm Dynamics: Evidence from Micro and Industry Data." Economics Department Working Paper No 329. Paris, France: OECD.

Scarpetta, S., and T. Tressel. 2003. "Productivity and Convergence in a Panel of OECD Industries: Do Regulations and Institutions Matter?" OECD Economics Department Working Paper No. 342. Paris, France: OECD.

Appendix A. Data Description

Table A.1. Definitions and Sources of Variables

Variable	Description
SUM	**Job Reallocation**. This variable is defined as the sum of job creation and job destruction. We construct a sector-country data set computing the time average of the annual measures. The data comes from several sources. In some cases, like in Chile, Mexico, Brazil and Venezuela, we compute the reallocation measures based on industrial surveys. For the other countries, we use data available from published articles to build a sector-country data set. See Table A2 for a complete description of sources for each country. The data set covers industries in the manufacturing sector defined according to the 2-digit ISIC Rev.2 classification. The periods covered, the unit of observation (whether plant or firm) and the treatment of entry and exit differ across countries (see Table A.2).
Excess SUM	**Excess Reallocation**. This variable is defined as job reallocation minus the absolute value of net job creation. As with job reallocation, we compute the time average of the annual measures. The sources are the same than the ones listed in Table A.2 although there are less country-sector observations available for this variable.
Index USA SUM	**Ranking of Reallocation**. This variable is the ranking of average employment volatility across U.S. sectors during the period 1973-1993
Job Security Bot.	**Job Security**. This variable measures the protection of the rules governing the termination of the employment contract as the average of (i) protection of grounds of dismissal; (ii) protection of dismissal procedures; (iii) notice and severance payment; and (iv) right to job security in the constitution. It ranges from zero to one. Higher values of this measure indicate more stringent job security regulations. Source: Botero, Djankov, La Porta et al. (2003).
Job security HP	**Job Security**. This variable measures the stringency of job security regulations according to the expected value of the payments to a worker to abide by mandatory advance notice and severance pay regulations. The source is Heckman and Pagés (2003) and is the sum of their variables *advance notice* and *Indemnities for dismissal*. In the cases that this index exhibits time variation, we compute the time average for the periods listed in Table A.2 It is measured in multiples of monthly wages.
EPL_80 EPL_90	**Job Security**. These variables measure the stringency of job security regulations, at the end of the eighties and at of the nineties according to the unweighted average of two indices measuring (i) the strictness of regular contracts and (ii) the regulation of temporary contracts, respectively. In turn, the index of regular contracts is the average of the procedural inconveniences, the notice and severance pay and the difficulty of dismissal. The index of temporary contracts reflects the difficulties to hire with fixed term contracts and the restrictions on temporary work agencies. Higher values of the EPL indices reflect more stringent regulations. Source: OECD (1999)

Table A. 1. Definition and Sources of Variables (Continuation)

Variable	Description
R. of Law	**Rule of Law.** This measure captures the extent to which agents have confidence in and abide by the rules of society. It includes perceptions of incidence of crime, effectiveness and predictability of judiciary and the enforceability of contracts. These components are aggregated using an unobserved components model. Source: Kaufmann, Kraay and Matruzzi (2003). For our estimates, we compute the time average of the original measure.
Government Effectiveness	**Government Effectiveness.** This measure captures the ability of the government to formulate and implement policy. It combines measures of the competence of the civil servants, the independence of the civil service and the credibility of the government's commitment to policies. These components are aggregated using an unobserved components model. Source: Kaufmann, Kraay and Mastruzzi (2003). For our estimates, we compute the time average of the original measure.
CEE1	**Cost of Entry and Exit.** Is the unweighted average of the time cost (in years) of creating and closing a firm. The source for the cost of entry is Djankov, La Porta, López-de-Silanes et al. (2002); the source for the cost of bankruptcy is Djankov, Hart, Nenova et al. (2003).
CEE2	**Cost of Entry and Exit.** Constructed as the unweighted average of the cost of entry (measured as number of procedures to create a firm and normalized between zero and one) and the cost of bankruptcy (measured as percent of the insolvent estate also normalized between zero and one). The source for the cost of entry is Djankov, La Porta, López-de-Silanes et al. (2002), the source for the cost of bankruptcy is Djankov, Hart, Nenova et al. (2003).
Absolute Priority	**Order in which claims are paid in insolvency process.** Higher value of this measure reflect higher priority given to creditors' claims over other claims. Source: Djankov, Hart, Nenova et al. (2003)
GDPpc	**Gross Domestic Product per Capita**. Measured in Constant 1995 US $.Source: World Bank Development Indicators

Note: The first column gives the names of the variables as we use them. The second column provides a description of the variables as well as their sources.

Table A.2. Job Reallocation Data Sources

Country	Country	Period	Sectors	Unit	Entry/Exit	Source
Argentina	ARG	1991-2001	9	Firms	No	Butler and Sanchez (2003)
Brazil	BRA	1992-2000	8	Plants	Yes	Menezes-Filho (2003)
Brazil	BRA (IS)	1997-2000	9	Firms	No	Authors' construction [1]
Canada	CAN	1979-1988	9	Plants	Yes	Baldwin, Dunne and Haltiwanger (1998)
Chile	CHL	1991-1999	8	Plants	Yes	Bergoeing, Hernando & Repetto (2003)
Colombia	COL [2]	1993-1999	9	Plants	Yes	Medina, Meléndez & Seim (2003)
Germany	DEU	1986-1989	9	Plants	Yes	Grey (1995)
Finland	FIN	1985-1988	9	Plants	Yes	Grey (1995)
France	FRA	1984-1988	9	Plants	Yes	Gourinchas (1999)
United Kingdom	U.K.	1987-1989	9	Firms	Yes	Barnes & Haskel (2002)
Italy	ITA	1987-1989	9	Firms	Yes	Grey (1995)
Mexico	MEX	1994-2000	9	Plants	Yes	Kaplan, Martínez & Robertson (2003)
Mexico	MEX (IS)	1994-2000	9	Firms	No	Authors' construction [3]
Norway	NOR	1984-1986	9	Plants	Yes	Grey (1995)
New Zealand	NZL	1986-1989	9	Plants	Yes	Grey (1995)
Portugal	PRT	1992-1996	9	Plants	Yes	Blanchard and Portugal (2001)
Sweden	SWE	1980-1991	9	Plants	Yes	Grey (1995)
Uruguay	URY	1988-1995	6	Plants	No	Casacuberta, Fachola & Gandelman (2003)
United States	U.S.	1973-1993	9	Plants	Yes	Baldwin, Dunne and Haltiwanger (1998)
Venezuela	VEN	1996-1999	9	Plants	No	Authors' construction [4]

Notes: All information is restricted to the manufacturing sector. Industries are defined using 2dig. ISIC rev2 classification.
For the case of BRA (IS), CAN, FRA, MEX(IS) and U.K. we use correspondences between national classifications and ISIC rev2.

We do not include sectors that on average have fewer than 40 plants.

1 BRA uses data from the social security agency (*Relação Anual de Informações Sociais*),and BRA (IS) from the Manuf. Annual Survey (*Pesquisa Industrial Anual*).

2 Due to methodology changes in 1992, we restrict the data to the period 1993-1999.

3 MEX uses data from the social security agency (*Instituto Mexicano del Seguro Social*). MEX (IS) uses data from the Manuf. Annual Survey (*Encuesta Industrial INEGI.*).

4 VEN uses data from the Industrial Survey (*Encuesta Industrial de Venezuela – Instituto de Estadísticas de Venezuela*).

Table A.3. Job Reallocation Data by Sector

Country / Sector	31	32	33	34	35	36	37	38	39
ARG	15.31	15.47	17.43	12.73	12.91	11.98	12.32	15.36	17.32
BRA	34.40	36.37	36.53	27.69	30.29	29.86	30.32	31.69	
BRA (IS)	13.77	9.78	10.69	8.57	8.56	8.38	8.56	9.82	7.29
CAN	17.63	26.04	27.70	16.55	18.60	23.00	13.30	25.11	28.10
CHL	28.45	22.79	32.70	21.34	21.77	23.47	9.78	25.45	
COL	24.86	23.39	29.56	22.71	20.53	19.77	16.01	23.39	22.44
DEU	15.90	15.00	17.50	11.60	8.60	13.00	10.10	12.50	14.60
FIN	14.60	18.90	18.20	19.20	14.70	13.80	10.70	19.60	16.70
FRA	31.24	21.47	28.84	17.27	18.36	14.03	27.41	20.16	28.39
U.K.	22.95	26.19	29.80	22.20	19.96	22.30	20.87	23.87	35.60
ITA	22.40	25.40	23.10	17.40	15.80	17.70	19.10	19.40	38.90
MEX	23.53	35.53	39.57	26.26	22.49	24.90	21.42	26.72	30.82
MEX (IS)	5.95	7.93	9.02	5.46	6.00	6.54	6.07	8.09	6.33
NOR	14.80	17.40	15.70	11.80	12.00	14.30	7.30	18.90	16.30
NZL	27.30	34.30	32.70	23.80	27.40	30.90	25.10	32.30	38.30
PRT	27.09	24.35	27.05	23.31	21.95	22.23	18.06	24.36	26.02
SWE	24.60	21.70	24.60	20.70	20.20	26.10	32.60	22.30	19.00
URY	11.91	17.55		10.46	10.91	12.24		15.34	
U.S.	17.67	21.95	23.58	15.34	17.38	20.24	15.43	19.16	24.02
VEN	9.39	7.61	11.40	7.39	8.67	10.21	4.48	10.06	9.35

Job Reallocation is the sum of job creation and job destruction. We compute the time average by sector for the periods described described in Table A.2. See also Table A.2 for data sources.

Appendix B. Additional Correlations and Estimates

Table B.1. Pair-Wise Correlation for Sector Excess Job Reallocation Between Countries

	ARG	BRA	CHL	COL	GBR	MEX	URY	USA	VEN
ARG	1								
BRA	0.6400*	1							
	0.0874								
CHL	0.7542*	0.6607*	1						
	0.0306	0.0745							
COL	0.9017*	0.6116	0.8040*	1					
	0.0009	0.1072	0.0162						
U.K.	0.7283*	0.6458*	0.8562*	0.7457*	1				
	0.0261	0.0837	0.0067	0.0211					
MEX	0.3956	0.6749*	0.5925	0.5537	0.7715*	1			
	0.2919	0.0663	0.1217	0.122	0.0149				
URY	0.7874*	0.3912	0.5688	0.5376	0.605	0.1176	1		
	0.063	0.4431	0.2389	0.2713	0.2032	0.8244			
U.S.	0.5941*	0.6758*	0.8034*	0.6367*	0.9260*	0.6662*	-0.0003	1	
	0.0916	0.0658	0.0163	0.0652	0.0003	0.0501	0.9996		
VEN	0.2719	0.254	0.7503*	0.4326	0.2179	0.0245	-0.1786	0.2619	1
	0.4791	0.5439	0.032	0.2448	0.5732	0.9501	0.7349	0.496	
Anglo Saxon	0.6828*	0.6744*	0.8541*	0.7116*	0.9861*	0.7395*	0.391	0.9759*	0.2414
	0.0427	0.0666	0.0069	0.0316	0	0.0228	0.4434	0	0.5315

Notes: Sector Excess Reallocation is defined as sector job reallocation minus the absolute value of sector net job creation. The first line indicates the correlation coefficient and the second the significance level (p-value). * significant at the 10 percent level. All pair-wise correlations are estimated with either 8 or 9 observations (depending on whether information is available for sector 39 ISIC Rev2), except for Uruguay, where there are only six sectors with more than 40 firms. *Anglo Saxon* is the simple average of sector job reallocation for Canada, U.K., New Zealand and U.S.

Table B.2. Job Reallocation and Job Security (HP and EPL1), Cross Section

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	sum	sum	sum	sum	sum	sum	sum	sum	sum	sum	sum	sum
HP	0.392	0.587	-0.056	-0.176	2.650	-1.357	5.350	-1.262				
	(0.942)	(0.801)	(1.693)	(1.060)	(5.495)	(1.206)	(3.619)	(1.494)				
Rule Law (RL)			-2.628	-1.668	11.014	-8.341			-6.289	65.665	-7.790	-9.334
			(7.344)	(1.574)	(30.828)	(7.812)			(5.211)	(17.492)a	(4.144)c	(22.152)
HP*RL					-4.246	1.987						
					(9.220)	(2.220)						
Gov. Effect. (GE)							30.296	-9.111				
							(22.701)	(6.360)				
HP* GE							-9.434	2.134				
							(8.570)	(1.530)				
EPL_90									-2.128	14.646		
									(1.445)	(4.003)a		
EPL_90*RL										-22.192		
										(5.690)a		
EPL_80											-1.173	-1.467
											(1.104)	(4.043)
EPL_80*RL												0.387
												(5.600)
GDP growth Volat.	1.242	1.758	1.587	1.567	1.303	1.048	1.492	1.068	1.567	-1.509	1.088	1.146
	(4.619)	(0.950)c	(4.623)	(0.862)c	(4.617)	(1.085)	(4.021)	(0.953)	(3.376)	(2.368)	(2.595)	(2.758)
Entry/Exit Dummy	0.000	16.825	0.000	17.492	0.000	16.280	0.000	16.514	0.000	0.000	0.000	0.000
	(0.000)	(3.568)a	(0.000)	(3.322)a	(0.000)	(2.879)a	(0.000)	(2.719)a	(0.000)	(0.000)	(0.000)	(0.000)
Plant Dummy	-2.473	-2.348	-1.478	-1.948	-4.365	-0.377	-8.390	-0.711	-2.104	-4.307	-0.389	-0.310
	(4.435)	(1.155)c	(4.874)	(1.330)	(7.832)	(1.993)	(6.583)	(1.541)	(4.561)	(4.225)	(3.391)	(3.598)
Observations	99	157	99	157	99	157	99	157	99	99	90	90
R-squared	0.21	0.49	0.22	0.51	0.24	0.53	0.27	0.52	0.31	0.52	0.37	0.37
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Dev.	ALL	Dev.	ALL	Dev.	ALL	Dev	ALL	Dev.	Dev.	Dev.	Dev.

Notes: Robust standard errors in parentheses, clustered by country. c significant at 10%; b significant at 5%; a significant at 1%. *HP* is the Job Security Index developed by Heckman and Pagés (2003). *EPL_90* and *EPL_80* are the indices of stringency of job security developed by OECD (1999). *RL*=Rule of Law and *GE* = Government Efficiency, both are institutional variables from Kaufmann, Kraay and Mastruzzi (2003) *Entry/Exit* is a dummy that indicates whether the entry and exit of firms can be observed in the data set. *Plant* is a dummy for the unit of observation (1 plants, 0 firms)

Table 1. Job Reallocation and Institutional Variables

Country	Period	Sectors	Unit	Job Reallocation	Excess Realloc.	Entry / Exit	Job Sec. Bot.	Job Sec. HP	Rule of Law	Gov. Eff.
Argentina	1991-2001	9	Firms	14.54	9.61	No	0.44	2.99	-0.84	-0.71
Brazil	1992-2000	8	Plants	32.14	27.90	Yes	0.69	3.04	-1.22	-1.23
Brazil (IS)	1997-2000	9	Firms	9.49	6.46	No	0.69	3.04	-1.22	-1.23
Canada	1979-1988	9	Plants	21.78		Yes	0.17	0.79	0.86	0.84
Chile	1991-1999	8	Plants	23.22	17.87	Yes	0.31	2.56	0.20	0.18
Colombia	1993-1999	9	Plants	22.52	17.25	Yes	0.62	3.60	-1.65	-1.12
Germany	1986-1989	9	Plants	13.20		Yes	0.50	0.75	0.81	0.70
Finland	1985-1988	9	Plants	16.27		Yes	0.57	1.61	0.99	0.77
France	1984-1988	9	Plants	23.02		Yes	0.31	1.34	0.43	0.45
United Kingdom	1987-1989	9	Firms	24.86	19.14	Yes	0.20	1.44	0.87	1.01
Italy	1987-1989	9	Firms	22.13		Yes	0.24	3.22	-0.11	-0.20
Mexico	1994-2000	9	Plants	27.92	20.13	Yes	0.71	3.16	-1.35	-0.91
Mexico (IS)	1994-2000	9	Firms	6.82	4.95	No	0.71	3.16	-1.35	-0.91
Norway	1984-1986	9	Plants	14.28		Yes	0.30	0.88	1.00	0.75
New Zealand	1986-1989	9	Plants	30.23		Yes	0.04	0.22	0.98	0.72
Portugal	1992-1996	9	Plants	23.83		Yes	0.70	4.48	0.18	0.10
Sweden	1980-1991	9	Plants	23.53		Yes	0.39	1.97	0.89	0.72
Uruguay	1988-1995	6	Plants	13.06	8.59	No	0.03	2.23	-0.51	-0.43
United States	1973-1993	9	Plants	19.42	13.77	Yes	0.08	0.00	0.73	0.68
Venezuela	1996-1999	9	Plants	8.73	5.11	No	0.64	3.94	-1.75	-1.85

Notes:

Job Reallocation is the sum of Job Creation and Job Destruction. Excess Reallocation is Job Reallocation minus the absolute value of the net employment change. Rule of Law and Government Efficiency both are institutional variables from Kaufmann, Kraay and Mastruzzi (2003).

Job Sec. Botero is the Job Security Index developed by Botero, Djankov, La Porta et al. (2003). Job Sec. HP is the Job Security Index developed by Heckman and Pagés (2003). Brazil (IS) is computed with data from the Manufacturing Annual Survey (*Pesquisa Industrial Anual*) conducted by the Instituto Brasileiro de Geografia e Estatística. Mexico (IS) is obtained from Mexico's industrial survey: *Encuesta Industrial* INEGI.

Table 1. Job Reallocation and Institutional Variables (Continuation)

Country	Period	EPL_80	EPL_90	Absolute Priority	CEE1	CEE2
Argentina	1991-2001			67	1.49	0.61
Brazil	1992-2000			33	5.21	0.48
Canada	1979-1988	0.6	0.6	100	0.40	0.04
Chile	1991-1999			0	2.94	0.47
Colombia	1993-1999			33	1.58	0.50
Germany	1986-1989	3.2	2.5	100	0.66	0.30
Finland	1985-1988	2.3	2.0	100	0.50	0.06
France	1984-1988	2.7	3.0	67	1.27	0.47
United Kingdom	1987-1989	0.5	0.5	100	0.52	0.21
Italy	1987-1989	4.1	3.3	67	0.68	0.44
Mexico	1994-2000			33	1.07	0.38
Norway	1984-1986	3.0	2.6	100	0.48	0.06
New Zealand	1986-1989		1.0	100	1.00	0.07
Portugal	1992-1996	4.1	3.7	33	1.43	0.36
Sweden	1980-1991	3.5	2.2	100	1.02	0.12
Uruguay	1988-1995			100	2.04	0.33
United Status	1973-1993	0.2	0.2	100	1.51	0.13
Venezuela	1996-1999			100	2.16	0.85

Note: For description of variables and sources see Table A.1

Table 2.1. Summary Statistics, Whole Sample

	# Observations	Mean	St.Dev.	Min	Max
Job Reallocation (SUM)	157	20.88	7.42	4.48	39.57
Excess Reallocation	76	15.56	7.42	1.94	32.32
Job. Sec. Botero *	18	0.39	0.23	0.03	0.71
Job. Sec. HP *	18	2.12	1.32	0.00	4.48
Gov. Effectiveness *	18	1.08	0.87	-0.80	2.07
Rule of Law *	18	1.09	0.99	-0.69	2.07
USA SUM*	9	19.27	3.14	15.44	23.44

LAC

	# Observations	Mean	St.Dev.	Min	Max
ob Reallocation (SUM)	58	20.42	8.87	4.48	39.57
Excess Reallocation	58	15.29	8.15	1.94	32.32
Job. Sec. Botero *	7	0.49	0.25	0.03	0.71
Job. Sec. HP *	7	3.08	0.58	2.23	3.94
Gov. Effectiveness *	7	0.18	0.64	-0.80	1.23
Rule of Law *	7	0.05	0.69	-0.69	1.26

Developed Countries

	# Observations	Mean	St.Dev.	Min	Max
ob Reallocation (SUM)	99	21.14	6.45	7.3	38.9
Excess Reallocation	18	16.46	4.38	7.91	25.4
Job. Sec. Botero *	11	0.32	0.21	0.04	0.70
Job. Sec. HP *	11	1.52	1.32	0.00	4.48
Gov. Effectiveness *	11	1.65	0.35	0.85	2.07
Rule of Law *	11	1.76	0.37	0.95	2.07

Note: * One observation per country. ** One observation per sector.

Table 2.2. Correlation Between Job Security Indexes

	EPL_80	EPL_90	Job Sec. HP	Job Sec. Botero et al.(2003)
EPL_80	1			
EPL_90	0.9557	1		
Job Sec. HP	0.6919	0.6988	1	
Job Sec. Botero *et al.* (2003)	0.6613	0.6653	0.5961	1

Table 3. Pair-Wise Correlations of Sector Job Reallocation between Countries

	ARG	BRA	CAN	CHL	COL	DEU	FIN	FRA	U.K.	ITA	MEX	NOR	NZL	PRT	SWE	URY	U.S.	VEN
ARG	1																	
BRA	0.8722*	1																
	0.0047																	
CAN	0.7536*	0.6357*	1															
	0.019	0.0902																
CHL	0.7445*	0.5654	0.7015*	1														
	0.0341	0.1441	0.0525															
COL	0.7624*	0.6674*	0.5948*	0.9198*	1													
	0.0169	0.0705	0.0912	0.0012														
DEU	0.7763*	0.8015*	0.6313*	0.7469*	0.7919*	1												
	0.0139	0.0167	0.0683	0.0332	0.011													
FIN	0.5219	0.2718	0.5937*	0.58	0.6862*	0.3941	1											
	0.1495	0.515	0.0919	0.1318	0.0412	0.294												
FRA	0.6388*	0.6126	0.0569	0.1713	0.3335	0.5258	-0.1739	1										
	0.064	0.1064	0.8845	0.685	0.3805	0.146	0.6546											
U.K.	0.8458*	0.7980*	0.7781*	0.6752*	0.4851	0.6493*	0.3811	0.474	1									
	0.0041	0.0176	0.0135	0.0662	0.1856	0.0584	0.3116	0.1973										
ITA	0.7405*	0.9141*	0.5988*	0.3987	0.2416	0.5217	0.1896	0.5404	0.9242*	1								
	0.0225	0.0015	0.0885	0.3279	0.5312	0.1497	0.625	0.1331	0.0004									
MEX	0.7512*	0.7418*	0.7924*	0.592	0.7514*	0.7466*	0.6319*	0.2406	0.6997*	0.4684	1							
	0.0196	0.0351	0.0109	0.1221	0.0196	0.0208	0.0679	0.5328	0.0359	0.2034								
NOR	0.6867*	0.5594	0.8446*	0.7494*	0.6478*	0.6138*	0.7292*	-0.0034	0.5221	0.4104	0.5796	1						
	0.041	0.1494	0.0042	0.0323	0.0592	0.0787	0.0258	0.9931	0.1494	0.2725	0.1019							
NZL	0.7406*	0.7095*	0.9325*	0.5384	0.3666	0.5507	0.381	0.1883	0.8385*	0.7810*	0.6487*	0.7522*	1					
	0.0225	0.0487	0.0002	0.1686	0.3319	0.1244	0.3116	0.6276	0.0047	0.013	0.0587	0.0194						
PRT	0.8199*	0.6480*	0.6388*	0.9464*	0.8976*	0.8252*	0.6106*	0.3994	0.6195*	0.4972	0.6074*	0.7553*	0.5234	1				
	0.0068	0.0823	0.0641	0.0004	0.001	0.0062	0.0807	0.287	0.0752	0.1733	0.0828	0.0186	0.1481					
SWE	-0.3965	-0.0402	-0.4902	-0.5221	-0.4272	-0.1074	-0.7092*	0.2275	-0.3983	-0.3543	-0.3031	-0.5835*	-0.4148	-0.5632	1			
	0.2907	0.9247	0.1804	0.1844	0.2515	0.7833	0.0324	0.5561	0.2883	0.3495	0.4278	0.099	0.267	0.1143				
URY	0.7016	0.7416*	0.8984*	0.1322	0.3454	0.4883	0.5087	0.1164	0.8908*	0.7575*	0.8471*	0.8882*	0.9065*	0.25	0.0069	1		
	0.1203	0.0915	0.015	0.8028	0.5025	0.3257	0.3028	0.8261	0.0172	0.0811	0.0333	0.0181	0.0127	0.6328	0.9896			
U.S.	0.7816*	0.7760*	0.9482*	0.6749*	0.554	0.7045*	0.3825	0.2482	0.8546*	0.7129*	0.8062*	0.6971*	0.9386*	0.6213*	-0.3562	0.8369*	1	
	0.0129	0.0236	0.0001	0.0663	0.1217	0.0341	0.3096	0.5195	0.0033	0.0311	0.0087	0.0369	0.0002	0.0741	0.3468	0.0377		
VEN	0.5296	0.3722	0.7044*	0.9202*	0.7273*	0.5721	0.449	-0.0185	0.4039	0.1661	0.4535	0.7265*	0.5162	0.7543*	-0.4427	-0.0208	0.6283*	1
	0.1426	0.3639	0.0341	0.0012	0.0264	0.1075	0.2254	0.9624	0.281	0.6693	0.2202	0.0266	0.1548	0.0189	0.2327	0.9688	0.07	
Anglo Saxon	0.8195*	0.7535*	0.9589*	0.6836*	0.5243	0.6601*	0.466	0.2501	0.9111*	0.7922*	0.7696*	0.7424*	0.9717*	0.6310*	-0.4432	0.9400*	0.9761*	0.5890*
	0.0069	0.0309	0	0.0616	0.1474	0.053	0.2061	0.5163	0.0006	0.0109	0.0153	0.022	0	0.0684	0.2322	0.0053	0	0.0952
All	0.9294*	0.8579*	0.9097*	0.7871*	0.7550*	0.8514*	0.5677	0.4149	0.8733*	0.7244*	0.8667*	0.7854*	0.8618*	0.8068*	-0.4024	0.8786*	0.9286*	0.6358*
	0.0003	0.0064	0.0007	0.0204	0.0187	0.0036	0.1108	0.2668	0.0021	0.0273	0.0025	0.0121	0.0028	0.0086	0.283	0.0212	0.0003	0.0657

Notes: Job reallocation is the sum of job creation and job destruction. The first line indicates the correlation coefficient and the second the significance level (p-value),
significant at the 10 per cent level. All pair-wise correlations are estimated with either 8 or 9 observations (depending whether we have information for sector 39 ISIC Rev2),
except in Uruguay where there are only 6 sectors with more than 40 firms. *Anglo Saxon* is the simple average of sector job reallocation for Canada, U.K., New Zealand and U.S.
All is the simple average of sector job reallocation for all countries.

Table 4. Job Reallocation and Job Security: Cross Section

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
JS Bot.	-10.655	-2.927	-14.862	-10.146	-10.270	20.294	-7.655	-8.322	14.158	-8.538
	(9.273)	(5.266)	(8.312)	(6.225)	(5.834)c	(8.650)b	(5.326)	(4.563)c	(7.311)c	(5.764)
Rule of Law (RL)			-7.487	-3.231	-1.950	16.048	1.230	1.624		
			(5.354)	(1.538)c	(1.010)c	(6.673)b	(3.706)	(3.274)		
JS Bot.* RL						-48.322	-7.309	-6.277		
						(10.987)a	(6.155)	(6.135)		
Gov. Efficiency (GE)									15.164	1.163
									(4.910)b	(3.469)
JS Bot. * GE									-48.869	-8.562
									(10.973)a	(6.281)
GDP growth volatility	2.510	2.152	3.174	1.745	1.006	3.327	1.844	1.416	2.980	1.935
	(3.414)	(1.124)c	(2.499)	(0.971)c	(0.543)c	(1.386)b	(0.820)b	(0.594)b	(1.323)b	(0.847)b
Entry/Exit dummy	0.000	17.294	0.000	20.006	14.844	0.000	18.391	15.493	0.000	19.695
	(0.000)	(3.758)a	(0.000)	(3.821)a	(1.948)a	(0.000)	(3.916)a	(2.007)a	(0.000)	(4.184)a
Plant Dummy	-3.384	-2.834	1.144	-1.481	-1.629	-7.199	-2.249	-2.945	-6.332	-2.694
	(3.389)	(1.342)b	(4.770)	(1.504)	(1.361)	(3.162)b	(1.501)	(1.279)b	(3.160)c	(1.455)c
Constant	22.943	7.280	24.504	8.223	13.741	13.522	7.771	11.489	15.929	7.144
	(4.225)a	(6.600)	(4.200)a	(5.453)	(3.999)a	(3.553)a	(4.980)	(3.347)a	(2.968)a	(5.011)
Observations	99	157	99	157	158	99	157	158	99	157
R-squared	0.31	0.49	0.37	0.56	0.63	0.53	0.58	0.64	0.50	0.59
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Dev.	ALL	Dev.	ALL	ALL*	Dev.	ALL	ALL*	Dev.	ALL

Notes: Robust standard errors in parentheses (Clustered by Country). c significant at 10%; b significant at 5%; a significant at 1%. *JS Bot.*is the Job Security Index developed by Botero, Djankov, La Porta *et al*. (2003). *RL* =Rule of Law and *GE* = Government Efficiency, both are institutional variables from Kaufmann, Kraay and Mastruzzi (2003). *Entry/Exit* is dummy that indicates whether the entry and exit of firms can be observed in the data set. *Plant* is a dummy for the unit of observation (1 plants, 0 firms) *For Brazil and Mexico we use the manufacturing census data (only continuous plants) instead of the registry information. *Dev*. denotes developed countries.

Table 5. Job Reallocation and Job Security: Differences-in-Differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Sum	Sum	Sum	Sum	Sum (ln)	Sum (ln)	Sum	Sum	Sum	Sum	Sum (ln)
USA SUM*JS Bot.	-1.041	-1.742								-2.327	
	(0.423)b	(0.456)a								(0.457)a	
AS SUM*JS Bot.			-1.377								
			(0.318)a								
Exc. USA SUM*JS Bot.				-1.854							
				(0.628)a							
Index USA SUM*JS Bot.					-0.053	-0.079					-0.092
					(0.020)a	(0.024)a					(0.026)a
USA SUM* Job. Sec. HP.							-0.243				
							(0.130)c				
USA SUM*EPL_90								-0.245			
								(0.116)b			
USA SUM*EPL_80									-0.228		
									(0.114)b		
USA SUM*Income (GDPpc)		-0.333					-0.369	-0.738	-0.666	-0.220	
		(0.131)b					(0.210)c	(0.359)b	(0.364)c	(0.127)c	
AS SUM* Income (GDPpc)			-0.253								
			(0.102)b								
Exc. USA SUM*GDPpc				-0.453							
				(0.181)b							
Index USA SUM*GDPpc						-0.013					-0.010
						(0.008)					(0.008)
Observations	148	148	157	148	148	148	148	90	81	149	149
R-squared	0.83	0.84	0.84	0.84	0.86	0.87	0.83	0.76	0.70	0.86	0.89
Country and Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All	All	All+USA	All	All	All	All	Dev.	Dev.	All*	All*
Diff. In Job Real. P90-P10	-5.813	-9.728	-11.661	-12.359	-0.280	-0.417	-6.949	-7.25	-7.52	-12.9	-0.48
Diff. In Job Real. P80-P20	-4.412	-7.383	-6.425	-4.628	-0.165	-0.246	-4.694	-5.59	-5.57	-9.86	-0.28

Notes: Robust standard errors. Sectors are defined at the 2 digit ISIC (rev 2). c significant at 10%; b significant at 5%; a significant at 1%. All regressions have sector and country fixed effects. *USA SUM* denotes Sector Job Reallocation in USA; *Index USA SUM* denotes the ranking of U.S. Sector Job Reallocation; *AS SUM*= Simple average of Sector Job Reallocation for U.S., Canada, U.K., and New Zealand. *JS Bot.* is the Job Security Index developed by Botero et. al. (2003). *Job Sec. HP* is the Job Security Index developed by Heckman and Pagés (2003). Sample *All* includes all countries but the U.S. Sample *Dev.* only includes developed countries. Sample *All** includes manufacturing census data (only continuous plants) for Brazil and Mexico, instead of the Social Security registry information. *Diff. In Job Real. p90-p10* measures the decline in job reallocation (in percentage points) of an industry at the 90th percentile level of flexibility requirement relative to an industry at the 10th percentile level when such industries are located in a country at the 90th percentile of job security regulation rather than at the 10th percentile.

Table 6. Job Security and Job Reallocations for Different Regions: Differences-in-Differences

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Sum	Sum	Sum	Sum (ln)	Sum (ln)	Sum (ln)	Sum	Sum	Sum
USA SUM* JS Bot.	-0.789	-2.608	-2.100				-1.503	-1.698	-1.421
	(0.907)	(0.749)a	(0.518)a				(0.620)b	(1.851)	(1.345)
Index USA SUM* JS Bot.				-0.087	-0.116	-0.078			
				(0.048)c	(0.050)b	(0.027)a			
Index USA SUM* JS Bot*Rule of Law							-0.729	-3.148	-1.224
							(0.644)	(2.076)	(1.698)
USA SUM* Rule of Law							0.168	2.051	-0.125
							(0.385)	(1.181)c	(0.892)
USA SUM*Income (GDPpc)	-0.337	-0.577	-0.797						
	(0.343)	(0.283)b	(0.336)b						
Index USA SUM*Income (GDPpc)				-0.011	-0.019	-0.012			
				(0.020)	(0.020)	(0.018)			
Observations	58	59	90	58	59	90	148	58	90
R-squared	0.93	0.94	0.78	0.94	0.93	0.78	0.84	0.93	0.78
Sample	LAC	LAC*	Dev.	LAC	LAC*	Dev.	All	LAC	Dev.
Country & Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors. c significant at 10%; b significant at 5%; a significant at 1%. All regressions have Sector and Country fixed effects. *USA SUM* denotes sector job reallocation in U.S., *Index USA SUM* denotes a ranking of sector job reallocation in U.S. *JS.Bot*, is the Job Security Index developed by Botero, Djankov, La Porta et al. (2003). *Rule of Law* is developed by Kaufmann, Kraay and Mastruzzi (2003). Sample *All* * uses manufacturing census data (continuous plants only) for Brazil and Mexico instead of the Social Security registry information.

Table 7. Correlation between Job Security and Cost of Entry and Exit Measures

	Absolute Priority	CEE1	CEE2	JS (Bot.)	JS (HP)
Absolute Priority	1				
CEE1	-0.5406*	1			
CEE2	-0.4624*	0.5001*	1		
JS Bot.	-0.4937*	0.3149*	0.4922*	1	
HP	-0.6324*	0.3890*	0.7354*	0.7072*	1

* indicates significance at 10%.

Notes: CEE1 denotes average cost of firm entry and exit measured in years, while *CEE2* denotes average cost of entry and exit entry, measured according to a simple average of cost of in number of procedures to open a firm and cost of exit, measured as a percentage of the insolvent estate, once both have been standardized between 0 and 1. *Absolute Priority* documents the order in which claims are paid in the insolvency process, including payment of post-petition claims. Higher values of this measure indicate higher priority for creditors' claims. *JS Bot.* Is the job security measure developed by Botero, Djankov, La Porta et al. (2003). *HP* is the Job Security measure developed by Heckman and Pagés (2003)

Table 8. Job Security versus Firm Entry and Exit Regulations: Differences-in-Differences

	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
USA SUM*JS Bot.	-1.698	-1.605	-1.894	-1.711	-1.681	-2.764	-1.287	-0.421
	(0.469)a	(0.518)a	(0.495)a	(0.469)a	(0.499)a	(0.844)a	(0.657)c	-1.59
USA SUM*CEE1	-0.095					-0.593		
	(0.11)					(0.43)		
USA SUM**CEE2*		-0.727					-0.222	
		(0.65)					(1.45)	
USA SUM**Absolute Priority*			-0.006					0.003
			(0.00)					(0.01)
USA SUMbirth&death**CEE1*				-0.184				
				(0.25)				
USA SUMbirth&death**CEE2*					-0.955			
					(1.48)			
USA SUMbirth&death*Income (GDPpc)								
USA SUM**CEE1*JS Bot.						0.812		
						(0.61)		
USA SUM**CEE2*JS Bot.							-1.218	
							(2.53)	
USA SUM**Abs. Priority* JS Bot.								-0.019
								(0.02)
USA Sum*Income (GDPpc)	-0.398	-0.442	-0.205	-0.375	-0.382	-0.482	-0.469	-0.183
	(0.163)b	(0.174)b	(0.13)	(0.148)b	(0.153)b	(0.180)a	(0.177)a	(0.13)
Observations	148	148	148	148	148	148	148	148
R-squared	0.84	0.85	0.85	0.84	0.84	0.85	0.85	0.85
Country and Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Robust standard errors. c significant at 10%; b significant at 5%; a significant at 1%. *CEE1* denotes average cost of entry and exit measured in years, while *CEE2* denotes average cost of entry and exit according to a simple average of cost of entry, measured in number of procedures to follow to open a firm, and cost of exit, measured as percentage of the insolvent estate, once both measures have been standardized between zero and one. *Abs. Priority* documents the order in which claims are paid in the insolvency process, including payment of post-petition claims. Higher value of this variable reflects higher priority for creditors. *USA SUM* denotes sector job reallocation in *U.S. Index USA SUM* denotes a ranking of sector job reallocation in U.S.*USA SUMbirth&death* denotes sector job reallocation in U.S. due to the birth and death of firms. *JS Bot*. Is the Job Security Index Developed by Botero, Djankov, La Porta et al. (2003). See text and Table A.1 for data sources of firm entry and exit regulations measures.

Table 9. Robustness to Changes in the Sample of Countries: Differences-in-Differences

	Dependent Variable SUM				Dependent Variable SUM (ln)			
	USA SUM*JS Bot.	(Robust S.E.)	Observations	R-squared	Index USA SUM*JS Bot.	(Robust S.E.)	Observations	R-squared
Without Argentina	-1.769	(0.457)a	139	0.84	-0.079	(0.024)a	139	0.86
Without Brazil	-1.799	(0.472)a	140	0.82	-0.077	(0.024)a	140	0.85
Without Canada	-1.555	(0.495)a	139	0.85	-0.069	(0.025)a	139	0.87
Without Chile	-1.664	(0.439)a	140	0.85	-0.072	(0.022)a	140	0.88
Without Colombia	-1.735	(0.455)a	139	0.85	-0.078	(0.024)a	139	0.87
Without Germany	-1.856	(0.492)a	139	0.83	-0.092	(0.025)a	139	0.86
Without Finland	-1.779	(0.500)a	139	0.84	-0.077	(0.026)a	139	0.87
Without France	-1.737	(0.451)a	139	0.86	-0.079	(0.024)a	139	0.89
Without UK	-1.642	(0.479)a	139	0.84	-0.079	(0.025)a	139	0.86
Without Italy	-1.588	(0.437)a	139	0.86	-0.074	(0.023)a	139	0.87
Without Mexico	-2.036	(0.449)a	139	0.85	-0.085	(0.024)a	139	0.86
Without Norway	-1.752	(0.461)a	139	0.84	-0.079	(0.024)a	139	0.87
Without New Zealand	-1.776	(0.567)a	139	0.83	-0.096	(0.028)a	139	0.86
Without Portugal	-1.834	(0.518)a	139	0.84	-0.078	(0.028)a	139	0.86
Without Sweden	-1.584	(0.429)a	139	0.87	-0.07	(0.024)a	139	0.89
Without Uruguay	-1.902	(0.514)a	142	0.84	-0.076	(0.028)a	142	0.86
Without Venezuela	-1.656	(0.454)a	139	0.82	-0.081	(0.024)a	139	0.83

Notes: In parenthesis robust standard errors. c, b and a significant at 10%; 5% and at 1%. Each coefficient is obtained from a separate regression which, in addition to the interaction variable whose coefficient is reported in this table, it includes the variables contained in Table 5 Column (2), that is, country and sector fixed effect and an interaction term that multiplies *USA SUM*Income* (GDPpc), where *USA SUM* denotes U.S. sector labor reallocation and *Income* is GDP per capita. *Index USA SUM* refers to a ranking of sector reallocation across U.S. Sectors. *JS Bot*. refers to the Job Security Measures created by Botero, Djankov, La Porta et al. (2003).

Table 10. Robustness to Exclusion of Sectors: Differences-in-Differences

	Dependent Variable SUM				Dependent Variable SUM (ln)			
	USA SUM* JS Bot.	(Robust S.E.)	Observations	R-squared	Index USA SUM*JS Bot.	(Robust S.E.)	Observations	R-squared
Without sector 31	-1.701	(0.466)a	131	0.85	-0.076	(0.024)a	131	0.87
Without sector 32	-1.982	(0.515)a	131	0.84	-0.08	(0.026)a	131	0.86
Without sector 33	-2.103	(0.503)a	132	0.83	-0.091	(0.024)a	132	0.86
Without sector 34	-1.757	(0.567)a	131	0.84	-0.076	(0.036)b	131	0.86
Without sector 35	-1.804	(0.479)a	131	0.83	-0.085	(0.026)a	131	0.86
Without sector 36	-1.767	(0.463)a	131	0.85	-0.081	(0.024)a	131	0.87
Without sector 37	-1.733	(0.441)a	132	0.87	-0.081	(0.021)a	132	0.91
Without sector 38	-1.737	(0.454)a	131	0.84	-0.077	(0.024)a	131	0.87
Without sector 39	-1.088	(0.456)b	134	0.86	-0.057	(0.027)b	134	0.87

Notes: Robust standard errors in parentheses; c, b and a significant at 10%; 5% and at 1%. Each coefficient is obtained from a separate regression which, in addition to the interaction variable whose coefficient is reported in this table, includes the variables contained in table 5 Column (2), that is, country and sector fixed effect and an interaction term that multiplies *USA SUM*Income* (GDPpc), where *USA SUM* denotes U.S. sector labor reallocation and Income is GDP per capita. *Index USA SUM* refers to a ranking of sector reallocation across U.S. Sectors. *JS Bot.* refers to the Job Security Measures created by Botero, Djankov, La Porta et al. (2003).

Figure 1. Partial Regression: Job Reallocation versus the Interaction of U.S. Job Reallocation and Job Security

(Controlling for Country, Sector and Income Effects. (Regression 2 in Table 5))

coef = -1.7420591, (robust) se = .45570554, t = -3.82