

POLICY RESEARCH WORKING PAPER

4708

# Job Creation and Labor Reform in Latin America

*David S. Kaplan*

The World Bank  
Financial Private Sector Development Department  
Enterprise Analysis Unit  
September 2008



## Abstract

This paper studies the effects of labor-regulation reform using data for 10,396 firms from 14 Latin American countries. Firms are asked both how many permanent workers they would have hired and how many they would have terminated if labor regulations were made more flexible. I find that making labor regulations more flexible would lead to an average net increase of 2.08 percent in total employment. Firms with fewer than 20 employees would benefit the most, with average gains

in net employment of 4.27 percent. Countries with more regulated labor markets would experience larger gains in total employment. These larger gains in total employment, however, would be achieved through higher rates of hiring and higher rates of termination. These results may explain why there is substantial opposition to labor reforms despite the predicted gains in efficiency and total employment.

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This paper—a product of the Enterprise Analysis Unit, Financial Private Sector Development Department—is part of a larger effort in the Financial Private Sector Development VPU. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at [dkaplan@worldbank.org](mailto:dkaplan@worldbank.org).

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David S. Kaplan<sup>†</sup>  
Enterprise Analysis Unit  
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\*I gratefully acknowledge helpful comments from Mohammad Amin, Penelope Brook, Simeon Djankov, Veselin Kuntchev, Vikram Pathania, and Augusto de la Torre, as well as seminar participants at the World Bank. Joshua Wimpey provided excellent research assistance. All remaining errors are mine.

<sup>†</sup>MailStop F4P-400, 1818 H Street, NW, Washington, DC 20433. Email: [dkaplan@worldbank.org](mailto:dkaplan@worldbank.org).

# 1 Introduction

The challenge of labor market policy is to devise a framework for contracting between employers and workers that is at once efficient and fair. Most people would agree that excessively rigid labor market regulations prevent the labor market from operating efficiently. The resulting losses to employment and productivity therefore reduce opportunities for workers to find good jobs. Most people would also agree that some regulation is necessary to codify and protect basic standards of fair treatment for workers. Regulations may also introduce a degree of predictability to, and reduce the cost of, contracting between employers and workers. The debate over the design of labor market policy centers on the question of how much and what kind of regulation is necessary to efficiently achieve these goals—and when regulation becomes "excessive".

There is considerable evidence that rigid labor regulations may prevent labor markets from operating efficiently. Botero, et. al. (2004), for example, find that countries with heavier labor-market regulations have lower rates of labor-market participation and higher levels of unemployment. Besley and Burgess (2004) find that "pro-worker" labor reforms in India negatively affected employment and productivity and increased poverty. Amin (2008) also shows that labor regulation in India has substantial and negative effects on employment. Heckman and Pagés (2000) find that job security legislation in Latin America reduces employment and increases inequality. Almeida and Carneiro (2008) find that increased enforcement of labor regulations constrains firm size and reduces employment. Ahsan and Pagés (2008) find that employment protection reduces output and employment in the formal sector without benefitting workers. Kugler (2004) finds that a reduction in firing costs in Colombia reduced unemployment. A more complete review of the literature on the effects of labor regulations in developing countries can be found in Djankov and Ramalho (2008).<sup>1</sup>

There is also evidence that labor market regulations affect the labor market in ways that cannot be captured by aggregate employment statistics. Saavedra and Torero (2004), for example, find that increases in firing costs reduce labor demand. Although they could not observe worker flows, they did find that a reduction of firing costs in Peru led to a decrease in mean tenure of workers. Kugler (2004)

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<sup>1</sup>See Heckman and Pagés (2004) for an influential collection of 11 studies of the effects of labor regulations in Latin America.

finds similar results. Bosch et. al. (2007) find that reduced labor market flexibility in Brazil led to an increase in informality, primarily due to a reduction in the job finding rate in the formal sector.

A burgeoning literature also shows that labor-market regulations affect the way jobs are distributed across firms. Caballero, et. al. (2006), Gonzaga (2003), Haltiwanger, et. al. (2006), and Micco and Pagés (2007) all find that labor-market rigidities reduce the reallocation of jobs across firms. That is, labor-market rigidities cut off the constant churning of workers and jobs across firms that would otherwise occur naturally in a free market. Blanchard and Portugal (2001) arrive at a similar conclusion by comparing job creation and destruction rates in the U.S. and Portugal. They attribute the lower rates of job creation and destruction observed in Portugal to its employment-protection laws.

The papers mentioned above interpret the evidence that labor regulations reduce the pace of labor-market reallocations as evidence that labor regulations are impediments to productivity since they prevent workers from being allocated to the firms where they are most productive. One could, however, interpret the results of these papers as evidence that a substantial fraction of workers might be hurt by making labor regulations less rigid. The reallocation of jobs across firms generates losses for the workers who lose their jobs. A well-designed labor-market reform should take into account the short-term losses of workers who would likely be displaced from their jobs if labor markets are made more flexible. In fact, papers like Jacobson, et. al. (1993) suggest that, even in countries with flexible labor markets like the U.S., the negative effects of being a displaced worker may be permanent.

This paper makes two contributions to the literature on labor regulations in developing countries. The first contribution is to use a different methodology to confirm previous results in the literature that rigid labor regulations reduce aggregate employment. In particular, I exploit a unique data set that asks firms how many permanent workers would have been hired and fired in the previous fiscal year in absence of rigid labor regulations. Indeed I confirm that, on average, aggregate employment across 14 Latin American countries would increase by about two percent if labor regulations were made more flexible.

The second contribution, which relates these aggregate gains in employment to the changes in the hiring and firing of individual workers, is the main contribution of the paper. I find that countries that would gain most by making labor regulations more flexible in terms of aggregate employment, which tend to be those countries with more heavily regulated labor markets, would exhibit particularly large increases in worker dismissals. These particularly large increases in worker dismissals would be accompanied by

even bigger increases in worker hires. Nevertheless, one may interpret these findings as saying that more heavily regulated labor markets have more people who would be hurt by the adoption of pro-market reforms.

A concrete example may make the above point clearer. Using an index of labor market rigidity that comes from the Economic Freedom of the World report issued by the Fraser Institute, Chile has the most flexible labor market among the 14 countries studied while Argentina has the least flexible labor market. Firms in Chile report that, if labor regulations were made more flexible, the net gain to employment would be 0.76% while Argentinian firms report a net gain of 2.82% of total employment. This finding should not be surprising given the extensive literature that shows that making labor regulations more flexible generates gains to employment.

The focus of the current paper, however, is how these gains in net employment are accomplished. Chilean firms report that the additional dismissals that would result from making labor regulations more flexible would be 0.94% of total employment, while Argentinian firms report an additional dismissal figure of 2.34%. We therefore see that, despite the fact that Argentina would gain more in terms of aggregate employment by reforming its more rigid labor regulations, Argentina would also see a higher percentage of its workers losing their jobs. The larger net employment gains in Argentina arise because their higher dismissal figures are more than compensated for by even higher figures for additional hires.<sup>2</sup>

The outline of the rest of the paper is as follows. Section 2 briefly reviews the literature on worker and job reallocations and places the current paper into this broader literature. Section 3 describes the essential features of the data set used in the paper and documents the manner in which all variables are calculated. Section 4 presents the main empirical results. Section 5 presents evidence that some of the results from section 4 can be attributed to changing the status of temporary workers to permanent ones, but that the main conclusions of the paper hold even when firms that employ temporary workers are excluded from the analysis. Section 6 concludes.

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<sup>2</sup>Specifically, Chilean firms report that making labor regulations more flexible would result in additional hires as a percentage of employment of 1.70% while Argentinian firms report a figure of 5.15%. Details on these calculations are presented in the data and methodology section.

## 2 Related Literature

The literature on worker and job reallocations has achieved considerable importance in recent years. The essential insight of the early papers such as Davis and Haltiwanger (1990 and 1992) is that aggregate statistics such as total employment, which may not vary much over time, mask considerable activity at the micro level. Even when aggregate employment does not change from one year to the next, one can observe individual firms being born or expanding dramatically at the same time when other firms are exiting the market or contracting dramatically.

In the parlance of the literature, we say that a firm creates jobs when the firm's employment in the current year is greater than in the prior year. We say that the firm has destroyed jobs when firm employment in the current year is lower than in the previous year. The key early insight of this literature is that an economy exhibits substantial rates of job creation and job destruction simultaneously. That is, even when aggregate employment is neither expanding nor contracting, an economy is always reallocating jobs at a rapid rate.

Hamermesh et. al. (1996) point out that reallocations measured in Davis and Haltiwanger (1990 and 1992) are only a part of total labor reallocations. In data sets like those used by Davis and Haltiwanger, in which one only observes the total number of employees at the firm, one cannot measure the total number of people who have entered the firm in the past year nor the total number of people who have left. Hamermesh et. al. define total worker flows to be the sum of people who have been hired since the prior year plus the number of people who have separated from the firm within the past year. They show that job creation and destruction, as defined by Davis and Haltiwanger, account for less than half of total worker flows.

The contributions mentioned above have changed dramatically the way we view labor markets. Even when aggregate employment is not changing, some firms are growing at the same time when others are shrinking. Even when firm employment is not growing or shrinking, employee turnover is still high.

By exploiting a data set in which firms are asked how many workers they would have hired and terminated in absence of rigid labor regulations, I examine the relationship between labor regulations and these flows. The effects of rigid labor regulations on net employment growth, which are studied in the current paper and have been studied extensively in the previous literature, play a central role in the

policy debate over labor reforms. The effects of rigid labor regulations on worker flows (hires and fires), which is the novelty of the current paper, is also of crucial importance both for understanding the effects of the reforms and for understanding why pro-market labor reforms are often met with such opposition.

This paper is the first that analyzes directly the effects of labor-market regulations on worker flows in Latin America.<sup>3</sup> Indeed, the descriptive statistics show that making labor regulations more flexible would have a larger impact on worker flows than on job flows. Since opposition to labor reforms likely stems from individuals who are afraid of being displaced, the focus on worker flows may be particularly relevant for policy. An individual worker fearing dismissal as a result of a labor reform would likely oppose the reform even if his or her firm would increase its total employment as a result of the reform.

Although I do not examine productivity in this paper, it is important to stress that these reallocations have clear productivity effects. Krizan et. al. (2006) find that, for the U.S. retail industry, virtually all of the labor productivity growth in the retail trade sector is accounted for by more productive entering establishments displacing much less productive exiting establishments. Autor et. al. (2007) find that employment protection laws have negatively affected productivity in the U.S. Foster et. al. (forthcoming) show that exiting plants are less productive than incumbent plants and that entering plants are more productive. Eslava et. al. (2005) show that the factor-market frictions in Colombia that restrict the reallocations of inputs substantially affect aggregate productivity. Bartelsman et. al. (2004) study data from 24 countries and confirm the importance of these reallocations in explaining aggregate productivity.

### 3 Data and Methodology

This paper uses data from 14 Latin American countries. The 14 countries are Argentina, Bolivia, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, and Uruguay. The data can be accessed at [www.enterprisesurveys.org](http://www.enterprisesurveys.org). These countries were chosen for two reasons. First, the enterprise surveys data sets for these countries have weights that can be used to make the statistics representative of the population of non-agricultural and non-financial sector firms. Second, the surveys applied to these 14 countries contain the main questions that will be used to generate all job- and worker-flow statistics used in the paper.

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<sup>3</sup>Almeida and Carneiro (2008) study hires and fires separately, but their strongest results are for aggregate employment. They also study the enforcement of regulations rather than the regulations themselves.



All firms were asked "In fiscal year 2005, would this establishment have hired or fired permanent workers had it not been for having to comply with labor regulations?" When a firm answered yes to this question, the firm was asked specifically how many workers would have been hired or fired. I also observe the number of full-time permanent employees who were employed in the last fiscal year.

Table 1 presents some basic information about the firm-level data. In total, 10,396 firms were used in the analysis. Observations per country ranged from 436 in Honduras to 1,478 in Mexico. Statistics are weighted to give estimates of the population of all firms with at least five employees not in agriculture or the financial sector. Perhaps the most striking feature is that 83.2% of firms state that neither hiring nor firing decisions were affected by rigid labor regulations. The large informal economies in these countries may explain why so many firms say that their hiring and firing decisions are unaffected by labor regulations, since firms may be able to substitute informal workers for formal ones thereby avoiding the regulatory costs. According to the calculations presented in Schneider (2007), the informal economy contributes an average of 44% to total GDP for the 14 countries studied here. Another possibility, which I will explore later in the paper, is that firms can substitute temporary workers for permanent workers.

Only 2.2% of firms said that rigid labor regulations affected their dismissal decisions but not their hiring decisions while 6.6% of firms said that rigid labor regulations affected their hiring decisions but not their dismissal decisions. Interestingly, 8.0% of firms said that rigid labor regulations affected both their hiring and their dismissal decisions. We will see later that, despite the fact that small percentages of firms state that rigid labor regulations affected their hiring or firing decisions, rigid labor regulations do have an important effect on aggregate employment.

The next step in the analysis is to calculate the job- and worker-flows statistics at the level of the country. In order to explain this procedure, I begin by defining some terms. Let the subscript  $c$  denote the country and let the subscript  $j$  denote the firm. Specifically, consider the following definitions:

$empl_{cj}$  = the number of full-time permanent employees in the last full fiscal year  $t$  for firm  $j$  in country  $c$ .

$hire_{cj}$  = the number of permanent employees that firm  $j$  in country  $c$  would have hired in fiscal year  $t$  in absence of rigid labor regulations.

$fire_{cj}$  = the number of permanent employees that firm  $j$  in country  $c$  would have let go in fiscal year  $t$  in absence of rigid labor regulations.

$$\widetilde{empl}_{cj} = empl_{cj} + hire_{cj} - fire_{cj}.$$

$$create_{cj} = \max(0, hire_{cj} - fire_{cj}).$$

$$destroy_{cj} = \max(0, fire_{cj} - hire_{cj}).$$

The term  $\widetilde{empl}_{cj}$  is the number of full-time permanent employees that firm  $j$  in country  $c$  would have employed in absence of rigid labor regulations. The job creation figure for the firm,  $create_{cj}$ , only takes on non-negative values. In the case that the firm would not have increased the number of permanent full-time employees in the absence of rigid labor regulations, this job creation figure is zero. In the event that the firm would have increased the total number of permanent full-time employees in absence of rigid labor regulations, we say that the increase in the number of employees is the number of jobs that would have been created. The term  $destroy_{cj}$  measures the number of jobs that would have been destroyed in absence of rigid labor regulations. It is analogous to  $create_{cj}$ , but deals with decreases in the number of permanent full-time employees that would have occurred in absence of rigid labor regulations.

In order to gain some intuition about what these statistics measure, consider the following example. Suppose that, in absence of rigid labor regulations, firm A would have hired one employee and fired zero employees. Suppose further that firm B would have hired 100 employees and fired 99 employees. For both firms A and B, it would be recorded that they would have created one job if labor regulations did not exist. Obviously their values for the number of workers that would have been hired and fired are dramatically different. We therefore see from this example that the number of jobs that would be created by making labor regulations more flexible and the number of people who would be hired might be substantially different things. An analogous example would show that the number of jobs destroyed and the number of people fired might be quite different as well.

Now that the relevant statistics have been defined at the firm level, I turn to how I aggregate up to the level of the country. If I had access to a census of firms, aggregation would be a simple matter of summing across all firms. Since different firms had different ex-ante probabilities of entering the sample, some firms "represent" more firms than do others. Now define  $w_{cj}$  to be the inverse of the ex-ante probability that

firm  $j$  in country  $c$  would appear in the sample. A simple interpretation for  $w_{cj}$  is that it tells us the number of firms that are represented by firm  $j$ .

The first and most basic statistic is the net percentage increase in total employment that would have been achieved by making labor regulations more flexible. The formula is

$$net\_perc_c = 100 * \left( \frac{\sum_j w_{cj} (\widetilde{empl}_{cj} - empl_{cj})}{\sum_j w_{cj} \left( \frac{\widetilde{empl}_{cj} + empl_{cj}}{2} \right)} \right).$$

The numerator of the formula should be straightforward. It is simply the amount (measured by number of permanent workers) that total employment would have increased if labor regulations had been more flexible. It is standard in the literature to define the denominator as the average of the two total employment observations.<sup>4</sup>

The next statistic measures how much job creation would have been achieved if labor regulations were made more flexible. Recall that job creation can occur even if making labor regulations more flexible would have reduced aggregate employment in the economy. The formula is:

$$create\_perc_c = 100 * \left( \frac{\sum_j w_{cj} * create_{cj}}{\sum_j w_{cj} \left( \frac{\widetilde{empl}_{cj} + empl_{cj}}{2} \right)} \right).$$

The above statistic on job creation is simply the sum of all increases in firm-level employment expressed as a percentage of total employment. We can define the analogous job destruction statistic as follows:

$$destroy\_perc_c = 100 * \left( \frac{\sum_j w_{cj} * destroy_{cj}}{\sum_j w_{cj} \left( \frac{\widetilde{empl}_{cj} + empl_{cj}}{2} \right)} \right),$$

which is simply the sum of all decreases in firm-level employment expressed as a percentage of total employment. It is useful to note that

$$net\_perc_c = create\_perc_c - destroy\_perc_c,$$

that is, we can express the net percentage change in employment as the percent of jobs created minus the percent of jobs destroyed.

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<sup>4</sup>This practice ensures that a country that expands employment by 15% and then contracts by 15% returns to the exact same number of employees.

As mentioned earlier, the statistics on jobs that would have been created and jobs that would have been destroyed in absence of rigid labor regulations ignore within-firm worker turnover. We therefore define the additional hires that would have occurred as a percentage of total employment as

$$hire\_perc_c = 100 * \left( \frac{\sum_j w_{cj} * hire_{cj}}{\sum_j w_{cj} \left( \frac{\widetilde{empl}_{cj} + empl_{cj}}{2} \right)} \right)$$

and the additional fires that would have occurred as a percentage of total employment as

$$fire\_perc_c = 100 * \left( \frac{\sum_j w_{cj} * fire_{cj}}{\sum_j w_{cj} \left( \frac{\widetilde{empl}_{cj} + empl_{cj}}{2} \right)} \right).$$

Recall that the net percentage change in employment could be decomposed into its job creation and job destruction components. Similarly, we can decompose the net percentage change in employment into its hiring and firing components as follows

$$net\_perc_c = hire\_perc_c - fire\_perc_c.$$

It may also be useful to note that

$$hire\_perc_c \geq create\_perc_c \text{ and } fire\_perc_c \geq destroy\_perc_c.$$

I will present some of the results separately by industry and by firm size. These calculations are straightforward. For example, if one would like to calculate the above statistics only for the manufacturing sector, one simply needs to exclude all non-manufacturing firms from the data set and proceed as described above.

I will also make use of an indicator of labor market rigidity. I use the index from the The Economic Freedom of the World (EFW) report published by the Fraser Institute. The index is a function of six indicators: a measure of the importance of minimum wages, the legally mandated cost of hiring, the legally mandated cost of worker dismissal, firm perceptions of the importance of hiring and firing regulations, firm perceptions on the importance of collective bargaining, and an index of the importance of military conscription. I standardize the index, setting the mean to be zero and the standard deviation to be one for the 14 countries used in the analysis. I then multiply by minus one so that high values of the index now correspond to more rigid labor markets.

## 4 Empirical Results

Table 2 presents the descriptive statistics of the data set aggregated at the country level. All statistics are based on 14 observations: one for each of the countries used in the analysis. Each country receives equal weight in all analyses in the paper. Table 2 also presents the statistics separately for manufacturing and non-manufacturing firms as well as separately for small firms (those with at least five employees but less than 20), medium-sized firms (those with at least 20 employees but less than 100), and large firms (those with 100 or more employees).

We see that, on average, aggregate employment of permanent employees would increase by 2.08 percent if labor regulations were made more flexible. This increase would be accomplished by 2.59 percent in additional job creation offset by 0.51 percent in additional job destruction. Using a more inclusive measure of worker reallocations, we can show that the 2.08 percent increase in aggregate employment would be accomplished through 3.64 percent additional hires offset by 1.56 percent additional dismissals. The results are fairly similar in the manufacturing sector and the non-manufacturing sector.

There are, however, important differences across size categories. The net employment change of permanent workers that would occur if labor regulations were made more flexible would be 4.24% for small firms, 2.85% for medium-sized firms, and 1.27% for large firms. Despite the fact that smaller firms would benefit the most in terms of net employment growth if labor regulations were made more flexible, smaller firms would also experience more employee dismissals. Additional dismissals due to labor regulations becoming more flexible would amount to 2.55% of total employment for small firms, 1.96% for medium-sized firms, and 1.30% for large firms. In this sense we can conclude that rigid labor regulations have a larger effect on small firms both in terms of net employment growth and in terms of worker turnover. These results are consistent with the results of Pierre and Scarpetta (2004) who find that small firms are least likely to say that labor regulations are no obstacle to their operation.

Table 3 explores the cross country relationship between worker turnover and gains in net employment if labor regulations were made more flexible. Specifically, I take two measures of employment contractions, additional dismissals as a percentage of employment and additional jobs destroyed as a percentage of employment, and regress these measures against the percent change in net (or aggregate) employment if labor regulations were made more flexible.

Using all firms, we see that for each percentage point increase in net employment that would result from the labor regulations being more flexible, dismissals as a percentage of employment would increase by 0.45 percentage points and that this result is significant at the 0.05 level. This result implies that for each percentage point increase in net employment, additional hires as a percentage of employment would increase by 1.45 percentage points. The raw data underlying this estimation are plotted in figure 1.

There are two additional noteworthy observations on the results from table 3. The first observation is to note that the analogous estimations done separately for manufacturing or non-manufacturing firms and the estimations done separately by size categories all yield positive coefficients, although not all of them are significant. It is worth mentioning, however, that these disaggregated regressions do not pick up reallocations across broad sectors or across size categories that would arise in response to labor reform. It is for this reason that the coefficient of 0.45 from the aggregate regression is larger than any of the coefficients from the disaggregated models.

The second observation is to note that there are insignificant results using job destruction as the dependent variable. That is, the relationship between net growth and worker flows is stronger than the relationship between net growth and job flows. This result demonstrates that labor reform has important effects on worker turnover that are not being captured in papers that only study job flows such as Caballero, et. al. (2006), Haltiwanger, et. al. (2006), and Micco and Pagés (2007).

In light of the previous literature on the effects of labor reforms, one might conjecture that the countries that could gain the most by reforming their markets in terms of net employment growth would be those with heavily regulated labor markets. The results from table 3 would therefore suggest that the particularly high gains in terms of net employment that could be obtained by labor reforms in highly regulated countries would be accompanied by the displacement of particularly large fractions of their workforces. I address this possibility in table 4.

Table 4 studies the relationship between an indicator of labor-market flexibility and the job- and worker-flows statistics used in the paper. The top panel of table 4 presents the results from OLS models. The independent variable is always the standardized value (multiplied by minus one) of the labor flexibility indicator from the EFW report as described in the data section. Larger values for the indicator imply that the labor market is more rigid. When the net percent change in employment from making labor

regulations more flexible is the dependent variable, we see that countries with more rigid labor markets would experience larger percentage gains in net employment due to pro-market labor reforms.

But how would countries with more rigid labor market obtain these larger percentage gains in net employment? We see that additional fires as a percentage of total employment would be larger in countries that currently have more rigid labor regulations. These larger values for additional fires, however, would be more than offset by even larger values for additional hires. Once again the picture emerges that the countries with very rigid labor regulations would observe large gains in net employment and large increases in worker turnover if they made their labor regulations more flexible. The results using additional jobs created and destroyed yield similar conclusions although the positive coefficient in the job destruction equation is not significant. I plot the raw data behind these OLS regressions in figures 2-6.

The bottom panel of table 4 presents the results of Spearman rank-order correlation models as a robustness check. These models can be helpful if a small number of outliers is driving the OLS results. Indeed figure 4 shows that Bolivia has an extremely large figure for job destruction that may confound the OLS models. Rank-order correlation models only take into account the rankings of the variables and not their actual values. The correlation coefficients are all positive and estimated to be 0.6 or higher. Furthermore, they are all statistically significant at least at the 0.05 level. In this sense the rank-order correlation results are even stronger than the OLS results.

## 5 Temporary Workers

Recall that the main employment variables used in the paper refer to permanent workers. One therefore wonders the extent to which the effects documented in the previous section are the result of firms switching from temporary to permanent workers once rigid labor regulations are lifted. Unfortunately, firms are not asked whether the increased hires of permanent workers would be truly new employees or if the newly-hired permanent workers would come from their current pool of temporary workers.

Firms are, however, asked how many temporary or seasonal workers were employed in the 2005 fiscal year. Using this information, the average share of temporary or seasonal workers in total employment is calculated to be 10.6%, ranging from a low of 4.3% in Mexico to a high of 18.3% in Bolivia. Suppose that the post-reform increases in the number of permanent workers documented in the previous section

disproportionately come from firms with high shares of temporary workers. It would therefore seem likely these gains are not really gains in employment but rather changes in status from temporary to permanent.

I use the firm-level data to investigate this possibility. I calculate all of the job- and worker-flows variables described in the data and methodology section at the firm level. Within each country, each firm's weight in the regressions is proportional to the inverse of its ex-ante probability of being in the sample multiplied by the average of its current number of permanent employees and the number of permanent employees it would have if labor regulations were made more flexible. Across countries I set the sum of the weights equal to each other, that is, I give each country equal weight in the regressions. This weighting scheme is chosen to make these firm-level regressions exactly analogous to the country-level regressions from table 4. I present these results in table 5.

The first column of table 5 presents the regressions of the five measures of job and worker flows used in table 4 against the standardized value (multiplied by minus one) of the labor-market flexibility indicator from the EFW report. The construction of the weights guarantees that the estimated coefficients be identical to those in table 4. The standard errors tend to be somewhat smaller than those reported in table 4, which is caused by the fact that I am using a country-level indicator in a firm-level data set. Although the standard errors are clustered at the country level, Bertrand et. al. (2004) warn that standard errors tend to be too small when the number of clusters is small. For this reason the results using the indicator of labor-market flexibility from table 5 need to be interpreted with some caution, although the main results will later be confirmed in models with one observation per country.

The second column of table 5 reports the results of regressing the job- and worker-flows variables against the percent of the firm's workforce that is temporary or seasonal. The results show that, for each percentage point increase in temporary workers as a percent of employment, the net gain in permanent employment from making labor regulations more flexible rises by 0.13 percentage points.<sup>5</sup> Not surprisingly, the variable "temporary workers as a percentage of employment" has no effect in the job destruction model and has a statistically significant but small effect in the fire equation. The fact that the creation of permanent jobs and the hiring of permanent workers in response to labor reform disproportionately

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<sup>5</sup>Since this independent variable is calculated at the firm level, there is no clear reason to cluster the standard errors in this regression. Indeed the standard errors are nearly identical when the clustering procedure is dropped.



come from firms that employ large shares of temporary workers lends credence to the hypothesis that some of the new permanent workers would be workers who currently have temporary jobs.

The third column of table 5 presents the results of including the indicator of labor-market flexibility and the percent of the firm's workforce that is temporary or seasonal together in the same equation. The interesting fact from these models is that the coefficients are nearly identical to those in the first two columns, which occurs because the two variables are essentially uncorrelated.<sup>6</sup> The fourth column adds an interaction term (the indicator of labor-market flexibility multiplied by the percent of the firm's workforce that is temporary or seasonal) to the models from column three.

Two interesting results emerge from including the interaction term. First, the interaction term's positive and significant coefficients in the equations for net growth, permanent job creation, and the hiring of permanent workers imply that the effects of labor reform disproportionately work through firms that currently rely heavily on temporary workers. It therefore appears that some of the effects of labor reform that were estimated in table 4 pick up firms changing the status of their temporary employees.

To understand the second result, note that the coefficient of the labor market indicator can now be interpreted as the effect that making regulations more flexible has on firms with no temporary employees. This effect in the net growth model is estimated to be positive but miniscule in magnitude and not statistically significant. The other conclusions from table 4, however, remain qualitatively unchanged although the magnitudes decrease somewhat. In particular, even for firms that currently have no temporary workers, making labor markets more flexible will yield larger increases in both hires and fires in countries that currently have more rigid labor markets.

As I mentioned earlier, there are statistical problems with these firm-level regressions. To address these concerns, I once again calculate country-level aggregates of all job- and worker-flow variables as described in the methodology section. This time, however, I exclude firms that have any temporary workers. In this way we can be sure that the results will be unaffected by firms who may change the status of their temporary workers. On average, employment in firms that do not use temporary workers accounts for 45.3% of total employment, ranging from a low of 27.5% in Bolivia to a high of 80.1% in Mexico.

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<sup>6</sup>A regression of one against the other yields a negative and insignificant coefficient.

Table 6 uses the country-level data set described above to re-estimate all of the models from table 4. The most noteworthy difference from the results in table 4 is that, although the net gains of making labor markets more flexible are still estimated to be larger for countries that currently have more rigid labor regulations, this coefficient is no longer statistically significant. The results from table 6 on creation, destruction, hiring, and firing, are qualitatively the same as in table 4. We therefore conclude that changes in the status of temporary workers do not drive the main results of the paper.

In summary, the results from tables 5 and 6 suggest that some of the effects of labor reform reported in table 4 may involve re-classifying workers from temporary to permanent. The result that making labor regulations more flexible will lead to larger increases in net employment in countries that currently have more rigid regulations appears somewhat more likely to be driven by these changes in status. Nevertheless there is no evidence that pro-market labor reforms would have a detrimental effect on net employment. The result that countries with more rigid labor regulations would experience larger increases both in hires and in fires is quite robust to excluding firms that employ temporary workers.

## 6 Conclusions

I find that labor-market reforms that make regulations more flexible will likely lead to an increase in aggregate employment, at least for permanent employees. Given the vast empirical literature on the effects of rigid labor regulations on employment, the results on net employment changes from the current paper can be viewed as yet another confirmation of the findings of a well-established literature.

The novelty of this paper is to study how net employment increases would be achieved after pro-market labor reform. I find that the post-reform increases in aggregate employment would be associated with increases in employee dismissals. Naturally, these increased dismissals would be more than compensated for by the post-reform increases in hires. Although I do not analyze productivity in this paper, it is logical to conjecture that pro-market labor reforms would lead to productivity gains as workers are more efficiently allocated to firms.<sup>7</sup>

The first policy implication is that advocates for incumbent workers may be quite rational in opposing market-based labor reforms despite the gains to aggregate employment and productivity. To the extent

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<sup>7</sup>Recall that the Autor et. al. (2007), Besley and Burgess (2004) found negative affects of labor market regulations on productivity.

that unions represent workers who currently have jobs that are protected by the existing rigidities, they may be representing the best interests of their constituents by opposing these reforms.

The natural next question to ask is whether there is a way to achieve the efficiency gains and gains in aggregate employment that are associated with pro-market labor reforms in a way that is more palatable to incumbent employees concerned about the losses of their jobs? One may consider an unemployment-insurance scheme as a way to offer protection to those who are dismissed from their firms in a way that would not reduce the efficiency of the labor market. In fact, as pointed out by Acemoglu and Shimer (2000), unemployment insurance may provide social protection in an efficiency-enhancing way since unemployment insurance allows unemployed workers to search longer and therefore find jobs for which they are particularly well suited.

Indeed Chile, the country that is ranked as having the most flexible labor regulations among the 14 countries studied in this paper, has adopted a successful unemployment-insurance system. In this sense one can say that Chile has obtained labor-market flexibility while securing protection for their workers. Chile has chosen a way to offer social protection to its workers in a way that does not hinder the efficient working of the labor market.

This paper reinforces a literature that offers considerable empirical support to the hypothesis that pro-market labor reforms increase aggregate employment. This paper also, however, demonstrates in a clear way that these labor reforms will likely displace some workers despite the aggregate gains. A reform package that takes into account the welfare of these displaced workers may have a better chance of being approved.

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Figure 1: Labor Regulations and Job Rotation

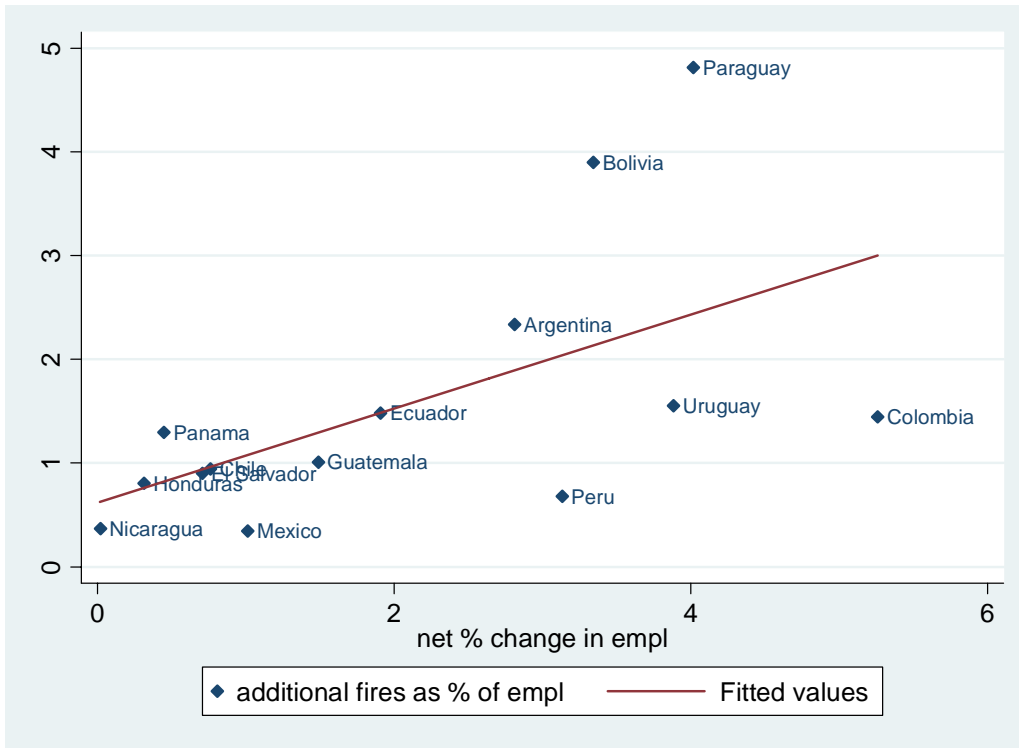


Figure 2: The Effect of Labor Regulations on Aggregate Employment and the Employment Rigidity Index from the Economic Freedom of the World Report

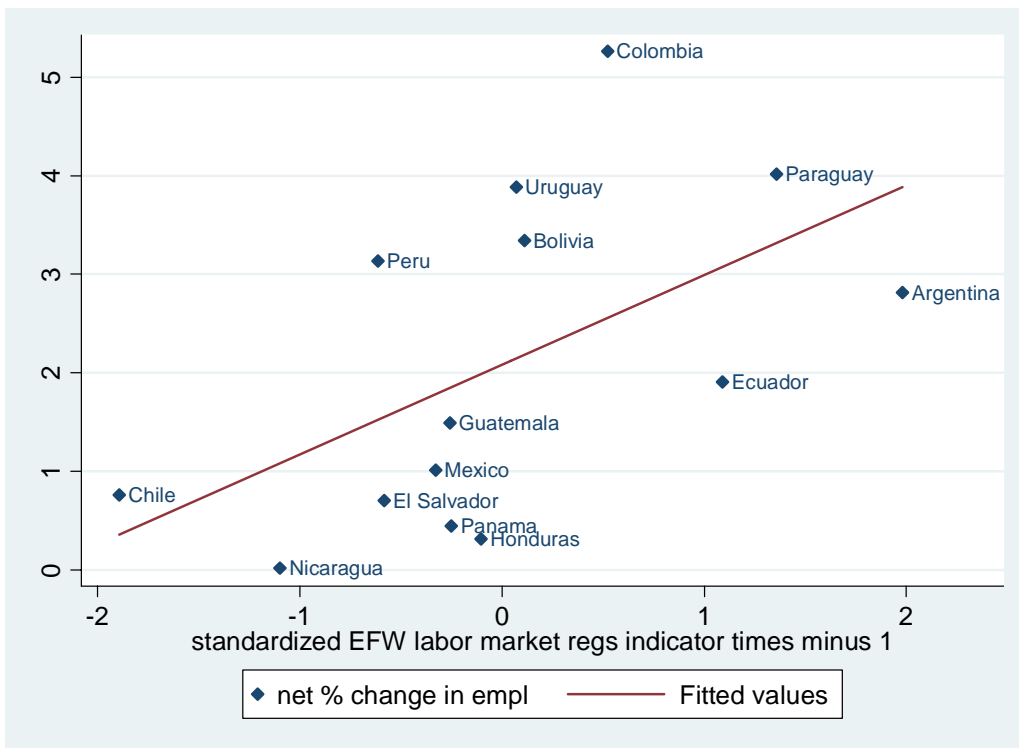


Figure 3: The Effect of Labor Regulations on Job Creation and the Employment Rigidity Index from the Economic Freedom of the World Report

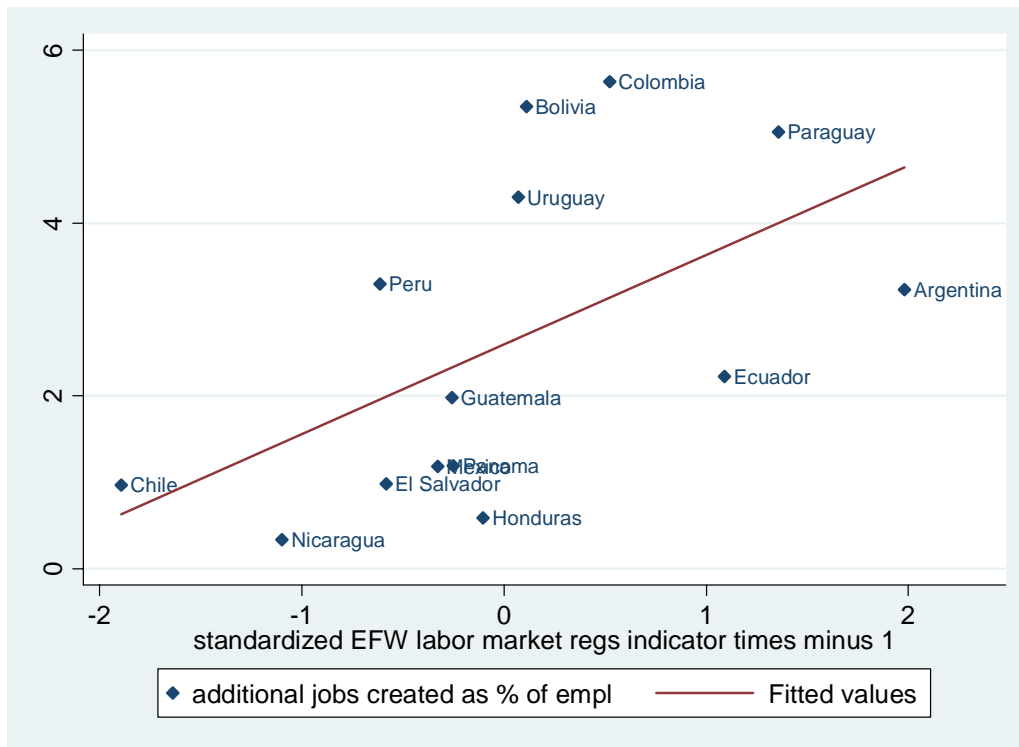


Figure 4: The Effect of Labor Regulations on Job Destruction and the Employment Rigidity Index from the Economic Freedom of the World Report

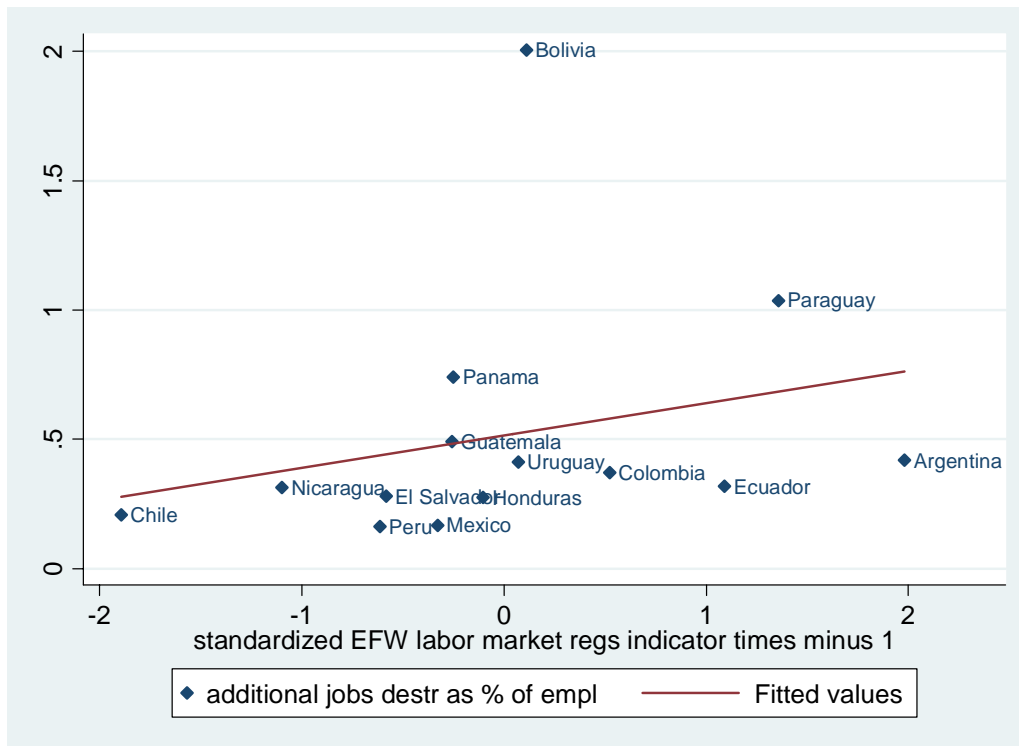




Figure 5: The Effect of Labor Regulations on Hires and the Employment Rigidity Index from the Economic Freedom of the World Report

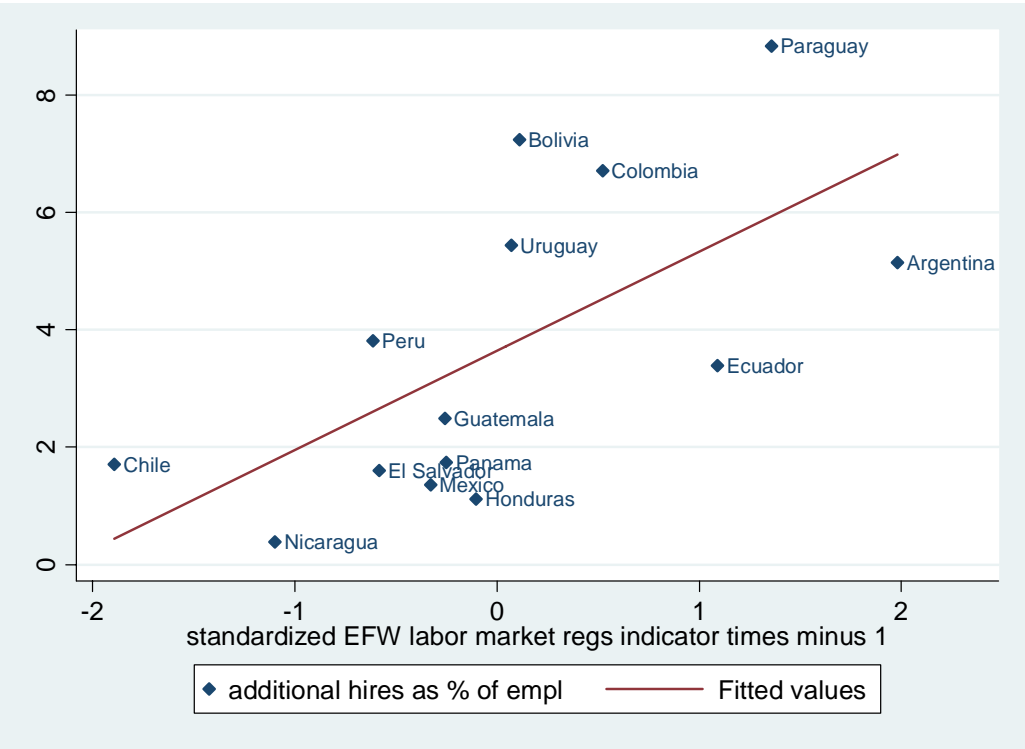
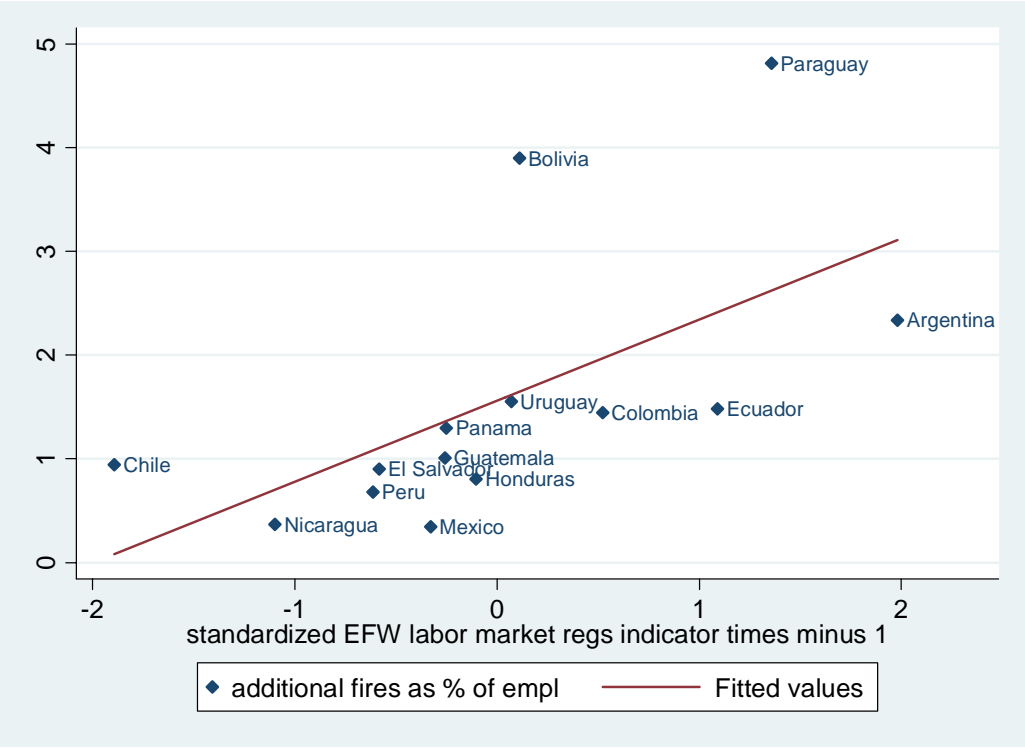


Figure 6: The Effect of Labor Regulations on Fires and the Employment Rigidity Index from the Economic Freedom of the World Report



**Table 1: Descriptive Statistics: Firm-Level Data**

	obs	mean empl	hiring & firing not affected	only hiring affected	only firing affected	hiring & firing affected	in manuf	% small empl<20	% medium 10<=empl<100	% large empl>=100
Argentina	1,059	110.5	47.0%	15.1%	5.5%	32.4%	55.9%	50.0%	37.2%	12.8%
Bolivia	609	32.1	79.1%	6.0%	4.1%	10.8%	26.5%	56.4%	35.2%	8.4%
Chile	1,013	119.5	71.3%	6.0%	4.3%	18.4%	19.6%	46.7%	31.8%	21.5%
Colombia	1,000	27.7	85.8%	8.8%	1.0%	4.4%	37.1%	64.8%	31.3%	3.9%
Ecuador	654	44.9	86.3%	4.2%	2.0%	7.5%	39.0%	55.3%	31.0%	13.7%
El Salvador	692	39.5	94.5%	1.1%	2.3%	2.1%	12.4%	64.0%	26.1%	10.0%
Guatemala	522	31.2	88.6%	6.4%	2.1%	2.9%	26.9%	69.6%	25.2%	5.1%
Honduras	436	77.0	88.8%	3.5%	1.8%	5.9%	18.9%	55.2%	23.7%	21.2%
Mexico	1,478	29.8	93.3%	4.5%	1.1%	1.1%	12.6%	72.6%	20.3%	7.1%
Nicaragua	476	29.8	97.2%	1.2%	1.1%	0.5%	26.0%	64.1%	29.8%	6.2%
Panama	602	49.1	84.4%	5.0%	3.8%	6.8%	23.3%	60.8%	28.6%	10.6%
Paraguay	605	37.6	73.8%	8.6%	4.6%	13.1%	57.6%	54.4%	35.9%	9.6%
Peru	632	86.1	83.6%	6.5%	1.2%	8.7%	29.6%	37.3%	45.4%	17.3%
Uruguay	618	29.2	76.1%	14.0%	1.4%	8.6%	57.2%	68.2%	27.2%	4.6%
all 14 countries	10,396	53.2	82.1%	6.5%	2.6%	8.8%	31.6%	58.5%	30.6%	10.9%

Notes: Calculations based on data from Enterprise Surveys. Weights are used in the calculation of country-level statistics to approximate the values that would be obtained by using a census of firms. The statistics for all 14 countries are simple averages of the 14 country-level observations, giving each country equal weight. See text for details.



Table 3: Coefficients from job rotation regressions  
(independent variable is always % change in total empl if regs eliminated)

	All firms		Small Firms	
	% additional fires if regs eliminated	% jobs destroyed if regs eliminated	% additional fires if regs eliminated	% jobs destroyed if regs eliminated
coef	0.45 ** (0.19)	0.10 (0.08)	0.20 (0.16)	-0.07 (0.06)
R <sup>2</sup>	0.33	0.11		
	Manufacturing		Medium-Sized Firms	
	% additional fires if regs eliminated	% jobs destroyed if regs eliminated	% additional fires if regs eliminated	% jobs destroyed if regs eliminated
coef	0.39 * (0.21)	0.00 (0.06)	0.37 ** (0.16)	0.05 (0.05)
R <sup>2</sup>	0.21	0.00	0.31	0.37
	Non-Manufacturing		Large Firms	
	% additional fires if regs eliminated	% jobs destroyed if regs eliminated	% additional fires if regs eliminated	% jobs destroyed if regs eliminated
coef	0.32 * (0.18)	0.09 (0.10)	0.13 (0.21)	0.02 (0.11)
R <sup>2</sup>	0.21	0.059	0.03	0.00

Notes: Standard errors in parentheses. Statistics based on 14 Latin-American countries for which Enterprise Surveys exist. Each country is given equal weight in the regressions. Firm-level weights are used in the calculation of country-level statistics to approximate the values that would be obtained by using all firms (or all firms in the category). See text for details including the formulas for each statistic. We use the notation of \*\* to denote significance at the 0.05 level. Similarly \* denotes significance at the 0.10 level.

Table 4: Job Rotation and Rigidity of Labor Regulations

OLS Regressions					
	% change in total empl	Dependent Variable			
		additional jobs created as % of empl	additional jobs destroyed as % of empl	additional hires as % of empl	additional fires as % of empl
econ freedom index for 2005	0.91 ** (0.40)	1.04 ** (0.45)	0.13 (0.14)	1.69 ** (0.58)	0.78 ** (0.30)
R <sup>2</sup>	0.30	0.31	0.07	0.41	0.36
Spearman Rank Correlations					
	% change in total empl	Dependent Variable			
		additional jobs created as % of empl	additional jobs destroyed as % of empl	additional hires as % of empl	additional fires as % of empl
rho value for econ freedom index for 2005	0.60 **	0.66 **	0.64 **	0.69 ***	0.81 ***

Notes: Standard errors in parentheses for OLS models. The dependent variables are calculated from the Enterprise Surveys data as described in the text. These dependent variables could be calculated for 14 Latin American countries. Each country receives equal weight in the regressions. The data from the Economic Freedom index correspond to the year 2005 and come from the 2007 Annual Report titled "Economic Freedom of the World" by the Fraser Institute. The data set was downloaded on June 3, 2008 and was last updated on September 14, 2007. The indicators were standardized and multiplied by minus one so that a larger value implies a more rigid labor market. We use the notation of \*\*\* to denote significance at the 0.01 level. Similarly \*\* denotes significance at the 0.05 level and \* denotes significance at the 0.10 level.

Table 5: Firm-level regressions of job and worker flows

	Dep Var: % change in total employment			
econ freedom index for 2005	0.91 *** (0.28)		0.89 *** (0.24)	0.02 (0.26)
temporary workers as % of all workers (econ freedom index) *		0.13 *** (0.04)	0.13 *** (0.04)	0.14 *** (0.03)
(temps as % of all workers)				0.09 ** (0.03)
R <sup>2</sup>	0.01	0.03	0.03	0.04
	Dep Var: additional jobs created as % of empl			
econ freedom index for 2005	1.04 *** (0.33)		1.01 *** (0.29)	0.19 (0.19)
temporary workers as % of all workers (econ freedom index) *		0.13 *** (0.04)	0.13 *** (0.04)	0.13 *** (0.03)
(temps as % of all workers)				0.08 (0.03)
R <sup>2</sup>	0.01	0.04	0.04	0.05
	Dep Var: additional jobs destroyed as % of empl			
econ freedom index for 2005	0.13 (0.08)		0.13 (0.08)	0.17 * (0.10)
temporary workers as % of all workers (econ freedom index) *		0.00 (0.00)	-0.004 (0.002)	-0.004 ** (0.002)
(temps as % of all workers)				-0.005 ** (0.002)
R <sup>2</sup>	0.00	0.00	0.00	0.00
	Dep Var: additional hires as % of empl			
econ freedom index for 2005	1.69 *** (0.54)		1.66 *** (0.49)	0.80 *** (0.23)
temporary workers as % of all workers (econ freedom index) *		0.15 *** (0.04)	0.15 *** (0.04)	0.15 *** (0.03)
(temps as % of all workers)				0.08 ** (0.04)
R <sup>2</sup>	0.02	0.03	0.05	0.06
	Dependent Variable: additional fires as % of empl			
econ freedom index for 2005	0.78 ** (0.31)		0.78 ** (0.31)	0.78 *** (0.24)
temporary workers as % of all workers (econ freedom index) *		0.02 ** (0.01)	0.02 ** (0.01)	0.02 ** (0.01)
(temps as % of all workers)				0.00 (0.01)
R <sup>2</sup>	0.01	0.00	0.01	0.01

Notes: N = 10,396. Standard errors in parentheses. Weights are set such that each country receives an equal weight in each regression. Within each country, weights are set to approximate an employment-weighted regression using a census of firms. The data from the Economic Freedom index correspond to the year 2005 and come from the 2007 Annual Report titled "Economic Freedom of the World" by the Fraser Institute. The data set was downloaded on June 3, 2008 and was last updated on September 14, 2007. The indicators were standardized and multiplied by minus one so that a larger value implies a more rigid labor market. We use the notation of \*\*\* to denote significance at the 0.01 level. Similarly \*\* denotes significance at the 0.05 level and \* denotes significance at the 0.10 level.

Table 6: Job Rotation and Rigidity of Labor Regulations:  
(firms with temporary workers are excluded)

OLS Regressions					
	Dependent Variable				
	% change in total empl	additional jobs created as % of empl	additional jobs destroyed as % of empl	additional hires as % of empl	additional fires as % of empl
econ freedom index for 2005	0.67 (0.53)	0.91 ** (0.35)	0.24 (0.33)	1.51 *** (0.45)	0.83 ** (0.35)
R <sup>2</sup>	0.12	0.36	0.04	0.48	0.32
Spearman Rank Correlations					
	Dependent Variable				
	% change in total empl	additional jobs created as % of empl	additional jobs destroyed as % of empl	additional hires as % of empl	additional fires as % of empl
rho value for econ freedom index for 2005	0.38	0.55 **	0.65 **	0.60 **	0.73 ***

Notes: Standard errors in parentheses for OLS models. The dependent variables are calculated from the Enterprise Surveys data as described in the text. These dependent variables could be calculated for 14 Latin American countries. Each country receives equal weight in the regressions. The data from the Economic Freedom index correspond to the year 2005 and come from the 2007 Annual Report titled "Economic Freedom of the World" by the Fraser Institute. The data set was downloaded on June 3, 2008 and was last updated on September 14, 2007. The indicators were standardized and multiplied by minus one so that a larger value implies a more rigid labor market. We use the notation of \*\*\* to denote significance at the 0.01 level. Similarly \*\* denotes significance at the 0.05 level and \* denotes significance at the 0.10 level.